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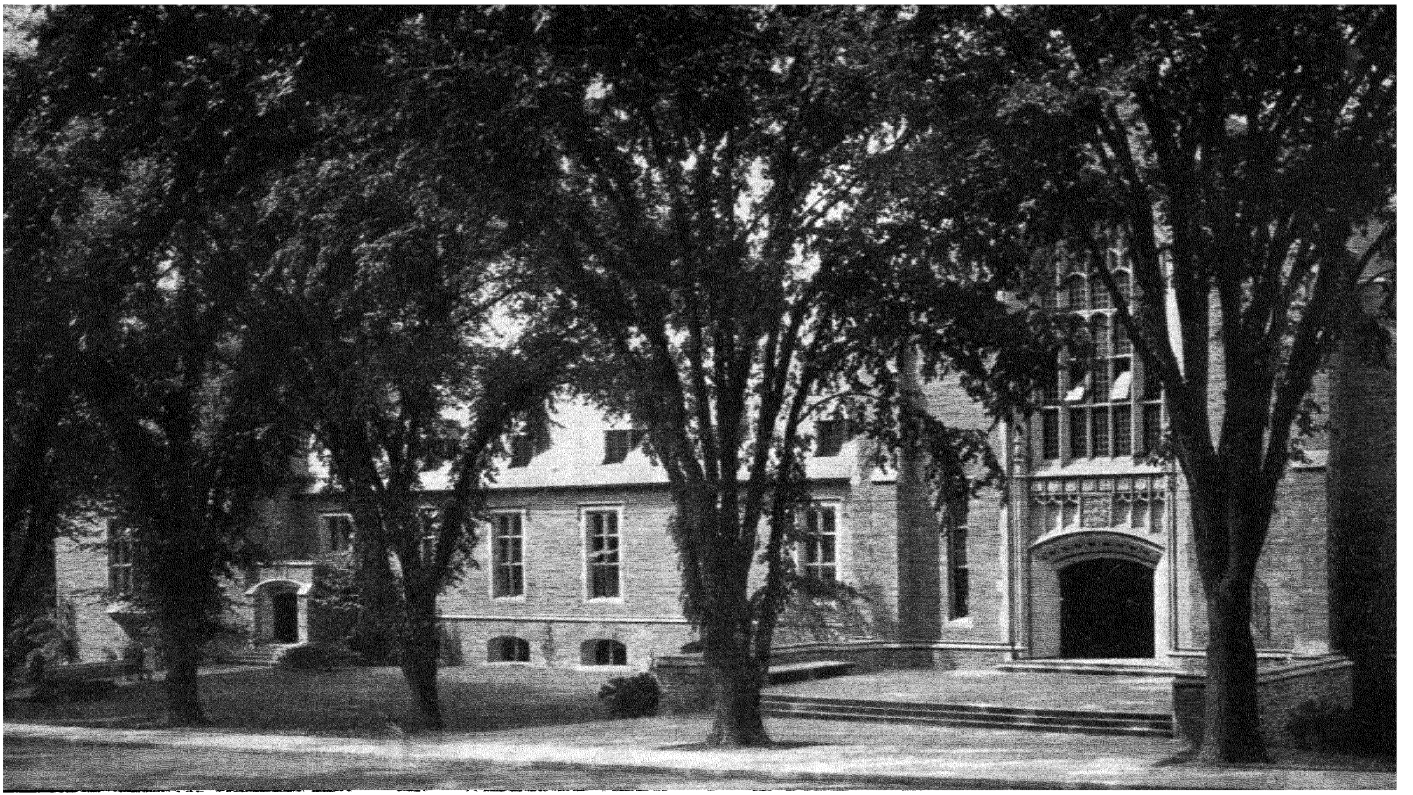
PROCEEDINGS

OF THE

SECOND INTERNATIONAL CONFERENCE

OF

AGRICULTURAL ECONOMISTS



Willard Straight Hall, Cornell University

PROCEEDINGS

OF THE

SECOND INTERNATIONAL CONFERENCE

OF

AGRICULTURAL ECONOMISTS

HELD AT

CORNELL UNIVERSITY,

ITHACA, NEW YORK,

AUGUST 18 TO AUGUST 29, 1930

The Collegiate Press

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FOREWORD

THE International Conference of Agricultural Economists held at Dartington Hall, Totnes, Devon, England, in 1929, voted to hold a second Conference in 1930, and to accept the invitation of Cornell University to meet at that institution. The following committee was appointed to make the necessary arrangements:

L. K. Elmhirst, Dartington Hall, Totnes, Devon, England.

J. R. Currie, Dartington Hall, Totnes, Devon, England.

A. Bridges, Agricultural Economics Research Institute, University of Oxford, Oxford, England.

J. P. Maxton, Agricultural Economics Research Institute, University of Oxford, Oxford, England.

G. F. Warren, Cornell University, Ithaca, New York.

C. E. Ladd, Cornell University, Ithaca, New York.

During the second Conference a committee was elected to recommend plans for holding future Conferences. The report of the chairman of this committee, Professor A. W. Ashby, University College of Wales, Aberystwyth, Wales, together with the constitution, a list of the officers, and provisions for the temporary organization of The International Conference of Agricultural Economists is to be found at the back of this volume.

The second Conference appointed F. F. Hill of Cornell University to act as secretary and to assemble the papers for the permanent record. He prepared this volume for printing. Printer's proof was not sent to the various authors, since to do so would have greatly delayed publication. It is hoped that no serious errors have been made.

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PROCEEDINGS

OF THE

SECOND INTERNATIONAL CONFERENCE

OF

AGRICULTURAL ECONOMISTS

OPENING ADDRESS

G. F. WARREN
CORNELL UNIVERSITY, ITHACA, NEW YORK

THE committee has given me the enjoyable task of calling the Conference to order.

Probably the first thing which I should say is to state how we come to be here. Last year, on the invitation of Mr. and Mrs. Elmhirst, an International Conference of Agricultural Economists was held at Dartington Hall, Totnes, Devon, England. This Conference enjoyed fine hospitality, fine weather, and a quiet country estate—an ideal place for a conference. Each day, the members of the Conference climbed the war stairway of an old castle to cross swords in discussion. Not having settled all the economic problems of agriculture, the persons present voted to hold another conference. A committee consisting of Mr. Elmhirst and Mr. Currie of Dartington Hall; Mr. Maxton and Mr. Bridges of Oxford; and Mr. Ladd and myself of Cornell, was asked to make arrangements. The Conference also voted to accept the invitation of Cornell University to meet in Ithaca this year. We are, therefore, here on the invitation of the President of the University.

Since the committee could not hold any committee meetings, it had to make all arrangements by correspondence. If you find any arrangements which are not satisfactory to you, it will probably be due to the fact that the American members were unable to obtain the advice of the persons from England on this particular topic.

We cannot hope to duplicate the sessions of last year which were held far from cities, among the trees and flowers of an English estate, but we hope that the friendships made there may be renewed and extended, that the arguments there begun may be continued, and that the intellectual stimulus will be a spur to more work and clearer analysis.

We are dealing with a new subject, or set of subjects, in which progress has been extremely rapid in recent years. Intellectual contacts were broken by the war. It is important, therefore, that the workers in this field meet each other so that we may know the other man's work and know what manner of man he is.

Agriculture is going through a revolution comparable to the industrial revolution. Farming that follows tradition was never

before so out of adjustment with what is needed. National policies respecting agriculture which are based on past experiences were never before so out of line with the needs of the times. Research work must be pushed actively. National and international conferences are needed for the presentation of results of research, for the guidance of future research, and for the stimulus to renewed activity which comes from discussion.

President Farrand has taken a keen interest in this Conference. Unfortunately, he is away this summer, but Dean Mann is here to represent the University and the College of Agriculture.

ADDRESSES OF WELCOME

A. R. MANN
DEAN OF THE NEW YORK STATE COLLEGES OF AGRICULTURE AND HOME ECONOMICS, AND DIRECTOR OF EXPERIMENT STATIONS, CORNELL UNIVERSITY, ITHACA, NEW YORK

THE American states have been especially favored in recent years by the number and the character of international scientific gatherings held within their borders; and we are happy that others are in prospect. By reason of our physical remoteness from many of the world's greatest centers of learning, our participation in international scientific meetings has never been in proportion to our interest in them or our desire to share in their benefits. Our anticipation of this present event has therefore assumed large proportions.

In any field of learning, contact among the workers in the same and cognate fields is an important aid to constructive progress and an incentive to superior achievement; and it is also conducive to that proper humility of spirit which characterizes the honest seeker after truth. Correspondence and the interchange of publications between individuals—never sufficiently well done—must always be the main dependence; but the association is vastly enriched when personal acquaintance has entered. This, perhaps, is the most valuable product of such international gatherings as this.

It is peculiarly appropriate that agriculture, which is a meeting ground of all the sciences, and is the basic industry of every nation, should be made the occasion for frequent and varied assemblage of the leaders in progress from many lands. In much of the civilized world the solution of the more apparent and the relatively superficial problems of agriculture has been accomplished, and the time is here when the more fundamental and the more obscure and intricate problems have become the main lines of attack, calling for scientific preparation, application, and collaboration of the highest order. Here, if anywhere, progress will be accelerated by an increasingly close and intimate fellowship among men of science and the integration of minds engaged in related fields of inquiry.

Possibly in no other field of agriculture is the need for comprehensive, international acquaintance and collaboration more likely to prove fruitful than in the fields of agricultural economics, much

of the exploration in which requires accurate knowledge of general and special economic materials and processes on a world basis. The urgent need in many nations for tested knowledge to guide them in meeting the peculiarly difficult economic problems of agriculture at this moment is of itself ample justification for the present gathering. Furthermore, the development of this segment of economics in the several countries reveals so much variation in point of emphasis, in scope, and in method, that opportunity for discussion and exchange may be expected to contribute much to clarification of objectives, improvements in methodology, and coordination of thought.

While men have spoken and written concerning the broad economic problems and relations of agriculture from the earliest times, we can scarcely look beyond the middle of the past century for the inception of formalized and particularized study of the economic forces which directly affect the welfare of agriculture. Rural economy, as a specialized phase of political and industrial economy, has yet attained but modest stature among the fields of knowledge. The progress of the past two decades and the resources in funds and personnel now being brought to bear on this broad field, are indicative of a prospective growth and of an academic and a public awakening of extraordinary proportions. This youth possesses vitality, vigor, and vision which forecast a maturity of exceptional interest and service to the peoples, and especially to the farmers, of the nations.

In common with many fields of knowledge, much of the early work concerned itself with the theory or the philosophy of the rural economy, and deductive reasoning from general economic phenomena was the chief instrument of interpretation. To this has now been added the inductive contributions of vast undertakings of statistical analyses of concrete economic situations in agriculture. An essential to the progressive development of a knowledge of the problems of agriculture is the careful assemblage and critical interpretation of vast bodies of data from original sources and from units of small size, such as the farmer, the merchant, the supply house, the tax-collector, the markets, the carriers, the farm laborer, the consumer, and others. The statistician is providing a vastly enriched medium out of which more reliable generalizations, new statements of economic theory, and new public policies in relation to agriculture may come. But the correlation of these statistical studies for the purpose of discovering the

principles which they may be expected to reveal, and must reveal if they are to contribute to the creation of a dependable body of knowledge as a basis for guidance in action, and are to add to the sum of tested and accepted economic thought, should not lag far behind the statistical analyses. The new generalizations and the revised economic principles are needed currently in the solution of present-day problems; and they are essential if a science of rural economy is to come into being. Society needs as an instrument of progress a scientific approach to the economics of agriculture; and governments everywhere, as they venture into new areas of trial and experience in the application of economic theories in relation to agriculture, are deplorably in need of what a science of agricultural economics should become competent to supply. Statescraft in relation to agriculture is now undergoing its greatest strain, in part, at least, because the economics of agriculture are yet so imperfectly understood. This present conference, with its comprehensive interchange of the latest advances among economists of many nations, and its association of the theoretical economist, the statistician, and all gradations in between is most timely.

In welcoming this body to Cornell University it may be permissible as a matter of record to tell of its origin. In the summer of 1928, three professors associated with the work in agricultural economics of this institution were in England at the time of the meeting of the Agricultural Economic Society of Great Britain, and were extended the fortunate privilege of listening to the Society's discussions. As a result of the interest aroused in the exchange of ideas between countries, a small informal group met to consider the desirability of holding an international conference of agricultural economists. On the invitation of Mr. L. K. Elmhirst, a graduate of Cambridge and Cornell Universities, such a conference was held during the summer of 1929 at his home, Dartington Hall, at Totnes, in Devonshire. This conference created a committee consisting of representatives of Dartington Hall, of the Agricultural Economics Research Institute of Oxford University, and of Cornell University, to arrange for this present conference. To them are we indebted.

Cornell University and the New York State College of Agriculture in connection therewith, are sensible of the high privilege which has been accorded them in the selection of this place for the second international conference. Honored by the presence for these two weeks of so great a body of our fellow workers from

our sister states of this country, and doubly honored by the great number of distinguished leaders in agricultural economics from other nations, whose presence makes this conference particularly notable, we place every facility of this institution at your command. On behalf of my colleagues I cordially greet you and bid you hearty welcome.

H. C. M. CASE
UNIVERSITY OF ILLINOIS, URBANA, ILLINOIS, PRESIDENT OF THE AMERICAN FARM ECONOMICS ASSOCIATION

IT HAS BEEN the experience of all of us from the United States to meet fine personalities among those who have visited us from time to time from foreign countries. It would be easy at times to believe that a part of the impressions we get from these visitors is due to a gentleman's effort to make himself agreeable in a foreign country. However, I shall never have that feeling. Several members of the American Farm Economics Association who had the opportunity of attending the two-weeks conference a year ago, which conference was attended by men working in the field of farm economics from a number of different countries, found genuine personalities. We found that our agricultural problems have much in common and that we could discuss them in amiable disagreement as well as in agreement, and as soon as the conference broke up we could forget our serious thoughts in that wonderful game known as cricket.

It is highly significant that this conference and its predecessor held in England a year ago have come into being. They give recognition to the fact that the problems in the field of farm economics have much in common the world over, and that the best means of progress between nations, as well as within a nation, is to come together to compare opinions and to get a common view of our problems. It carries a pertinent suggestion of the best means of meeting other and more serious international problems. It is indeed a pleasure to me, in the name of the American Farm Economics Association, to welcome our foreign visitors to the United States for a conference devoted to farm economic problems. The only regret I have is that this conference cannot be held at the time of the annual meeting of the American Farm Economics Association in order that our visitors might have the opportunity of meeting a larger number of our members and that

more of the members of the American Farm Economics Association might have an opportunity of listening to and enjoying the good thoughts which I know are going to be brought to us from across the water. I do not know how to express my wishes any more forcefully than to say that I hope this conference will prove as stimulating and as enjoyable as the one held in England last year. I hope members of our association may be able to leave with you the feeling of welcome, serious purpose, practical thinking, and good sportsmanship when the day's work is done, which stood out in my mind following the conference of a year ago.

Words after all are only a feeble expression of our thoughts and I will not prolong any expression of welcome but say a few words regarding the historical development of the work in farm economics in the United States.

The American Farm Economics Association, representing the united interests of about 1,000 workers in the field of farm economics came into being in January, 1919. The adoption of the name at that time, however, merely signified the closer consolidation of the interests of groups and individuals who had been working in that field for some years.

Interest in this field of work developed at a much earlier date. It is even of interest to glance back and find that the Massachusetts Agricultural College in 1867 offered courses under the following names: "Farm Management by Lectures" and "Bookkeeping and Farm Accounts." This dates back, however, to the days of the old professor of agriculture who taught about everything that was known about agriculture and with emphasis upon farm practice. However, this generation of teachers left an indelible, practical imprint on the agricultural education of the nation. Gradually specialists came along to take over one by one the specialized phases of agriculture.

Although lacking in subject matter as compared with present day teaching, farm management seemed to hold its place in the curricula of agricultural colleges. A discussion of the scope and work of the colleges of agriculture presented in the Cyclopedia of American Agriculture, published in 1912, recognized that the main subjects relating directly to production consisted of the "Crop Growing Group," the "Animal Growing Group," and "Farm Management."

At its annual meeting in 1897, the American Economic Asso-

ciation had given some attention to agricultural economics although it is significant that the general topic might be stated as "Is There a Distinct Agricultural Question?"

A more definite recognition of the fields of agricultural economics and farm management found expression in a joint session of the Association for the Advancement of Science and the Society for the Promotion of Agricultural Science in 1903. It seems apparent, however, that a definite effort was made to segregate the fields of agricultural economics and farm management. Such an effort may have been partly due to the fact that those interested in the field of agricultural economics and who also represented the American Economic Association were to a large extent an academic group with their training largely within the field of economics while those interested in farm management were concerned directly with the practical problems of that field and their training had been mainly in the field of agriculture.

As a matter of fact, the American Farm Economics Association may be said to have had its birth as the American Farm Management Association on July 27, 1910. So unobtrusive was its beginning that one not present has little means of acquiring complete information regarding its formation. For some years prior to this date a summer graduate school of agriculture was held, circulating from one agricultural college to another. Men of like interests were in this way drawn together and it was during the graduate school in 1910 that plans were made for the organization of the American Farm Management Association.

The purposes of the Association were indicated in the constitution as follows:

1. To promote the investigation and teaching of farm management.

2. To consider lines of investigation best adapted to the needs of the work of farm management and to suggest to various investigators, plans of correlation and cooperation in the work.

3. To investigate the methods of lecture and laboratory work in farm management and to make suggestions to the members of the Association and to colleges intending to organize courses in farm management.

4. To hold annual meetings at times and places designated by the executive committee.

With the tendency to subdivide the work of the agricultural

colleges, it is not surprising that the early workers in the field tried clearly to differentiate between the work of the various specialists. It is of interest to note that in a paper presented before the American Farm Management Association, entitled "Analysis of the Rural Problem," the division of agricultural subject matter under five headings, was set forth as follows: (1) the technical aspect, "farm practices" or "agriculture;" (2) the business aspect, "farm administration" or "farm management;" (3) the scientific aspect, "agricultural science;" (4) the industrial aspect, "agricultural economics;" (5) the community aspect, "rural sociology."[1]

Likewise, the report of the committee on scope and cleavage attempted clearly to define the field of farm management from that of other closely related subjects. This tendency to designate sharply the field of different agricultural workers no doubt tended to hold apart the field of farm management from the field of agricultural economics. This is reflected again by a statement in Bailey's Encyclopedia of American Agriculture as follows: "The plan of arrangement of the farm involves two sets of questions, those that concern the practical work or administration of the farm itself or farm management; and those that are involved in the relation of the farm to the community, or rural economy."

While the work of the American Farm Management Association went forward steadily from its organization in 1910, a second group, which may be termed Agricultural Economists, was likewise developing.

In December, 1910, a group of men interested in agricultural economics met with the American Economic Association. The report of this meeting was published by the American Statistical Association.[2] Under the name of the National Conference of Marketing and Farm Credit the group continued to meet regularly for a few years. The work of this group gradually evolved until in 1916 the Association of Agricultural Economists was organized with the following purposes in mind:

1. To unite the interests of agricultural economists.

2. To promote the study of various phases of agricultural economics; to encourage research and the discussion of problems and subjects pertaining to the theory or practical application of the principles of agricultural economics.

[1] K. L. Butterfield was the author of this paper.

[2] American Statistical Association Quarterly Publication, Volume 12, pp. 160-489.

3. To disseminate information relating to the subject of agricultural economics.

4. To collect and disseminate information concerning agrarian legislation; and to analyze, digest, and classify agricultural laws in their economic application.

5. To hold an annual meeting at some place to be designated by the members of the executive committee.

In 1917 several proposals were made for organizing as one group those interested in the then considered two fields of farm management and agricultural economics. After much discussion the American Farm Management Association decided to appoint a committee to meet with a similar committee of the National Association of Agricultural Economists to consider some phases of affiliation. As a result of their work, the American Farm Management Association voted, in January, 1919, to change its name to the American Farm Economics Association and to change its constitution so as to broaden the scope of the work to include what was formerly covered by the National Association of Agricultural Economists. The Association of Agricultural Economists gave up their own organization and joined with the American Farm Economics Association. It may be said, therefore, that January, 1919, marks the consolidation in the United States of the workers interested in the field of economic work related to agriculture. While the interests of the agricultural economic workers represented a rather devious course up to this point, it may be said of the farm management group that they directed their efforts along definite lines. Up to the time of the consolidation, the farm management group held their interest very directly to the field of farm management although their interests were gradually expanded. The program presented in 1913 shows from the subjects and content of papers presented that the topics discussed dealt with farm management work with the single exception of one paper devoted to marketing. This, in general, continued to be true the next few years.

The program of the American Farm Management Association during its early years seems to indicate that national interest centered in teaching and that much research work was directed to quite an extent toward use in the class room. Later the passage of the Smith-Lever Act in 1914 provided federal aid for agricultural extension work, greatly stimulating the work in farm management and making it necessary to give close attention to the use

of farm management information for extension use and of finding the best means of translating the farm management message to the farmers. While a number of experiment stations had been giving considerable attention to farm management research, the Smith-Lever Act stimulated both research and extension activity along these lines and this was reflected in the programs of the Association. The agricultural economists, on the other hand, had interested themselves in a wide variety of subjects with considerable emphasis on agricultural policy.

To the outsider who has not been closely associated with the work of the various agricultural institutions in the country, it might appear from the recent programs of the American Farm Economics Association and the content of its journal, that the interests of the group have given relatively little space to farm management. In justice to the development of the work in the agricultural colleges in recent years as well as the work of the members of the association, it should be recognized that the kaleidoscopic aspects of agriculture following the World War have presented many problems to those interested in the field of agricultural economics. It is only natural that a dynamic organization such as the American Farm Economics Association should give much attention in its annual meetings to the current problems which arise. The annual meeting of such an association may well be looked upon as a clearing house for bringing together material regarding various approaches to the solution of new and important agricultural problems. The many workers in the field are going to have many ideas regarding the methods of solving agricultural ills and of perfecting remedies, which may well have the benefit of group reaction, even though the research programs in the various institutions are still following well-defined methods of procedure. Work in farm management and marketing research, for example, may be expected to be better defined than research work along some newer lines of interest which have recently come to the attention of the Association. The wide interests of the American Farm Economics Association at the present time is well indicated by the content of its journal including topics relating not only to farm management and marketing, but including co-operation, agricultural finance, land economics, transportation, rural sociology, agricultural legislation and applied to all these interests, refined statistical analyses.

As one looks back to the time when the association definitely

broadened and consolidated its interests in a formal way in January, 1919, and became known as the American Farm Economics Association, the growth of interests has been remarkable. At that time it was the writer's privilege to be present at one of the meetings. Even though the attendance at the sessions ranged from thirty to fifty, the discussions carried ideas of considerable moment. Elation was expressed by certain leaders when for the first time one prominent member of the group publicly stated that he had come to the conclusion that farm management and agricultural economics could not exist independently of each other. The happenings at that annual meeting more than at any other were undoubtedly responsible for the development of a strong, harmonious organization.

It is indeed significant that at this international meeting of agricultural economists the attendance probably exceeds in numbers that of the American Farm Economics Association less than twelve years ago. For all we know this meeting may be as important in coordinating the thinking and efforts of agricultural economists throughout the world as was that meeting of the American Farm Economics Association in unifying the thinking of our national group.

RESPONSES TO ADDRESSES OF WELCOME

L. K. ELMHIRST
DARTINGTON HALL, TOTNES, DEVON, ENGLAND

I AM HAPPY to be able, with you, to be the guest of Cornell University here today, in fact to be home again, and from this platform to pay my respects to Dean Mann. Some nine years ago I arrived here as a student, with fifty dollars in pocket, borrowed, and it was Dean Mann who gave me my first introduction to the study of economics by assisting me to find my first job on the campus. The interest that the staff of the Agricultural College showed in an unknown foreign student that day has pursued and supported me ever since and it was through this personal connection, established then, that Dr. Ladd, on Dean Mann's advice, accepted an invitation in 1928 to come and spend part of his sabbatic year on our estate in South Devon instead of taking up an attractive offer from the United States Department of Agriculture.

Through his coming to England and at his suggestion, warmly supported by Mr. Orwin of Oxford and Dr. Warren, our International Conference was held last year at Dartington Hall. Why?

Because fundamentally, agriculture is a business as well as a life, and when a business is as depressed universally as agriculture is depressed today it is only by the thorough study of figures and facts by specialists in all countries that the cure is going to be found.

But agriculture is a world business. Like any other industry it can be rationalized, and it is subject to improvement by cooperative action and cooperative understanding, but being international in character, permanent improvement and real stability can only come through enlarging our field of consciousness internationally, by stepping over our national boundaries, by the constant exchange of facts and figures, and by sharing our difficulties, our failures, and our successes.

It seems to me to be one of the first duties of the agricultural economist to see that the farmer is assured a reasonable standard of living with stability. Only thus can the farmer achieve the end to which we all aspire, a high standard of life, a standard that can be measured in terms of quality and in terms of the rich use of an ample leisure, as well as in terms of "labour income" or "interest on capital".

In the same way, in considering the business of this Conference, may I suggest that we measure its progress not by what we may call "lecture income", but by the quality of relationships we establish through coming to know one another, by the friendships and understandings we build with those in other lands, faced with much the same depression in agriculture and industry as we are.

So, if the papers begin to impede our discussion or to interfere with our chances of getting to know one another, let us call on Mr. Dallas to ring his cow-bell, or on Dr. Pearson to call us out to the game at which he became so proficient last year—the game of cricket.

A. W. ASHBY
UNIVERSITY COLLEGE OF WALES, ABERYSTWYTH, WALES, CHAIRMAN OF THE EXECUTIVE COMMITTEE OF THE AGRICULTURAL ECONOMICS SOCIETY OF GREAT BRITAIN

IT IS A great privilege to respond to the addresses of welcome which we have received from Dean Mann and Professor Case. The privilege is mine, but it is not personal. It is given to me as chairman of committee of the Agricultural Economics Society of Great Britain, and I respond on behalf of all the British members of this conference, most or all of whom are members of our society. But I must warn you that I may not be a representative agricultural economist of Great Britain. My colleagues sometimes describe me as a humanist, sometimes as an idealist; and when they want to indicate the depths of degradation, they call me a rural sociologist. I can only think myself fortunate that they do not describe me as a sentimentalist. However, in our science there are reasons for approaches from many different angles.

Your welcome has been cordial and it has also given evidence of appreciation of the work to be done. It promises for the conference both usefulness and pleasure.

In this conference there will be people of many types. There are certainly optimists and possibly pessimists amongst us. There will be those who obviously aim at constructive work in things large or small. Almost certainly there will be those who appear to be merely destructive critics or cold intellectuals. But if you watch this conference as I have watched some others, I think you will find that individuals change their positions in this list from time to time. All of us want to criticise something; all of us want

to state our positive ideas, and out of criticism, comparison, and definite statement, knowledge begins to appear or avenues to knowledge are shown.

The subjects for this conference cover a very wide field. In the briefest classification there are the subjects of farm management, marketing, prices, state policies, and there may be a little of social philosophy. There is descriptive work and analytical. There are statements on work in progress and statements of more or less dogmatic conclusions. The eighty papers, or thereabouts, which are listed show not only the scope of the work being done, but also the great activity of the workers.

If I might for a moment try to state my views of the great need in a conference such as this, it is that it might sooner or later arrive at the consideration of the great fundamental problems in the economic organization of agriculture. Amongst these I would put in the first place the problems of "subsistence farming". By this I mean the problems created for the agricultural group and for society by that large mass of farmers who are satisfied if their farms yield them subsistence according to the standards to which they have become accustomed. Looking around the world we cannot doubt that a large mass of farmers come under this category. With the commercial organization of agriculture, and the great movements in its products, these farmers constitute a great danger to those others, perhaps a minority, who think of agriculture as the basis of the good life. Those of us who know our history say that the basis of the good life is found only with industrial efficiency, and only with the production of relatively large quantities of the material requirements of civilization. There are many farmers who are satisfied with very low quantities of the material requirements of civilization, and with these we are in competition.

Another problem would be that of the apparent surplus of food products. Whether the surplus is due to under-consumption, lack of effective demand, or to real over-production, I am not prepared to say at this moment. I can best illustrate the situation by quoting the statement made to me a few days ago by a Canadian farmer. "The world has too much food, but we farmers want clothes, china, and furniture."

But I think we need to keep steadily in view the real object of our work, namely, the economical provision of the material

requirements of the good life for agriculturists and for society at large. Agricultural economics is one of the sciences—one of the applied sciences—which should give us the basis of knowledge which will make possible the building of a sound and healthy rural society. The provision of that knowledge is our aim. But we do not forget that rural society is a part of a larger whole with which we are ultimately concerned.

Dean Mann and Professor Case: I thank you again, and I say that I and my British colleagues look forward to a useful and happy time on the campus of Cornell University. It has been mentioned that there will be picnics and games. I may not play cricket and I certainly shall not play baseball, but there will be need at times to get away from these eighty papers. The campus of this University provides nearby opportunities. If I personally find a strain from the conference itself, I may find my way down to the creek and listen to the drop and murmur of the falls for there in times previous I have found rest.

MAX SERING
DEUTSCHES FORSCHUNGSINSTITUT FUR AGRAR- UND SIEDLUNGSWESEN, BERLIN, GERMANY

IN 1883, I was sent to America by my Government and traveled across the country from the Atlantic to the Pacific, studying the development of agriculture and transportation, especially in the West. I saw the building of the Canadian Pacific and the Northern Pacific railways.

Ten years later, I again visited the United States and Canada from the Atlantic to the Pacific, analyzing agriculture, industry, and transportation. On both occasions, I was deeply impressed by the rapid economic, social and political growth of the country and by the way German, English and Scandinavian immigrants were moulded together to build up this great nation of which we are now the guests.

I consider it a very great privilege to return to this country and study the same questions. In these 47 years, I am amazed at the phenomenal changes that have taken place in the life of the American people. To speak only of one of the most important events: during my early visits, agricultural economics was a comparatively uncultivated field. Little research had been carried on;

Boss, Taylor, and Warren had not yet appeared in the picture. I have followed with great satisfaction, the rapid development of agricultural economics started by these men, and successfully taken up by an ever increasing number of younger scientists.

Since my first visit, I have been convinced that the problems of agricultural economics can find a satisfactory solution only by comparing similar work in different countries and thereby making possible international studies of these problems.

In this country, the true scientific spirit exists which is indispensable for the fruitful discussion of the serious world-wide agricultural depression. It would be impossible to choose a more favorable place for an International Conference of Agricultural Economists, than Cornell University, an indispensable center to all economists working in this field.

The Germans, like all others, have the desire to contribute all we can to make this conference a success, but we are convinced that we will take away more than we contribute.

J. E. LATTIMER
MACDONALD COLLEGE, STE. ANNE DE BELLEVUE, QUEBEC, CANADA
PRESIDENT OF THE CANADIAN SOCIETY OF AGRICULTURAL ECONOMICS

IT IS indeed a pleasure to express appreciation of the opportunity to attend this International Conference. I am sure that all those from Canada share the opinion that we have many reasons for this gratitude. Economists of Canada are by no means reticent in regard to the place occupied by that country in international trade. Those economists working with the problems of agriculture are especially interested in international affairs as at present the export of farm products plays the leading rôle in that trade.

Another reason why we are grateful for the opportunity this particular conference affords is that the small, though increasing, number of economists working in this field in Canada have received a portion of their training in this country, many at this institution. It is a pleasure to renew acquaintance with those from whom we have received guidance and inspiration. And in response to the hearty welcome of Dean Mann and Professor Case, we must say that it is a great privilege to attend and participate in a conference which reflects so much credit on those who conceived the idea and have brought it to the present stage of fruition.

K. T. JUTILA
HELSINKI UNIVERSITY, HELSINKI, FINLAND

FOUR years ago, when Dean Mann was traveling in Europe in the interests of the International Education Board, he visited Finland and arranged a number of fellowships for Finnish agricultural scientists. Four of us came to the United States where we had an opportunity of becoming acquainted with the scientific work in agriculture being carried on at American universities and experiment stations. My own work was done at Cornell University under the guidance of Dr. Warren.

An indirect result of my stay at Cornell was an invitation to participate in the first International Conference of Agricultural Economists, held last summer in "glorious" Devon at glorious Dartington Hall, the home of Mr. and Mrs. Leonard K. Elmhirst.

Before coming to Cornell for the present conference, about twenty of us had the privilege of making a three-weeks trip through the Middle West under the guidance of Professor Case The trip was most interesting and instructive and we are grateful to Professor Case and to the persons and organizations who cooperated with him to make the trip the undoubted success which it was.

I have the great honor of bringing the greetings of all the Scandinavian countries, and especially Finland, to the second International Conference of Agricultural Economists. I am glad that the Conference is meeting here at Cornell. A visit to Cornell University permits of becoming acquainted with thorough and successful work in all of the agricultural sciences. More than that, it means making the acquaintance of the most cordial and hospitable of people.

On behalf of the Scandinavian countries, I wish to thank you for your kind invitation to attend this international gathering at Cornell.

CAUSES OF THE INTERNATIONAL DEPRESSION OF AGRICULTURE

MAX SERING
DEUTSCHES FORSCHUNGSINSTITUT FÜR AGRAR- UND SIEDLUNGSWESEN, BERLIN, GERMANY

SINCE THE world has been spanned by railroads and steamship lines, prices for the staple products of agriculture are set by the exchange between the industrial countries of western and middle Europe and the extended and more sparsely populated countries which have an abundance of the produce of the soil. Into this limited European area, not larger than a quarter of the United States, 230 million people are crowded together. It is a concentration comparable to the city in the midst of the isolated state of Johann Heinrich v. Thunen. Within these inner circles, prices for agricultural products attain their highest level, only to decline as the outskirts of European settlement are approached either in the west or in the east. A general and similar decline exists for agricultural soil, private and public charges on the land, supply of labour and, disregarding abnormalities since the peace of Versailles, in the supply of capital. Consequently there is a difference in the degree of intensity with which agricultural production is carried on as well as in the costs of producing a bushel of wheat or a pound of meat.

Over a long period of time, agricultural prices tended, according to the law of diminishing returns, to run ahead of industrial prices, or at least to keep pace with them (England 1850-1875). Since the establishment of world communication, two periods of agricultural price depressions have appeared which opened the price scissors in the opposite direction, disrupting the equilibrium between different agricultural areas and between city and country and endangering the economic existence of large groups of farmers

THE AGRICULTURAL DEPRESSION OF 1875-95

The first great price crisis lasted from 1875 till the end of the 19th century; the second began in 1920 and still holds us in its grip. The first one restricted itself mainly to grain production and was caused by the greatest colonisation movement of all time—the taking into possession by the white man of the larger part of the temperate zone. In this the United States led.

I can safely assume that the particulars of this movement are known to everyone present Nevertheless, it does not appear superfluous to investigate the final causes of that depression. I do not agree with the views expressed by Faulkner and Studensky, when they attempted to find the basic reason for the critical price decline in the mechanisation of American agriculture, and the splendid development of transportation facilities. The pioneering inventions which transferred human labour to the work machine and the draught animal had already been introduced and tried out in the eastern United States, England and the progressive parts of continental Europe at the time when the great tide of westward migration took possession of the prairies in order to change them into wheat fields. These settlers were equipped with the multi-shared plough, the harvesting, threshing and seeding machines, the cornplanter and cultivator. The only important improvement which took place after 1870 was the change from the harvester to the self-binder, which was shortly introduced also into the older agricultural regions. It must be admitted that the advantages of mechanised agriculture were greater for the extensive one-crop system of grain growing than for the more intensive systems of mixed farming.

During the last thirty years of the 19th century, the costs of transporting a bushel of wheat from the most distant North American new-lands to European ports were lowered by about 40 cents per bushel. This lowering of transport charges benefited in a large measure the European consumer, because the producers were crowding each other on the market.

Had the lowering of the costs of producing and transporting wheat in the Far West, been the deciding cause for the crisis, the crisis would have been restricted to agriculture in the inner and middle circles. But it was not long before it spread also to the exporting regions. The rôle which farm machinery and transportation facilities played in the world economy cannot be understood by a consideration which sees things under static conditions, and overlooks the highly dynamic nature of economy in the colonial period. Mechanisation of agriculture and improved transportation facilities were strong instruments for accelerating the expansion of the cultivated area. But the basic cause of this movement was non-economic in character.

The Homestead Act of 1862 brought happy tidings. Free land

would be distributed; free land which would permit the settler to support himself and his family with the assistance of a horse-team and machinery. This attracted many millions from the northern European countries, chiefly Germans and Scandinavians, into the western prairie-regions. Imbued with the ideal of true freedom, these immigrants joined the even larger number of consanguineous settlers coming from the eastern states. These people laid the agricultural foundation for a democratic state which developed, in the course of a few decades, into the mightiest nation in the world.

The grain competition was a result of this world historic development. The overwhelming momentum which this westward movement gathered was blind to any consideration of market requirements. That is the reason why the spectre of agricultural competition so suddenly appeared to the frightened agriculturalists of western Europe. But behind this spectre one sensed the strong spiritual and moral forces which were liberated by the land policy of the United States. It belongs to one of my most cherished memories when I think of the opportunity I had 47 and 37 years ago, to witness with my own eyes this impressive spectacle of human creative energy at work In my reports I was able to point out that not only were natural advantages the cause of the great strides made in the development, but that it was also a question of individual and political achievements. I also voiced the opinion that thanks to these qualities a short period of artificial protection could safely give way to a situation in which the exertion of the nation would make it able to hold its own in free competition. I could console my countrymen with the assurance that since physical labour in America had, for the first time since the existence of Christian civilization, attained such an honoured place in the esteem of society, the farmer's high standard of living would prevent the prices from reaching too low a level. When the over rapid expansion in production brought about a price collapse in the first half of the eighties we noticed a slowing up of the colonisation movement and a consequent standstill in the process of taking new land under cultivation. The crisis would have been warded off at this time, had not paper currency manipulations, burdens of taxation and usury which rested upon the Russian peasant and the Italian tenant farmer in the Argentines permitted the traders to obtain wheat under conditions which

brought the prices down to their lowest point in the course of the nineties (in England 40 per cent of the average price of 1850-1875).

This crisis came to an end with the 19th century, at the time when the free lands, in the better parts of the United States, had been settled and the United States entered the period of transition from an agricultural to an industrial country of first magnitude.

The progress of colonisation in Canada, Australia, and the Argentine, was much slower. None of these countries offered to willing but poor settlers the same natural and social opportunities to gain independence and prosperity as had been done by the United States. On this account, agricultural prices again tended in the same direction from 1895 to 1914, as was the case previous to 1875. Agricultural prices rose more rapidly than industrial prices. The price scissors closed in order to open again in favour of the farmers. Grain growing, even in the inner zones, again became profitable.

There was one advantage the farmer had during the entire period of the crisis, namely that the development in the new lands was accompanied by an equal development of industry not only in the eastern American states, but also in middle and western Europe. Such a development was furthered by the precept, "Right of way to the most efficient", adhered to in internal as well as in foreign policies. For the protection of special national interests no sharper methods were employed than protective tariffs, which, although correcting free price movements were yet unable to interfere with the purchasing power of the nations participating in world trade Not only was the lack of adequate transportation facilities responsible for the prices of meat and other high-grade foodstuffs remaining at a high level, but the strengthened purchasing power of the importing countries was also an important factor.

The war conducted by the world against the nations of central Europe interrupted this development. At its close, the work of reconstructing the shattered and intricate system of world economy had to be carried out under totally altered conditions.

First, the sources of the food and feed supplies of the European market had shifted from eastern Europe to overseas.

Second, there was a shift in the distribution of capital wealth from western Europe to the new countries. The latter were able, during the war, to pay off the debts to Europe by supplying the

combatants with war supplies. The final accounting showed the western powers heavily in debt to the United States.

The period after the Armistice of November, 1918, to the present, divides itself into two distinct periods of six years each. Both these periods were under the influence of non-economic occurrences. Both periods closed with a serious agricultural crisis. The second agricultural crisis soon changed into a general economic depression.

THE AGRICULTURAL DEPRESSION FOLLOWING THE WORLD WAR

The six-year period, 1918-24

When the settlement of the North American West came to an end, Russia and the Danube countries became the chief granaries of industrial Europe. These sources of grain were eliminated by the World War. The agrarian revolution in Russia and eastern Europe was responsible for their continued elimination. This was the greatest of all agrarian revolutions and destroyed the mainstays of eastern European export production by turning Russia as well as most of the eastern buffer-states into a domain of the inefficient small peasant. Through great extensions of their crop area, the United States and Canada were able to make up for the shortage which occurred after the elimination of eastern Europe during the war. At the same time, the southern parts of the southern hemisphere became the purveyors for meat and dairy products to the allies and their armies. Both these developments were due to the impulse of doubled prices. A rising market tendency lasted until 1920, to be followed by a sudden collapse. Prices for grain and meat, however, sank far lower than those for industrial goods. The price scissors again opened up in the wrong direction. The crisis commenced in the United States only to extend itself to all grain and meat producing countries. What was the cause of the sudden decline in prices?

Some see the chief reason in the deflation policies inaugurated by the United States, followed later by other leading states. This policy was intended to raise and to stabilise the purchasing power of money by curtailing bank credit and raising taxes in order to redeem the large quantities of representative currency in circulation. Professor Warren and Professor Pearson have portrayed in a most enlightening manner the reasons why changes in monetary standards and consequent alterations in prices have a more serious

effect upon the farmer than upon the industrial producer or labourer. Farming, which bases its production on biological phenomena and is a collection of millions of small producing units, is unable to adjust itself with the same alacrity to changed market conditions as industry. The American farmer had only a small part in the rising tendency which benefited industry after 1922. Similar observations could be made a year later, when in the fall of 1923, Germany terminated a period of inflation unparalled in history.

In each case the process of deflation and stabilisation was restricted to the individual economic structure within the national boundary, and affected only indirectly world trade. On the world market, war business came to an end at the time when the American government suspended credits to the allies and the latter showed their inability to purchase with their own means the expensive American agricultural products. Their export industry was unable to provide the necessary equivalents

By the collapse of the monetary systems in many countries participating in world trade, it became more than ever apparent that price relations in the exchange of industrial for agricultural products on the world market were entirely subject to the laws of supply and demand for goods.

From 1909-13 to 1921-23, the wheat production of eastern Europe and India declined 14.6 million tons. At the same time the total increase of wheat production in North America, the Argentine, and Australia amounted to only 10.9 million tons. Neither could an adequate substitute be found for the missing Russian barley export. Only the corn shortage arising in the Danube countries could be met through the supplies from the huge corn-growing regions of the United States. Argentine meat was not able for a number of years to fully compensate for the depleted stock of European herds caused by the war.

It is impossible, therefore, to find the cause of decline in prices of grain and cattle which took place between 1920 and 1923-24 on the side of supply; obviously it had to be found on the side of demand. The well-being of the industrialised importing countries had been destroyed and their purchasing power diminished. With a fixed supply, the unalterable truth of the economic law prevails, namely, that the price for the entire stock is set by the indispensable ultimate buyer.

Of all the nations depending upon agricultural imports, Germany was in the worst situation. The war exhausted the fields, reduced the herds and wore out the production apparatus. Germany lost one-tenth of her population and one-eighth of her limited territory, which was a very productive part. It included enormous amounts of private property of German subjects. The commercial navy, all colonies, cables, and the greatest part of the capital invested abroad were taken away. Repeated invasions and occupations by enemy troops retarded economic recovery. This accounts for the utter collapse of agricultural prices in 1923, at the time when French and Belgian troops invaded the Ruhr Basin, the largest and richest industrial district of the continent. This was done, to use their own words, to safeguard the reparation payments by taking for themselves productive securities. Because of the invasion, the German economic structure completely collapsed. The purchasing power was destroyed, the gold value of export goods fell to about one-half of its pre-war level, real wages of skilled labour declined to about one-quarter, and of unskilled, to about two-thirds of the pre-war standard. The farmers of the entire world who produced bread and meat for the industrial population of Europe participated in this misery. These events prove the fact that pauperisation of a great nation brings hardship to all other parts of the civilized world. Finally, the United States government took a hand in the European turmoil by proposing an international conference of experts to ascertain "Germany's ability to pay" and solve the problem of the so-called German "reparations".

The Six-Year Period, 1924-30

The ratification of the Dawes Plan in 1924 and the therein contained provisions for the evacuation of the Ruhr Basin, at last terminated a war which had a duration of ten years. Throughout the world hopes rose again that now the work of peaceful reconstruction could begin. A spirit of enterprise permeated all countries. It was strongest in the United States and, I may say, in Germany. Credits began to flow freely from the United States to Europe, especially to Germany. With this stimulant, the ravages of war were obliterated in the course of a few years, industrial production was rationalized, and the purchasing power of wages, at least in the northern countries and especially in Germany, was

raised to the pre-war standard. Consequently, agricultural prices began to rise. The price scissors which had been opened in the wrong direction narrowed or closed; industry supplied agriculture with cheaper means of production; and only consumers' goods like clothing, shoes, household articles, and building costs remained fairly high, because wages constitute a major item.

No fear was felt for prices being affected adversely by an oversupply. The price depression of 1920-23 reduced the North American crop area of wheat by one quarter. Neither Australia nor Argentina was inclined to expand. There was a shortage of suitable immigrants. The recovery of eastern Europe was only gradual. On the other hand, good prices were obtained for dairy products, eggs, fruit, and vegetables, because the rapidly increasing urban population was expending its growing purchasing power for a varied and lighter diet. It seemed as though a development similar to the one between 1900 and 1914 was about to set in.

As we know these expectations did not materialise. In 1926, wheat prices began to decline and fell rapidly in 1929 and 1930 to the level of the last five pre-war years. Feed grains fell still further, and finally, quality foodstuffs like butter, cheese and eggs suffered a serious decline.

The cause for the collapse of grain prices is a general topic of conversation. Everywhere one hears of the astonishing lowering of production costs due to the introduction of the tractor and the combine. When on American soil I speak about the significant and extended effect of this technical revolution, I do so only with the intention of broaching a topic whose discussion will be exceedingly instructive to the European guests. The combine as well as the method of dry farming originated on the driest of all continents—Australia. As early as 1883, I saw and described gigantic combined headers and threshers on bonanza farms in California. The attempt to use smaller models east of the Rocky Mountains, seems to have been carried through due to the misery, which followed the high war prices, of the thousands of farmers who had penetrated into the semi-arid regions. But I see as the real reason, the pioneering spirit which continues to be strong following the economic conquest of this continent. Therefore, in no country have new inventions come to such marvelous attainment as in the United States. Secondly, this pioneering spirit found a new opportunity to express its creative power in the automobile,

roads, and new farm implements. It has broadened the field of individual power. Everyone has become his own engineer. The complete mechanisation of planting and harvesting, with the tractor and combine, has extended the possible range of cultivation for the two-man farms to one, two, and even four sections, depending upon the size of the tractor and the combine. In the great plains area, the costs of production are so low and the profits, under existing prices, were so high that the risk of drought could be faced.

That mechanisation ought to lead to the disappearance of the one or two-man operations by substituting the gigantic farm enterprises, which can produce still cheaper, does not seem plausible to me, because the transition to mixed farming which becomes necessary after ten or twenty years of only wheat growing would nullify many of the advantages of large-scale operations. Apart from purely psychological obstacles, the powers-that-be in Soviet Russia seem to have embarked upon an unsound undertaking when they forced the small farmers into the giant collectivistic farms under uniform management for the purpose of producing cheap bread-grain for the ruling city proletariat as well as for the world market. There is no soul in this enterprise.

The economic significance of motorised farming to the world lies in the possibility of exploiting extensive areas for grain production which, up to the present, were used as ranches, and of expanding this area without depending upon the influx of new settlers. Since 1925, the wheat areas in the semi-arid regions have increased by leaps and bounds. The returns are high because the soil has not been washed out by rains. But if one considers the large surface lying as fallow, the average returns per acre apparently are not much above the North American average. It is a decidedly extensive agriculture.

Since the end of the American colonisation period, the centre of wheat production had gravitated more and more to Russia, Canada, and the La Plata regions. Although similar machinery has also been introduced into those countries, the United States again has the lead in taking new areas under wheat cultivation. Between 1925 and 1929, the increase was 9 million acres, almost entirely in the great plains area and the adjoining Mountain regions, as well as to a lesser degree in the Pacific States. The contemporary increase in Canada amounted to 4.5, in Australia to

4.3, and in Argentina to 1.8 million acres. Although a leading industrial country, the United States has again become a wheat exporting centre of first magnitude. The wheat exports of the United States, however, with her one hundred twenty million inhabitants, remain lower than in Canada and Argentina. There is no doubt that, in contrast to the great events in the last quarter of the 19th century, the technical improvements in the regions of extensive grain production are to be considered as the basic cause of the new pressure on grain prices.

The exceptionally good harvest of 1928 had dire results for the world wheat market, but even an ordinary harvest would have been sufficient to crowd supplies and depress prices. We are, therefore, faced by real over-production similar to that of the last quarter of the 19th century. We cannot doubt the possibility for further expansion. The question is simply to find which price represents the limit of profitableness According to the latest reports this limit seems to have been reached and if prices continue to decline, expansion will probably be checked. It is a certainty that the limit lies very low compared to production costs in older cultivated regions. Even the change to a bread diet by the many millions in the Far East will not cause a shortage. There will, therefore, be continued depression in the prices of grains. I need not enter into a description of the dangers which exist for those countries not endowed too richly by nature and largely dependent upon their grain production. For a small and thickly-populated country like Germany, it is a grave situation. But that is every country's own business.

On the whole, the problems to be solved by the countries in the inner or middle circles of Thunen are quite obvious. For them it is a question of lowering their costs not only for grain but also for all other kinds of production with every technical improvement at their disposal. The tractor has already found extensive application outside of the border lands, although not everywhere to the same extent as in the eastern United States. The tractor is especially suitable for intensive cultivation because it can fulfill many difficult tasks during the rush season better than horses. In Germany, experiments are under way to apply the tractor, together with a large number of attached field-machines, on the peasant farms. Judging by the results, I believe that this method will prove successful, and will still preserve the individuality of the average farmer.

When one considers world economy, one notices that a sharp geographical division of labour is in progress. While the border lands are mainly employed in producing a world supply of bread-grain, the older civilized countries are shifting more and more to the production of high-grade vegetables, fruit, wine, and the like, as well as to the production of finer animal foodstuffs such as higher quality meat, milk, dairy products, poultry, and eggs. Some of the younger countries are also taking part in supplying high-grade foodstuffs, as for example, the Argentine with its high-grade chilled meat, and grass-growing New Zealand with her dairy products. But the abundance of trained labour gives the older countries an advantage which counter-balances the physical advantages of new lands. I think of the enormous export of dairy products by such small countries as Denmark, Holland, Switzerland, and recently, Finland.

If the products of quality and high-grade suffer from low prices, it would seem at first to be caused by an over-supply, particularly in the older countries. In central and western Europe, meadows and pastures have quite extensively taken the place of the bread-grain fields. In the moister regions of North America, large tracts of land are being turned into cattle-feeding areas, thanks to the motorisation of agricultural production and the motorisation of traffic between country and city. Four million acres of oats and 750,000 acres formerly planted with rye, which has become superfluous due to prohibition, were planted with barley from 1925 to 1929. With the same quantity of feed, a greater quantity of meat may be produced today because a changed diet has replaced the demand for fat hogs and cattle with a demand for earlier maturing, well-fed animals. Milk and butter production in the older civilized countries has been increased, particularly by the introduction of fat and albuminous feeds which are obtained from the tropics, and, with its hot summers, from Manchuria. This has taken place with the help of the oil plants, the largest being in Holland and in Germany. These manufacturing plants substituted for the decline of fats, caused by the abandonment of the old method of fattening cattle and hogs, by extracting the vegetable oils and manufacturing these into margarine, and secondly, by supplying the cattle industry with oil cakes. In this way they indirectly contributed to increasing butter production. To all this may be added the improvements in poultry, eggs, fruit and vegetable production.

The factors, however, which caused the drop in prices for meats and high-grade foodstuffs were not the same as those which caused the decline in prices for grain. The latter came by a supply which increased with a falling per capita demand. In the case of high-grade foodstuffs, the increase in supply was for a long time accompanied by a rapidly rising demand, and we must keep in mind that the prices for butter and cheese, and therefore even for milk, are set on the international market. There is no reason why favorable business conditions and rising incomes should not have increased the consumption of such finer products enormously. The fact that this did not take place, and that even here an over-supply set in, was due to the most severe and most extended crisis which had ever happened to humanity. According to statistics published by the German Statistical Bureau and based upon careful records of household expenditures, it is apparent that with a declining yearly income and a growing number of children, the consumption of meat, meat-products, milk, butter (in particular), cheese, fruits, vegetables, and eggs is decreasing, while the consumption of margarine rises. It is the same with the consumption of rye instead of wheat bread.

I cannot agree with the opinion Dr. Ezekiel expressed this afternoon in his excellent report. Apparently he is thinking of American conditions. But in middle and eastern Europe with about 300 million inhabitants, the standard of living is very low and demand might be increased, not by two or three, but by one hundred or more per cent. In the named statistics there are 6 classes of income, rising from $250 (1000 marks) yearly per adult person, to $500 and more. In the lowest class, the annual expense for butter per person is 22.61 marks, equal to about $5, but in the highest classes it amounts to 61.55 marks, equal to about $15. The consumption of meat and meat products increases in the same classes by more than 100 per cent (from 77.14 to 157.58 marks), per adult person.

From the foregoing we can also see the effect of industrial unemployment with the resulting lowered incomes of millions of workers. In June, 1930, Germany, which has always held the lead, was obliged to pay doles to 2½ millions insured unemployed, and England to 1.9 millions. Together they paid doles to 4.4 millions, and, including their families, to 9 millions of unemployed. At the present time this number has risen to 10 or 11 millions. The situation is bad in all the industrial countries, with

the single exception of France. The problem of unemployment has become the major political question in many countries. As a conference of agricultural economists we cannot overlook the universal economic crisis.

THE CAUSES OF THE GENERAL INDUSTRIAL CRISIS

The most universal symptom of the world crisis is the decline in the wholesale prices for raw materials on the world market. This decline did not, as formerly, take place after a rapid rise but, except for copper and petroleum, the prices had been more or less stable with a slight declining tendency for some time. This difference is based largely upon technical advances.

The cotton harvests were cheapened by the cotton sled as was wool production by the substitution of machines for hand clipping and also the transition from the wool production to the wool and mutton production. Rayon exerts a pressure upon the textile industry. The enormous increase of plantation rubber by scientific methods has lowered prices as has the organisation of the Cuban cane sugar industry by American capitalists. For mineral extraction, the flotation process and electrolysis brought great savings. Just as the tractor and combine were able to cultivate profitably areas which hitherto were deemed of little value, so the flotation process was responsible for the smelting of ore formerly considered too poor or too distant to warrant working. The change to larger scale exploitation in the steel as well as in the non-ferrous metal industry has exerted a pressure upon production costs. Under the influence of the technical advances, prices diminished first for agricultural products like cotton and wool. Minerals were able to maintain their price level slightly longer, due to the control of production by trusts. These concerns were able to maintain stable prices despite rising profits, or, as in the case of copper, even to raise them. But just as the Canadian Wheat Pool or the valorisation of coffee in Brazil finally collapsed, so also did these concerns. They were unable to prevent production being increased under the influence of high profits, with the result that large stocks had to be disposed of at lowered prices. Like grain, prices fell to the level of pre-war times and even lower.

In the manufacturing industry, rationalisation has also been carried out on a large scale, but as yet prices for manufactured goods have not followed those of raw materials. This is quite

according to the economic rule: Prices for consumers' goods follow but slowly either upward or downward prices for raw materials. With a rising market the prices of raw materials used for construction and enlargement of plants increase first. Because of the lowered interest rates during the period of depression, the situation is thought opportune for such building investments. This creates a greater demand for necessary raw materials and only later a demand for consumers' goods. The set back in raw material prices comes when the savings deposits no longer suffice to finance plant extensions. Consumers' goods again follow only slowly, because sufficient unfilled orders are still on hand. Gradually, even these prices decline owing to a drop in demand by wage earners in the raw material and producing industries, and, as in our case, by the agricultural workers. The tempo gradually slows down because the influence of unions and, as in Germany, the governmental authority, maintain high wages for the employed The tremendous pressure exerted by unemployment will, however, break these resistances. If then, a price reduction follows which reaches the cost standards of the technically best developed enterprises, we must attach great significance to that. For agriculture, we could expect from this a certain equalisation of incomes which tends to do away with the social injustices resulting from agricultural returns lagging behind industrial returns But this would also presuppose a reduction of debts because a great price reduction means dearer gold and dearer money and leads therefore to a great disadvantage and further burdening of all those who have contracted long-time loans. In the first place, farmers are hit hardest. The same applies to countries with a large foreign debt, as is the case with Germany. If all this would take place, one could speak of a definite liquidation of the war.

A progress in the methods to produce material wealth can by no means be considered as a misfortune, and a general over-production is not possible. Technical improvements are carried through spasmodically and it takes some time until the balance between the different parts of production, and between production and income, is reached. The alternative periods of prosperity and depression are peculiar to the capitalistic system. Longer periods of prevailing good profits and quick technical progress alternate with shorter periods of depression where the equilibrium is restored under more or less critical conditions.

In the United States the economic trend from 1922 to 1929 was almost a straight line of prosperity which has now been broken by a crisis. This was the same as in Europe before the war when there were regular cycles of eight to ten or eleven years. This gives rise to the belief that the present American crisis, considered by itself, would soon be overcome.

But even the United States is not an autonomous body which can live an economic life for herself. It is the wealth and surplus of her soil which makes her dependent, especially her farmers, on international trade, and on the purchasing power of her foremost buyer, industrial Europe.

The depression which is felt in Europe is not only a passing disturbance characteristic of the capitalistic system, but rather the consequence of the structural changes caused by the war.

Since the war, a lasting depression has been experienced which was only interrupted by very short periods of prosperity. This rise was in every case, if not caused by inflation, then brought about, at least on the continent, by the influx of foreign loans. On the other hand, the European depression became more acute in the second half of 1928, when the Americans ceased to extend credits because they needed their capital for domestic investments and for speculations in stocks. For this purpose, they even attracted foreign capital.

All the European countries with the exception of France suffer from the continued depression. This is exemplified by unemployment which is not due to market tendencies but whose roots go deeper into the very economic structure and is therefore of a permanent character. For England, as well as Germany, reliable statistics are available. In Germany even during the most favourable periods it was not possible to use five to six hundred thousand unemployed in the productive processes. To these must be added the great army of those who are not covered by unemployment insurance but are cared for perpetually by public support.

According to the German Minister of Labour, there are at present in Germany more than twelve million persons, or 20 per cent of the entire population, who receive in different forms financial assistance from the government or from the public institutions of social insurance.

WHY THE DEPRESSION LASTED

1. Due to the war, capital wealth dwindled as rapidly in western Europe as it increased in the overseas countries. It must be kept in mind that the political indebtedness of 13 European countries to the United States amounts, with a five per cent interest computation, to about six billion dollars of present day value. This enormous sum, which does not include the private indebtedness, was arrived at after the United States had agreed to generous reductions of the original debts.

2. The ever-increasing barriers to free commerce have to be given special consideration. With the creation of the numerous new states more than 11 thousand kilometers of customs border have been set up. Impelled by a strengthened nationalism, the large as well as the small countries are shutting themselves off from each other. Everyone wants to sell and no one wants to buy, with the result that especially are those persons suffering who depend most on an export surplus—the farmers in the newer countries and the industrialists in the older countries. A gradual development has increased the production of coarser manufactures in the agricultural countries with a resultant decrease in the output of the staple industrial plants in the industrial countries, especially in England. The number of unemployed in these industries amounted for a number of years from 10 to 20 per cent.

3. The main reason lies in the political tension and antagonism which pervades Eurasia with its one and one-half billion inhabitants. The civil war in China has no end; the emancipation movement of the Asiatic races against the rule of the white man is gaining intensity and finds an outlet in boycotts and uprisings. Particularly British industry suffers from them.

The Russian economic revolution as well as the national frictions within the border states, arbitrarily formed out of a conglomeration of antagonistic national elements, bring with them grave economic disadvantages especially for Germany, because Germany had always occupied the first place as an importer. In western and central Europe, despite the League of Nations, the Dawes Plan, the Locarno, and the Kellogg pacts, severe tension still exists in a very distinct manner because of the distinctions made by the Treaty of Versailles between victor and vanquished, armed and disarmed, states of unlimited and states of limited international

rights. This tension is best exemplified by the tremendous sums expended on armaments by the victor states and their allies, sums which are even higher than before the war.

Briand's Pan-European Plan was conceived, in his own words, as a political scheme, and each political constellation must always be directed against a third party. His desire is to consolidate for all times the above described political situation. We, on the other hand, desire to guarantee Europe's economic progress by clearing away the obstructions to sound recovery and thus also strengthen Europe's purchasing power for the benefit of the entire world. That is why the Briand plan is doomed to fail.

Of the great European nations, only France enjoys stable and favourable economic progress, and has not experienced the world wide crisis. French prosperity still continues although her textile export industry is affected by the general world depression. France is less involved in international trade than the United States, Great Britain, and Germany. War damages in France have been repaired. The wealth of France has decidedly increased, due to the incorporation into her economic structure of the strongest steel-industry on the continent without obligations for compensation. France has the second largest gold reserves in the world and has extended large sums of short-time credit, but did not assist to any considerable extent in the reconstruction of Europe through the granting of long-time loans for economic investments.

England, on the contrary, is the greatest creditor-nation. Her foreign investments bring a net return, the pre-war value of which is as high as in 1913, namely 285 million pounds sterling. Her shipping has developed favourably. England is still the center of world-trade financing because England still possesses the largest volume of trade and most bills of exchange are in sterling. But her export trade has by no means increased as rapidly as her imports. Between 1913 and 1929, England's trade balance showed a deficit which rose from 158 to 382 million pounds sterling. Therefore, at times, no capital was available for foreign investments and those that could be made, flowed to her own dominions.

Germany has attempted with great exertion to rebuild her economic structure after the desperate collapse following the ten years' war and a peace which made it the poorest of all industrial nations, both in raw-materials and capital. After 1925, a fairly quick recovery was made, from the very low level after the war.

The exports of Germany increased rather quickly but not as rapidly, compared with pre-war, as those of England, France, and the United States. The 1929 index-number of the value of exports for Germany was 134 per cent of the 1913 value; England, 139; France, 148; and the United States, 211. Compared with 1925, the 1929 index number of the value of exports for Germany was 145; England, 95; France, 88; and the United States, 107. Owing to the loss of territory and the consequent lack of raw materials and food supplies, imports have risen even more rapidly than exports. Since 1928, however, there had been a striking change in Germany's balance of trade. The debit balance of trade fell from 3 to 4 billion r.m. per year to 1.7 billion r.m., and disappeared entirely in 1929. This is accounted for largely by the decline in prices for foodstuffs and raw materials and in part by the increase in Germany's share of the world's commerce From 1925 to 1928, Germany's share of international trade between the more important countries rose from 7.9 to 10.1 per cent. In 1913, Germany's share amounted to 12 per cent. Germany has begun the reconstruction of her foreign trade organisation and thus is regaining her former position. This pertains mainly, however, to the trade with industrial Europe amounting to 51 per cent of all her exports, whereas the other continents find Germany a growing customer, but take little in exchange.

From these figures we see that even in the best years Germany's balance of payments has never left a penny for reparations. With unsurpassable clarity, the Dawes commission formulated the statement that reparation payments could in the long run be made only out of an export surplus. "Loan operations" (I am quoting), "may disguise the position or postpone its practical results, but they cannot alter it." They also made provisions to lower, by the transfer clause, the annuities in case such an export balance could not be obtained. But this admonition was not heeded; reparations were paid entirely by borrowed foreign exchange Foreign credits revived German economic life, making it possible to purchase food with the artificially replenished wages fund, and revived the last and only source of Germany's wealth—labour.

Shipyards and industrial plants are again in good condition. The merchant marine was rebuilt and brings in about the same income as before the war.

Foreign credits were, however, unable to overcome the most

serious evil—lack of capital. It is true that the accumulation of capital has begun, but by no means rapidly enough, to provide occupation for the growing population. In 1930, the liquid condition of the money market has lowered the interest rate for long-term loans, which are always the best criteria of economic conditions. Yet in Germany, this rate is higher by far, than in any of the other important industrial countries. Actual interest rates on long-term loans in March, 1930, were as follows: France, 3¾ per cent; England and the United States, 4½ to 5 per cent; and Germany 8¼ per cent, which means for the debtor, 10 per cent. Such an interest rate for an over-populated industrial country is an unbearable handicap. It means that Germany's industry can hardly compete on neutral markets with countries which have a greater abundance of capital.

Technical progress is hindered by such prohibitive interest rates. But after all, industry is more able than agriculture to meet such obligations because of its rapid turnover. Here one sees particularly, the plight of the heavily indebted enterprising farmer, who has modernised his production apparatus. Professor von Dietze will cover this subject more thoroughly.

Amortisation is out of the question for agriculture, industry, and the state. Debts accumulate one after another, interest obligations one after another. In addition to the approximate 500 million dollars which Germany must pay in reparations out of her earnings, 250 million dollars per annum are due as payments for foreign loans.

The Young Plan, which Germany had to accept if it desired to emancipate one-fourth of its population from the hardships of foreign occupation, has not improved the situation. The nominal figure fixed in the plan is slightly lower than the highest annuity provided for in the Dawes Plan. The present value of all annuities is 8.79 billion dollars (37 billion r.m.), instead of about 10 billion dollars (40 billion r.m.) as in the Dawes Plan. But the transfer clause has been abolished together with the provision that a reduction should take place if gold rose in value. This condition has now set in. The decline in prices may be either the result of change on the monetary side or on the side of goods. There is one redeeming feature, namely, that a distinct division has been made between two kinds of payments, the so-called unprotected part embracing the real reparations debt, which

amounts now to 2.62 billion dollars (11 billion r.m.), and is to be paid within 37 years by the annuities of which the greatest part, 125 million dollars a year, goes to France. Here no reduction is possible. It is destined to be commercialised. But the largest share of German obligations,—(25.94 billion r.m.) 6.17 billion dollars—does not pertain to reparations for war-damages but rather to cover the interallied debts, which goes in the long run to the United States. It has the same periods of maturity, and lasts for two generations. It is the same debt which once was the cause of grievous complaints by the richest powers of Europe. The Young Plan is an improvement, in that the world sees that the German indemnity, for the greater part, has nothing to do with the obligations for damages to civilians as laid down by the fourteen points. It is rather a pure imposition of tribute payments. The "protected" part can be reduced, and in view of Germany's economic situation, a reduction seems to be unavoidable. But a claim to such a reduction can be raised only in case the United States is ready to reduce or cancel the allied debts.

Should the situation persist unaltered, no hopes can be held for a real recovery of central Europe. We must realise that Germany has always been the center of energy on the continent, and that she not only supplied central and eastern Europe with goods and capital, but also gave it organisation, and safe-guarded its economic progress. Should the situation remain unaltered, only one possibility presents itself for the payment of tribute. It might be achieved by lowering both the wages and the German standard of living; land rent has already disappeared; profits from industrial enterprises are low. The interest rate will remain high as long as the chief financial backer has an option to choose between placing his investments in the extended regions of his own West, in Canada, Mexico, or in South America where the product of labour is greater than in the thickly populated industrial countries whose natural wealth already finds itself under rational exploitation.

SUMMARY

The cause for the grave agricultural depression lies in the coincidence of great technical advances with consequent increase of production and a lowering of purchasing power in industrialised Europe caused by other than economic forces. Crises which arise

from technical progress find their solution in the universalisation of such progress. To what extent this takes place is dependent upon intelligence and will power. Only the inefficient will perish

But political disruption can be cured only by political measures. You must not misunderstand me. Germany's misfortune is that the lowering of this unjust tribute is bound by the United States. I do not think, however, that the United States has any moral obligation to cancel the interallied debts. If the allied nations have no moral claim against the United States for such cancellation, Germany likewise has no such moral claim. However, our duty at such an international conference is to show the economic consequences, and I have tried to demonstrate the great influence which the political situation in Europe and the reparation question have on the interests of the agricultural and industrial peoples throughout the world. The only real solution of the international agricultural and industrial depression is a universal understanding of the causes of the depression, which would build up a feeling of real solidarity. Such solidarity should exist between all nations which are bound to each other by the unbreakable ties of international trade. But this question is not only a matter of intelligence, but also the conviction that the economic world is governed by moral laws and that their disregard leads to continued economic hardship.

THE RELATION OF MONETARY CONDITIONS TO THE AGRICULTURAL DEPRESSION

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AGRICULTURAL economics and monetary science are both young and vigorous branches of applied economics; but the specialists in the two fields, on the whole, pursue their way independently of each other. I doubt if all agricultural economists are monetary experts and I think it is probable that most monetary experts know little of farm management or even of the marketing of agricultural products.

An anology may be taken from the older sciences. Monetary science may be compared to chemistry. It is fundamental and based on first principles, and it has made striking advances in the last decade. Agricultural economics may be likened to biology, not only because it is concerned with organic and perishable products but because it is still primarily descriptive and inductive In the study of living processes and especially of animal and plant diseases, chemistry and biology have fused in the new science of biochemistry. So in the study of agricultural prices and marketing, and especially of agricultural depressions, we need a new specialized branch of research. The subject matter of this branch of economic research would be the influence of monetary conditions upon agricultural prices and especially upon the marketing of primary products in the principal produce markets of the world. It would be concerned with the monetary aspects of agricultural depressions, the significance of changes in world stocks of agricultural products and the effect on farmers' livelihoods of fluctuations in the purchasing power of consumers, and changes in the value of money.

In this paper I propose to act as matchmaker and promote an auspicious union between these two young and active sciences. All that is necessary I hope is to get them to talk the same language. Take two problems, which are being actively discussed at the present time. This Conference of Agricultural Economists has been considering the over-production of goods. A few weeks ago the Gold Enquiry Committee of the League of Nations was discussing the shortage of gold. Is there any connection between

these two? I suggest that we may find that these two problems are closely related, if not indeed, actually two aspects of the same problem.

Let us consider first the fundamental paradox of the present situation. The central fact of the agricultural depression is falling prices. What causes prices to fall? Common sense says: "Over-production." Over-production in relation to what? The answer is generally to point to an increase in the production of one or more particular commodities, compared with the average of the last few years. That explains the fall in price of those commodities. But what of other commodities that show no such increase? The answer then might be over-production in relation to the purchasing power of consumers. But how is it that consumers' purchasing power has been reduced? If the price of certain commodities has fallen, ought that not to set free more purchasing power for other commodities? No, we are told, because the majority of consumers are also producers and many, if not most of them, have also been over-producing; look at the unemployment and short time in industry. The workers in industry can not sell their output and get enough money to buy what they want from the farmer, because the farmers can not get enough money for their produce to buy what they want from the workers in industry. That I think, a fair statement of the position acceptable to theory and common sense; and it is no answer to say, as the old-fashioned economists were inclined to say, that general over-production in this sense is impossible since in the last resort goods exchange for goods. Goods do not exchange directly for goods. Goods are exchanged for money and what hampers the exchange of goods is any sudden change in the relationship of price to cost of production.

But let us follow up the popular diagnosis and ask common sense what is the remedy for the present situation. Without hesitation and with very good reason every producer at any rate will naturally say that the remedy for over-production is to restrict production. The manufacturer seeks to limit output by agreement demands higher protection for his home market, goes short time or in the last resort closes down his factory altogether. Trade unions, faced with the falling off in the demand for labour, are tempted to pursue a policy of ca'canny and in other ways to limit output. Farmers can not respond quite so easily to falling prices.

But they will seek to exclude foreign supplies from the home market, to enter into pools and cooperative schemes for withholding supplies and preventing surpluses from coming into the market; and finally, they will applaud the advice given to them collectively to reduce their acreage and limit production even if individually they are slow to adopt this policy and are inclined to wait for the other fellow to do it first.

It is true that common sense has another remedy to suggest, but this is more often the suggestion of the economist or the armchair critic than of the producer himself. Reduce costs of production. An admirable sentiment, but unfortunately greater efficiency and lower costs take time, interest charges and taxes cannot be reduced, and meanwhile the producer faces certain loss.

Suppose therefore that production is restricted all around, what is the result? If less is produced, how can everyone be better off? Are we not confronted with this outrageous paradox: that the surest way to restore prosperity and enable us all to buy more of this world's goods is for us all to produce less and organize an artificial scarcity? This conclusion seems hardly acceptable to common sense and yet it seems to follow logically from the action that each producer individually is tempted, advised, or indeed compelled to take. Nor is it an unreal hypothesis. One of the principal evils of a trade depression is that it reduces the total production of wealth at the same time that it gives a larger share of the reduced aggregate income to the creditor classes in the community.

For an explanation of this paradox we must return to the point already mentioned about the relationship of prices and costs. If by some miracle all prices, wages, and charges were to be reduced simultaneously there would be little or no interference with the exchange of goods or reduction in consumers' purchasing power. But unfortunately this does not happen. In a trade depression prices of goods, and particularly of primary foodstuffs and raw materials, fall first; transportation costs, wages, interest charges, rates and taxes, and the cost of services fall much more slowly and with varying degrees of friction and economic loss. The first effect of prices falling below costs is to wipe out profits and the next is to create unemployment. The result in each case is to reduce consumers' purchasing power and thus accentuate the tendency of prices to fall. We thus see that a general fall of prices without

an equivalent reduction of costs must bring about a reduction of demand and a reduction of production. The fundamental problem, therefore, is what causes the price level to fall.

Before leaving the question whether over-production is the cause of falling prices and coming on to the problem of gold and credit, I should like to establish a prima facie presumption that money has something to do with the situation by enunciating three propositions which are so trite as to be truisms.

First, the price or money value of any commodity or service is the amount of money for which it is exchanged. That is the definition of price.

Secondly, the money value of all goods and services bought in a year must be equal to the amount of money paid for them. That will do for the quantity theory of money.

Thirdly, the relationship existing between the amount of money available to buy goods and services and the amount of goods and services offered for sale must therefore have an important bearing on the course of prices. Those who explain the fall of prices by over-production are in fact assuming a change in this relationship between money and goods. For they imply that the supply of goods has increased while the amount of money has remained unchanged. This may be a true explanation of the fall of prices. But if so, it amounts to the same thing as saying that there is a shortage of money in relation to the supply of goods.

The important fact which many people do not recognize or are inclined to forget is that changes in the amount of money do actually occur. The amount of money both in the form of currency notes and of bank deposits in each country and in the world as a whole is constantly changing every week. A glance at the figures published by the Federal Reserve Board and the Bank of England is sufficient to show this. But even more important in their bearing on the relation between money and goods are changes in the rate at which money changes hands. Unfortunately these changes in the rate of turnover of money cannot be measured, though we know that in periods of good trade and rising prices the velocity increases and in periods of depression and falling prices, decreases.

These preliminary remarks may be summed up in the single proposition, from which no economist I take it would dissent, that a fall in prices of things in general shows that the amount and turnover of money has not been increasing as fast as the produc-

tion of goods. The converse of this proposition, that rising prices show that money is increasing faster than goods, is unfortunately familiar enough to our generation through the experience of war-time and post-war inflation in Europe. And yet throughout this period there were many people who attributed the rise of prices, at any rate in Britain and I imagine in the United States, almost wholly to the alleged shortage of goods. Actually the production of goods and services in Great Britain during the post-war boom of 1919-20 was considerably higher than during the period of subsequent depression. In a sense, of course, there is always a "shortage" of goods in relation to demand in good times, just as there is always "over-production" in relation to demand in bad times; but historically it can be shown, I believe, that the "shortage" during boom years has generally represented a larger volume of production than the "over-production" experienced during the depression which preceded or immediately followed it. This shows the need for caution in using the words "over-production" and "shortage," when in different contexts they may both be applied to the same phenomenon.

Three different uses of the terms over-production and shortage may usefully be distinguished:

1. We may mean that the statistical position shows an exceptional increase or decrease of production compared with some previous period.

2. We may mean that the tendency of prices to fall or to rise reveals an excess or deficiency of production in relation to effective demand as measured by the amount of money which consumers are willing and able to pay.

3. We may use the terms to mean an absolute excess or deficiency in relation to consumers' needs caused, let us say, by satiety or insatiable demand. In this sense we can perhaps talk of an over-production of motor cars, and if a casual visitor may hazard a guess, possibly of popular magazines in the United States, though not in relation to the world as a whole. And we can certainly speak of an actual surplus and still more of an absolute shortage of water in particular localities. I am prepared to concede that there may conceivably be a surplus of wheat in the world in this sense, but certainly of no other foodstuff or raw material that I know of.

In what sense then can we rightly use the term over-production in relation to the present crisis? Do we mean that the statistical

position reveals an exceptionally large increase in production compared with previous years? Unfortunately our statistics of production are never very accurate and always lag behind our statistics of prices. But let us look at the League of Nations indices of world production published last year.

The Memorandum on Production and Trade contains indices of the production of raw materials and foodstuffs in the world for the 5 years 1923-1927. The combined index gives an increase of 15 per cent during this period or an average of 3 per cent per annum. The index number for foodstuffs alone during these five years shows an average increase of only 2 per cent, while raw material production increased by about 22 5 per cent, or 4.5 per cent per annum. The world's population meanwhile increased by about 1 per cent per annum, and therefore had 1 per cent more food each year to go round.

Among foodstuffs the group that contributes the largest increase is vegetable oils and oil seeds, which increased by 33 1/3 per cent. Increased consumption of fats is a sign of a higher standard of living. The smallest increase in the foodstuffs is that of the cereal group which shows an increase of only 4 per cent, or less than 1 per cent per annum. (This illustrates the general rule that as the standard of living rises less cereals are consumed not only proportionately to total food but absolutely; in other words, with every rise in wages less money tends to be spent on bread and more expensive foods take its place).

Textiles, mainly cotton and wool, show an increase of 25 per cent which also suggests a rise in the standard of living. Chemical fertilizers show an increase of 33 per cent which points to the growth of a more intensified and diversified agriculture. Cement production increased by 47 per cent, pointing to increased building activity, and wood pulp by 38½ per cent, mainly accounted for by the rise of the artificial silk industry and the growth of the newspaper habit. The largest increase of all is 70 per cent for rubber production and this figure, combined with a 22 per cent increase in petroleum production, is naturally associated with the growth of the motor car industry.

The statistics thus suggest that the world's population is eating slightly more, is better clothed and better housed, reads more newspapers and moves about more on wheels; which is satisfactory since they confirm what we thought we knew already.

The 1928 index of production has not yet been published but advance information received from Geneva gives the increase in 1928 as 4 per cent. Assuming that the same rate of increase of 4 per cent has been maintained in 1929 we get an increase of 23 per cent during the seven years from January, 1923 to January, 1930.

This may seem to some a dangerously rapid rate of increase of production, which is quite sufficient to account for the deplorable position in which producers now find themselves. To my mind they suggest rather the opposite. An increase of world production of foodstuffs and raw materials at the rate of 3 or 4 per cent per annum seems a desperately slow rate of progress in relation to human needs. Taking the white races alone, it is surely not unreasonable to ask that their standard of living should be increased by at least 200 per cent before we speak of the need for slowing down the wheels of progress. The masses of peasants and wage-earners would still be no better off than many of us—whom I presume still have some unsatisfied desires for food and clothing,—if their real incomes were increased ten-fold. But so far from being able to realize the dream of abolishing poverty we can scarcely expect an annual increase of even ten per cent in world production under the most favorable circumstances. You cannot double the supply of foodstuffs and raw materials in the world in a year nor even in ten years. The stubborn facts underlying all our talk of over-production and agricultural surpluses are the poverty of man and the niggardliness of nature.

This digression has, I hope, clarified the meaning of the term over-production. We conclude that the statistics show that there has been a steady increase of production at the rate of 3 or 4 per cent per annum during the last decade, but that this rate falls far short of what we should like to see if poverty is to be abolished and the standard of living of the masses is to be raised to a decent level. On the other hand it is evident from the fall in prices during the last twelve months that there is now substantial over-production in relation to consumers' purchasing power. In other words, the apparent—I would almost call it illusory—over-production from which the world is suffering is *over-production in relation to the demand at the former level of prices.* This is another of those truisms acceptable alike to theory and common sense, but it has important implications; for it is only another way of saying that

there has been a diminution or at least an insufficient increase in the amount of money available to purchase the world's staple products.

We are led back therefore to the other aspect of our two-fold problem. What evidence is there of a shortage of money? How has it come about? And what precisely is the manner in which it affects agricultural prices?

First let us look at the production and distribution of gold; for in all gold standard countries the total amount of money—that is notes and bank credit—is ultimately limited according to the various statutes and customs of each country, by the reserves of gold in the central banks. The total volume of money can contract and expand within fairly wide limits at the discretion of the central banks, but the limiting factor is ultimately the amount of gold That is one of the objects of the gold standard. The first is to provide a medium of international payment and thus maintain currencies at parity with one another. The second is to provide an automatic check on the unlimited creation of new money. If it does this too effectively money will not be created fast enough and prices will fall; if gold supplies are suddenly increased—as happened after each successive discovery of gold in California, Australia, and South Africa—then new money will be created too fast and prices will rise. The ideal of course would be to manage somehow that gold supplies are increased each year at the same rate as the production of goods and if this is impossible then to alter the ratio of total money to gold so that money at any rate, increases at the desired rate. Unfortunately this is not an easy matter.

Actually we find that during the seven years from January, 1923 to December, 1929, according to Mr. Joseph Kitchin's calculations, the world's stock of gold money has increased by only 1¾ per cent per annum, or from £2,000 m. to £2,336 m. In the British Empire alone which holds only approximately 11 per cent of the world's monetary gold, the stocks at the end of 1929 showed a decrease of 10 per cent compared with the amount held at the end of 1924.

It thus appears that the production of goods, as indicated by the League of Nations' indices of world production, has been increasing during the last seven years nearly twice as fast as the annual addition to the world's gold stocks. Prima facie therefore there

is evidence here of a relative shortage of gold in relation to goods.

But if that were the whole story, we might have expected prices to have fallen more steeply at an earlier date. In fact it has been possible for the central banks to make the existing gold go further by withdrawing gold coins from circulation and by obtaining supplies that were lying idle, either in their own or other countries. It is possible therefore to give an alternative set of figures which shows that the gold reserves of the principal central banks have increased during this period by about 24 per cent which is double the estimated increase in the stock of gold money in the world, and the same as the estimated increase in world production. It is possible to argue therefore that there is no gold shortage, as yet at any rate. The experts disagree as to the comparative significance of the two sets of figures.

More important however than the total supplies of gold is their distribution and the use made of them. We saw that within very wide limits the ratio of the total amount of money to gold reserves may be varied by law or by custom or by the discretion of the central banks. One country may receive a large accession to its gold reserves and not allow the increase to be reflected in a proportionate expansion of credit. This happened in the United States after the war and has happened in France during the last two years. Other countries, like England and Germany, may be able to make the same amount of gold support a much larger superstructure of currency and credit than before the war. A loss of gold from the United States and France has therefore little or no effect, while a moderate drain of gold from London may involve serious consequences.

Taking into account gold in circulation as well as gold reserves, the significant facts are, (1) that the United States has more than twice as much gold as before the war, (2) that France has increased her stock by 10 per cent since 1913 and 71 per cent since 1927 and, (3) that Great Britain and Germany had in December, 1929, less than before the war.

During 1929 movements of gold were on an unprecedented scale. Great Britain started the year with £152 m., gained £10 m. by June, then lost £34 m. and ended up with £146 m.—a net loss of £6m. Germany lost £47 m. by the middle of the year and then recovered £26 m., leaving a net loss of £21 m. The United States gained £50 m. by the end of October and then lost about £20 m.

leaving a net gain of £30 m. France took £79 m. and lost nothing. In the last two years the Bank of France has absorbed 30 per cent more than the total supplies of gold added to the world's stock of money.

The net result was to increase these stocks of the United States and France, which already had more than enough, and to deplete the stocks of Great Britain and Germany. The severe loss of gold from London compelled the Bank of England to raise the bank rate to 6½ per cent in order to raise the exchange value of the pound and stop the drain of gold. The Bank's paramount duty is to maintain the statutory gold standard in Great Britain, but the effects of its actions are world wide.

One of the most disquieting results of the maldistribution of gold is that while heavy gold exports from London must inevitably involve a contraction of credit in Great Britain, they can no longer be counted on to serve automatically as a basis for credit expansion elsewhere. It would hardly be an exaggeration to say that the expansion and contraction of credit in the world as a whole (and consequently the course of prices of primary products in world markets) depends more on what happens to the relatively small stock of about £60 m. or so of free gold held by the Bank of England than on the rest of the gold put together. Most of the rest is either tied up as statutory backing for internal note issues—a patent anachronism when gold is not needed for internal circulation—or hoarded in excess of statutory reserve ratios, or prevented from being used by suspension of gold payments and prohibition of exports. The "shortage" of gold is thus to a large extent artificial and is accentuated by the widespread tendency to hoard stocks of gold divorced from any close connection with the working of the international gold standard. London retains its position as the financial centre and principal produce market of the world, but the maldistribution of gold has rendered it more sensitive than ever to accidental shocks and has at the same time weakened its powers of control. In a situation like this the expression "shortage" of gold may give rise to misunderstanding and differences of opinion. Looked at from one point of view there is no shortage. As we saw, the gold reserves of central banks show considerable increase during the last ten years; and there are no doubt ample supplies to provide all reasonable requirements, given a satisfactory distribution and a reasonable elasticity in reserve ratios. On the

other hand we have the patent fact that gold has been steadily appreciating in value for some years and has risen in value—as measured by its command over goods—by more than 11 per cent during the last year. As we saw, it is customary and legitimate to speak of a shortage when the value of a commodity rises in value. In this sense therefore we are entitled to speak of a shortage of gold. Moreover the fact that central banks have been increasing their gold stocks is not unconnected with its rise in value, and is indeed often referred to by economists as the "scramble for gold." For my present purpose it is sufficient to stress the fact that London, at any rate, experienced a drain of gold last year and that this played a not unimportant part in precipitating the collapse of agricultural prices.

This brief analysis of the gold situation supplies the background of our monetary troubles.

The immediate cause of a collapse in prices of primary products is the contraction of credit resources in the primary world markets. A rise of the bank rate in London affects not only the domestic situation in England, but equally and even more quickly the position of primary producers in other countries who look to London as their principal market. An increase of 25 per cent or so in the cost of financing the purchase and shipment of primary products (which is what a rise in the bank rate involves) causes an immediate reaction on the price which dealers are prepared to offer. Bulls become bears and selling pressure meets with little or no resistance. At the same time contraction of credit through the sale of gold and securities by the Bank of England reduces the cash resources of the banks, discourages fresh lending and leads to the calling in of loans. Forced selling by dealers and speculators accentuates the slump and with every fall in values more loans are called in. Thus the vicious circle of progressive and cumulative deflation is set up, which tends to grow by its own momentum and spreads gradually throughout the whole economic system, eating up profits, closing factories, and bringing unemployment, bankruptcies and poverty in its train. The tide turns eventually when cheap money and the deliberate expansion of credit by the central banks have effected a change in psychology and re-started the wheels of trade and industry.

It is easier to point to the causes of our troubles than to put them right. The remedy for the world-wide agricultural depression

is a world-wide expansion of credit sufficient to counteract the fall of prices. Sooner or later this will happen; but in the absence of a common policy and the habit of close cooperation between central banks, confidence is hard to restore and isolated action by one country may fail to achieve its object. Given the irrational and unstable manner under which the gold standard is working under post-war conditions, I believe that neither the Federal Reserve Board nor the Bank of England is in a position to take the necessary remedial action safely, promptly and effectively. The initiative and the determining influence for good and evil seems for the time being to have passed to the Bank of France.

These are among the intricate problems now being explored by the League of Nations Committee of Enquiry into the gold problem. The outlook for the future is certainly disquieting. If the present competition for gold continues, prices will continue to fall with periodical crises like that of the last twelve months. The effects of falling prices and contraction of purchasing power are felt in every direction in paralysing business enterprise. Over-production, lack of markets, agricultural depression, and unemployment, are the constant preoccupations of governments throughout the world. The remedies adopted or proposed—restriction of production, tariffs, preferences, bounties, subsidies, producers' pools and price-fixing agreements—may benefit the parties immediately concerned and enable them to shift part of the burden on to other shoulders, but they do nothing to counteract the root cause of the trouble, and possibly even accentuate it. The monetary crisis is fundamental and concerns all countries. If the gold standard is to be maintained, closer international cooperation is essential to bring it into line with the requirements of the modern world.

THE GERMAN AGRICULTURAL SITUATION

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JUST TWENTY years ago I delivered my first and, up to the present day, my last speech in the English language, at the Union Society of Cambridge University. The subject of that debate was purely political, concerning especially foreign affairs. Today I have the honor to give you a report on the present agricultural situation of Germany. Unfortunately questions of a political character cannot be totally neglected when treating this subject. But you may be sure that I am not going to deal with politics just as politics, and disturb the spirit of this Conference. It is merely the sincere endeavor to give a true and all round idea of the economic situation and of its causes, which compells me to mention all important factors which have contributed to bring about the present unsatisfactory state of things.

The causes responsible for the situation are of domestic as well as international origin. To a great deal, the situation is determined by the international conditions which have been explained in the address of Professor Sering. But besides these, there are some important peculiarities upon which I shall have to lay special stress. They are partly strengthening and partly counteracting the international influences upon German agriculture.

The peculiarities of the situation in Germany may be summarized as follows:

1. The World War gave to German agriculture a check which was much more severe than in any other belligerent or neutral country except Russia.

2. The period of inflation delayed recovery and inflicted new damage upon the agricultural, as well as on other classes.

3. The reparation payments were to a large degree borne ultimately by the agricultural population as being the weakest and the least organized partner in economic competition.

During the last pre-war years German farmers experienced extraordinarily prosperous days, for the general rise of agricultural prices on the world market was supported after 1906 by a tariff reform. In 1913 which brought a record crop, the German farmers had available for savings substantially more than one billion

marks. The particulars may be seen from the figures in table 1. They show that in 1913 about 6.25 billions of marks remained at the disposal of the farmers and their families, or approximately 550 marks ($130) per head. This figure is not particularly high, but the modest standard of living which prevails among our rural population allowed it to subsist upon an average income of about 400 marks ($95) per person. Thus more than one billion of marks were available for savings.

Table 1 Receipts and Expenses of the Agriculture of Germany
(Billions of marks)

	1913		Average
	Old territory	*Present territory*	*1924–1927*
Income			
Crops	4 70	4 00	4 30
Animal produce	8 60	7 50	8 40
Total income	13 30	11 50	12 70
Expenses.			
Manures, feedstuffs, machinery, buildings, and so forth	3 70	3 20	3 20
Taxes . .	0 25	0 20	0 80
Interest to creditors	0 70	0 60	0 80
Rents to land owners	0 50	0 40	0 40
Total expenses	5 15	4 40	5 20
Income less expense	8 15	7 10	7 50
Wages paid to laborers	1 90	1 60	2 10
Amount at disposal of farmers	6 25	5 50	5 40
Amount per capita at disposal of farmers		550 marks	540 marks
Per capita costs of subsistence		400 marks	600 marks

During the war, there was a shortage of hands and draught-horses. Soon the blockade caused also a shortage of feeding-stuffs; the numbers of livestock were reduced by one-third and even more, the quality of animals went down, the land could not get sufficient manures, nitrogen was needed chiefly for the army, and all lines of agricultural production were decreased enormously. Even in 1924 the quantities of many crops sold by farmers, as well as milk and hogs, were one-third less than in 1913.

At the same time the inflation had deprived our farmers of an important portion of their property. All government loans, bank

credits, and so forth, were practically abolished. Moreover, within the sphere of agriculture, investments had been made which turned out to be failures under a stabilized currency. Towards the end of 1923 when this stabilization took place the German farmers had in hand the bulk of their crop, and the pre-war debts had become insignificant. But the farms were far from having preserved their old efficiency. High taxes were raised no matter whether the farmer had gained or lost, exceeding the pre-war level by some 400 per cent and simultaneously the international depression of agricultural prices made itself felt. Consequently as early as July 1, 1924, German agriculture had contracted anew a burdensome debt amounting to an average of about 150 marks per hectare on book-keeping farms. These figures have been published by the Enquete Commission which is investigating our economic situation. By the beginning of 1930 the debts pressing on German agriculture had risen to over 12 billions of marks. Only one quarter of this sum consists of pre-war debts which were partly revived by legislation in 1925. The progress of indebtedness has become slower during the years 1926-1929, and considerable sums again have been entrusted to saving banks and to cooperative societies. However, indebtedness continues to increase, and the last year's downfall of prices brought new complications.

Whoever became indebted, had to carry the burden of exceedingly high rates of interest which amounted to 20 or even 30 per cent in 1924. Since that time, interest rates have never gone substantially below 10 per cent for long time loans.

During the three years dating from July 1, 1924 to June 30, 1927, the German farmers had, as you see from the figures in table 1, 5.4 billions of marks at their disposal, or 540 marks per head.

As the prices of all commodities had arisen about 50 per cent over the pre-war level, 600 marks are indispensable now for the subsistence of a person. Consequently some 600 millions of marks had to be borrowed every year simply to keep the rural population alive. Other credits were needed to restore the efficiency of farms and to endow children leaving the rural home. Thus the whole debt was augmented approximately by one billion of marks yearly.

By 1928 the former efficiency of farms in Germany had been regained. Agricultural production was no longer lagging behind the pre-war level, and thus one important source of losses had been obliterated. But a sum of 1.2 billions of marks yearly is to be

paid instead, to the creditors, and the present depression on prices makes this burden all the heavier.

Prices rose in favour of the farmer in Germany as well as beyond her borders after 1924. The highest point was reached in 1927. In that year the index, in per cent of 1913, was as shown in table 2. The wholesale prices of all commodities had exactly the same index as that of all farm products in 1927. Only industrial consumers' goods were on a level of 160. But ever since that time prices have gone against the farmers' interests, and in April, 1930 the index of all farm products had gone down to 112 while in

Table 2 Index of Prices in Germany
1913 = 100

	1925	1927	April 1930
Cereals and vegetables	127	154	118
Animals. .	120	112	113
Animal products	162	143	110
Feedstuffs	122	146	99
All farm products	133	138	112
Industrial consumers' goods	172	160	162
Index of all commodities	142	138	127

dustrial consumers' goods were still at 162 and the index of all commodities at 127. The present state is almost the same as it was in April, 1930.

This low level of agricultural prices could not be prevented by all sorts of customs and tariffs, although they have been exalted again and again since 1925. Contrary to pre-war days, the customs have proved unable to make the domestic prices surpass those of foreign produce by the whole amount of the duty.

This fact stands in close connection with the general situation of economic life in Germany, especially with the high rate of interest. The rate of interest, however, expresses the shortage of capital and the insecurity of economic as well as political conditions. It is the inevitable consequence of the tributes Germany has to pay.

On the whole, if we consider the situation of agriculture in Germany and if we follow its causes, we always meet with the so-called reparation problem. The payments which are to be made to foreign creditors have made necessary the high taxes, and it was

the taxation which gave the first impulse to the debts contracted since 1924. But immediately another consequence made itself severely felt, namely, the high rate of interest. It is almost impossible to attain a satisfactory situation in agriculture so long as the rate of interest cannot be adapted to the conditions of farming, which do not by any means permit of making earnings of something like 10 per cent. Prices are also sensibly influenced by foreign debts, for the purchasing power of consumers is constantly curtailed and the railway freights must be kept high enough to fulfill the obligations laid upon the German railways.

So far, I have given a general survey of the situation of agriculture in Germany Of course the conditions are not everywhere exactly the same. There are, no doubt, not a few cases of mismanagement. Insufficient consideration of the changed economic circumstances has also caused serious difficulties in some instances However, it would be wrong to give too much weight to these cases which are certainly not to be regarded as peculiarly German

There are also differences in different regions of Germany as well as on holdings of different sizes. Roughly speaking, we can say that the situation is worst of all in the eastern parts of the country where large farms with an average size of about 1,000 acres occupy 40 per cent of the agricultural area, and where the sale of rye and potatoes is of special importance. In addition, the provinces neighboring the present frontier are suffering severely from the losses of markets, as their former buyers have been separated from them by an insurmountable wall of tariffs and other impediments Moreover, the larger holdings employing dozens of paid laborers could not meet the arising difficulties by cutting down the standard of living. This is the way in which the great masses of small peasant farmers have so far kept their ground. Such small holdings of from 20 to 40 acres are to be found everywhere in Germany. They are of overwhelming importance in the southwestern parts Their chief sources of income are from the sale of hogs and milk, but natural conditions do not allow them to refrain totally from crop production and especially from grain production In some parts of the country cabbage or other vegetables, fruits, and wine are chiefly produced by this class of farmers.

Farms of a medium size, from 40 to 200 acres, are predominant in the northwest, the middle, and the southeast of Germany. One

of their greatest difficulties is to get sufficient hands for agricultural work. Even the great unemployment of the last months has not yet perfectly done away with this distress, although the wages paid to unmarried laborers on these farms are not low when compared with town conditions in Germany (500 to 600 marks a year besides free lodgings and free food). Moreover, these farms have not yet achieved all the technical advantages a great holding can afford, nor will a reduction of personal expenses give them sufficient relief. But their position is nevertheless comparatively satisfactory where the market conditions are favorable, as for example, in the neighborhood of the Ruhr basin or in the industrialized parts of Saxony.

In all parts of the country there are still to be found farmers, large as well as small, who are doing well, for different reasons. But as a whole the situation is grave and full of dangers. Of the large holdings in eastern Germany, an alarming number has already succumbed to foreclosure and forced sale. Many others are indebted to a degree which leaves hardly any hope. In wide districts there is absolutely no demand for large farms. If they are not wanted for the laying out of small holdings, which is supported by financial assistance of the government, they are practically unsaleable.

In the middle, the west, and the south of Germany, where smaller holdings prevail and the natural, as well as the market conditions are as a whole more favorable, the crisis has not yet reached such a high degree. But the life on peasant farms is full of earnest sorrow and bitter privation. So far, they have held their own by extending the day's work and by refraining from all dispensable expenses. But this cannot last forever. The peasants' wives on whose shoulders lies a good deal of the farm work and especially of the dairy work, are especially hard hit, and in some parts of the country the smaller farmers have already great difficulty in finding apt wives. The dangers of the situation are to be felt with plain vigor in the case of inheritance or when an old farmer is willing to hand over his property to his children. These problems are fundamental for rural life in Germany, which is based upon the fact that the peasant families, as well as larger owners, are sticking to their land for sentimental reasons, as long as circumstances will permit, regardless of whether or not higher profits can be earned elsewhere. There are many thousands of farms which have been owned for

centuries by the families occupying them at present, and a sale, except between members of the family, does not take place but under the pressure of distress.

In Seligman's book "The Economics of Farm Relief", I read that for the United States the question is as to whether the inferiority of the farm to the factory, of agriculture to industry, shall be permanent. Methods are discussed of preventing the replacement of the American farmer, who has the highest standard of living which has ever been secured by a tiller of the soil, by a low-standard cultivator of the sort of the European continental peasant. For us in Germany the problem is as to whether our peasants can be preserved from a pauperism which threatens to make them almost slaves to their creditors and to the tax collector, and to ruin the foundations of rural as well as of national life.

What are the prospects for the future? The great depression of the '80's and '90's caused German farmers serious difficulty but it did not lead to a catastrophe. It was not merely protection which prevented the worst; farmers helped themselves in a manner which was probably more efficient than anything the government could do for them The yield per acre was increased by 40 per cent, the acreages of grain and roots were extended, the number of cattle rose by 20 per cent, the number of hogs was doubled, and the qualities of animals as well as of crops were improved. It was an intensification combined with rationalization, and the intensification turned out to be successful because German industry was growing and flourishing.

It was practically the same way that German farmers have tried to go since 1924. The pre-war level of agricultural production was regained in a comparatively short period. In all branches of agricultural life, work is going on with an energy as never before. But the results do not correspond to the efforts. The burden of debts continues to grow. Bitterness and despair begin to gain ground. There are, no doubt, possibilities of increasing the efficiency of farm work and thus lowering the costs of production, especially on the small peasant farms. But the realization takes either much time or a great outlay of capital, or both of them are needed. Capital is too expensive, and help is wanted immediately. There are still wide areas of heath and moorland which cannot be cultivated because of the shortage of capital. There is a great need of good drainages which cannot be built for the same reason.

Amelioration schemes can be performed only on a very modest scale within the reach of existing farms. The laying out of small holdings in the eastern provinces helps to make use of the area of the large farms which have collapsed recently, but it does not give a sufficiently vigorous impulse to economic life as long as its possibilities are so very narrowly limited. The chief reason again lies in the lack of capital.

Of course, there are ways of helping the farmers which could be followed successfully even now. A better organization of marketing is one of them. But the relief it can bring will never be decisive as long as the high burdens of taxes and interest are constantly compelling the farmer to sell, and thus prevent an orderly marketing. Besides, agricultural prices cannot reach a satisfactory level when the purchasing power of the whole population is cut down every year by the amount of about three billions of marks going to foreign creditors, political as well as private.

If things remain unchanged, the German farmers will be compelled to lower their standard of living more and more. That will mean a new pressure on agricultural prices as well as on the purchasing power of the urban population in Germany, and this pressure will no doubt be felt far beyond her boundaries. Furthermore, if the pauperization goes on as it did, the old strength of our rural families may break down and the social as well as the economic foundations will be in danger. The German farmers are not inclined to give way unresistingly. On the contrary, they are doubling their efforts in order to hold their own. But the question is whether they will be able to maintain their economic and social position. As long as the political problems and especially the so-called reparation problem are not solved in a reasonable way, human mind cannot see any hope to answer this question in the affirmative.

CAUSES OF THE AGRICULTURAL DEPRESSION IN GREAT BRITAIN

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ABOUT 1873 the period of agricultural prosperity and high farming in England, which had characterised the previous 20 years, passed away, and depression set in, which continued with minor ups and downs until about 1896. During that period the general trend in British agriculture was downward; prices declined; rents fell; marginal land went out of cultivation and as the depression deepened, distress and privation spread over a large part of the countryside. Towards the latter year the government set up a Royal Commission upon the agricultural situation, which, after taking voluminous evidence, stated its conclusions as follows: "We have no hesitation in expressing our entire concurrence in the opinion that the crisis in agriculture is due primarily to the fall in prices."

In 1920 the conditions of almost spectacular prosperity in British agriculture which had accompanied the World War abruptly came to an end and once more gave place to a depression which, although its intensity and character has changed, has continued ever since.

Today, in reviewing this depression we are forced to the same conclusion as that of the Royal Commission in 1896. The primary cause was the fall in prices.

When we come to examine the causes which have brought about the decline in prices we must first of all distinguish between those causes which lead to fluctuations in the general level of commodity prices taken together, and those which lead to fluctuations in the prices of individual products taken separately. Historically, it is the fluctuations in agricultural prices as a whole which have been of the greatest importance and have had the most far-reaching consequences, for price changes of individual commodities which are not part of a general change tend to neutralise one another, and therefore are less injurious to the farmer.

The initial step therefore in the analysis of the depression of the last ten years must be to examine the causes and agricultural consequences of a general fall in commodity prices.

Professor Sering in his address on Monday evening referred to the two periods of agricultural history which I have just mentioned —the period at the latter part of the nineteenth century, and the period beginning about the middle of 1920. Both were characterised by falling prices, both by agricultural depression spread over many countries Professor Sering sought to show that in each period the predominant cause of the fall in prices was the intensification of production—although other factors played their part. I must first of all give the reasons for respectfully differing from those who believe in this interpretation of these two important periods of agricultural history.

It is not uncommon to hear the view expressed that the general fall in commodity prices can be accounted for on the assumption that there has been a *general* increase in the world's production of goods in relation to consumption, or in other words that supply has outrun demand. Now it is obvious that in the case of a single commodity, if production outruns demand, the price will fall. But the phenomenon we have to deal with, characteristic of both the periods I have referred to, is a general and prolonged fall in commodity prices distributed in a fairly orderly and symmetrical fashion over the whole range of commodities. To assume that such a fall in prices can be accounted for by a maladjustment between supply and demand involves—I suggest—a conception of consumptive demand contrary to experience.

The incentive to increase the gains of industry is always present; indeed it is the motive of economic progress. The twenty years preceding the war were probably as prolific a period of intensified production as any in history (taking the world as a whole).

Carl Snyder has calculated from a wealth of statistical data, that trade in the United States has been increasing during the last fifty years at the compound rate of 4 per cent. Joseph Kitchin, measuring the economic progress of the world by figures of physical production, arrives at a similar conclusion. The League of Nations in its Memorandum on Production and Trade estimates the recent growth of world's production, at approximately a rate of 3 per cent.[1]

World population has been increasing during these periods at approximately 1 per cent per annum. Therefore, it is true to say

[1] See Strakosch-Economist, July 5, 1930, "Fall of the Price Level."

that there has been excess of production in the world of about 2 per cent per annum, over and above the needs to maintain the increasing population at a stationary standard of life. Yet, during the 20 years before the war, prices were rising and not falling, and except for a short period about 1907, none of the phenomena which have characterised recent years were present.

On these grounds alone we are entitled to doubt the theory that a general fall in prices is caused by supply outrunning demand. But it should be obvious that an increase in production distributed evenly over the whole range of commodities cannot alone lead to what is ordinarily meant by over-production

Trade is an exchange—between individuals, between communities, between nations. The farming community exchanges the produce of the soil for the produce of the towns. If the volume of production of the whole range of commodities increases 3 per cent, then each producer would on an average have 3 per cent more of his own produce to exchange for the produce of others; farmers would exchange their greater produce for the greater production of the towns and both would be enriched. No disturbance in the exchange of this greater output, no fall in prices, takes place so long as there are available media of exchange in the form of money, to correspond with the increased volume of trade.

This does not, of course, mean that agricultural prices as a whole cannot be depressed relative to the general level of prices, by a relative intensification of agricultural production, or as Professor Sering truly pointed out, through a fall in demand for farm produce, as a result of the impoverishment of an industrial community. In so far as deviation from the line of symmetrical production occurs, in the case of a single commodity or in a class of commodities, the result is shown in a corresponding deviation between the price of that commodity and the general price level.

But the outstanding characteristic of the fall in prices during the last 10 years has been the evenness with which it was spread over all classes of goods—particularly is that true of the earlier years in this period. To explain a fall in prices possessing this particular feature, we are bound to assume that it is caused, not by a change in supply and demand, but by a change in the purchasing power of money.

The monetary interpretation of the periods of depression which have from time to time afflicted agriculture, is not merely arrived

at by the reasoning I have just briefly outlined. The direct historical evidence is overwhelming. It is no new fact in agricultural experience that the industry should be feeling the consequences of a general price movement. So far as we have statistical data to go upon, it would be truer to say that agriculture has hardly ever been in any other position.

The long period changes in the fortunes of British farming—from prosperity to depression, and again from depression to prosperity—have been more intimately connected with the changes from the upward to the downward, and from the downward to the upward movement in the general level of commodity prices, than with any other single economic cause. These periods are roughly:

1815-1850	Prices falling	Agricultural depression
1850-1872	Prices rising	Agricultural prosperity
1872-1896	Prices falling	Agricultural depression
1896-1914	Prices rising slowly	Agricultural recovery
1914-1920	Prices rising rapidly	Agricultural prosperity
1920-1930	Prices falling	Agricultural depression

These are periods well known to economic students, but their significant feature is that the change from falling to rising prices, and from rising to falling prices, was in each case, without exception, associated with a change in monetary conditions. The twenty years of agricultural prosperity from 1850 onwards, was associated with the discovery of new gold mines in California and Australia and the rapid expansion in the world's stocks of monetary gold; the depression of 1872-1896 was associated with the spread of the gold standard to bimetallic countries and countries whose currencies had previously been upon a silver basis. The recovery after 1896 was associated with the development of the cyanide process of gold extraction in South Africa and a rapid addition to the world's stock of gold; the prosperity during the war with the abandonment of the gold standard and the war time inflation; the depression which followed, with the post-war deflation which started in 1920.

The next step, in the diagnosis of the present situation is to examine the agricultural consequences of a general fall in commodity prices arising from monetary causes.[2] The consequences

[2] Agriculture in Great Britain throughout the last decade has suffered, not so much because prices were low, as because they were falling.

are of two kinds: One is the effect due to the long period of turnover which is a necessary part of farming operations, and the other is the effect on the relation between the fixed charges in agriculture and the prices of agricultural produce.

1. A long period of time elapses between the expenditure in production costs, and the receipt of the proceeds of sale of the farm products. In effect the farmer buys his requisites at one price level and sells his produce at another. If the general price level has fallen in the meantime, he makes an unexpected loss; if it has risen, he makes an unexpected profit. This interval of time has been investigated by Mr. Dampier Whetham of Cambridge University and is related to what he has termed the "economic lag" in agriculture. By weighing the various factors in production, he calculates a fixed period as though all costs were incurred at one time and all sales off the farm were effected at one time. By these means he found the "economic lag" to be about fourteen months for a typical arable farm, and about 7 months for a typical grass-dairy farm. Hence, this effect of a general fall in prices is more severe in arable, than in grass-dairy farming.

2. The other direct effect is upon the fixed charges in farming and those costs which can only be adjusted downwards with difficulty. Conspicuous amongst these is mortgage interest. The indebtedness contracted to be paid off over a period of time is incurred by the farmer on the assumption that the purchasing power of the monetary unit in which the debt has to be repaid will remain the same in the future. If this does not happen and if the purchasing power of money is altered, it follows that the real cost of redeeming the debt is altered. This is precisely one of the things that has happened in our country. The farmer who bought his farm in 1920 or thereabouts, raising the purchase money by way of a mortgage on the then value of the farm, must have found that in each year of falling prices a larger and larger part of the produce of the farm had to be sold in order to pay the mortgage charges. Similarly as regards rent. Rent is not adjusted downwards automatically with prices and, therefore, as prices slowly fall, the burden of rent increases; a disparity develops and continues to widen until some readjustment has to be brought about by agreement between landlord and tenant. Hence a fall in rents has usually lagged behind a fall in produce prices, as was shown in the long depression after 1873. In the depression during the last ten years this factor

has, however, probably been of less importance than in the former period since the level of rents did not rise during the war anything like so high as the level of prices On the other hand wages (in many branches of farming the largest single item in the cost of production) have since 1925 become, to all intents and purposes, a fixed charge. As prices have fallen wages have remained at approximately the same level, real wages have risen, and the farmer has found as in the case of other fixed charges that each year a larger and larger amount of produce must be sold off the farm to meet the wages bill. Wages are a higher proportion of the total costs in arable than in grass farming, and consequently the general fall in prices has once more worked itself out with greater severity amongst arable farmers.

These are the chief of what we may call the direct consequences of a fall in prices due to monetary causes, but indirectly monetary changes have exerted a profoundly important, if less easily analysed influence on agriculture.

A general fall in the level of commodity prices creates what may be called an unfavourable economic environment in which the farmer's calculations, based on the ordinary data of experience, must almost inevitably be miscalculations. The farmer, for example, lays out a certain amount of money on the cost of production and often incurs certain debts to banks, tradesmen and others, relying on his normal farm receipts to clear the debts. In so doing he obviously takes the usual risk of fluctuations in price which are unavoidable in farming, but his expectation is that in the long run these fluctuations will average themselves out. In a year of bad prices, due say to an abundant world harvest, he may not be in a position fully to discharge his farming debts and he therefore carries on, on credit, in the expectation of a future improvement in prices. In normal circumstances this is a perfectly correct use of credit, but if monetary causes are bringing about a *general* fall in prices, these calculations must inevitably be misleading. A year of bad prices is followed by another and another, and the expected recovery does not come. One of the consequences therefore of a fall in prices arising in this way is a tendency for the volume of debts to increase and to be carried forward even after prices have become stable. I have little doubt that the burden of debt is one of the really depressing influences in British agriculture today, at any rate in certain districts. Unfortunately we have no direct means of

ascertaining the total volume of farm indebtedness, but what evidence is forthcoming from indirect sources appears to confirm the view that, particularly in arable districts, farming is handicapped precisely in this way. A burden of this kind hampers enterprise, prevents execution of improvements, and even restricts production.

Again, agriculture at all times is exposed to relatively violent fluctuations consequent upon large world harvests, good or bad seasons, outbreaks of disease, and so forth. Now one of the effects of a falling price level due to monetary causes is to create a state of affairs in which agriculture is less able to sustain the shocks, due to adverse seasons or similar causes, than it otherwise would be. When a fall in the price of an agricultural commodity due to abundant foreign supplies, or a loss of profits due to some other cause, has been superimposed on a fall in price due to monetary causes, the result not infrequently has been to cause a crisis amongst the producers of that commodity. The same applies to bad harvests or other causes of failure. There are several historical instances of this. The cold and wet summer of 1879, accompanied by one of the worst harvests and outbreaks of disease amongst cattle and sheep, produced such a crisis. Severe depression was caused in this way by the pressure of foreign wheat on the British market in the late seventies and from about 1882 to 1895. Two cold summers in 1891 and 1892, and a drought in 1893 again produced a crisis. During the whole of this period commodity prices were slowly falling owing to the appreciation in the value of gold. In the post-war period we have the minor crisis of 1923-24, which mainly affected the corn growing districts and was largely due to the great expansion of production of cereals in the United States, Canada, the Argentine and Australia during the war. We have also the fall in meat and livestock prices in 1926 and 1927 brought about by the increased imports of chilled beef from the Argentine during the so-called Argentine meat war, and finally the present critical condition in regard to a large part of the arable districts due mainly to abnormally low cereal prices consequent upon abundant world harvests.

During the last ten years all the influences described in the above paragraphs have been operative in a greater or less degree. In the first part of this period the fall in prices that occurred was the most rapid for which we have statistical records, and but for the fact that it followed immediately upon a period of rapidly rising

prices (1914 to 1920) during which large profits were made, agriculture would have undoubtedly suffered a more serious crisis. At the end of 1923, British farmers were in a position, so to speak, of having to write off the previous ten years as a wholly abnormal period. Large profits and large losses had been made, but except in the corn growing districts where exceptionally low cereal prices had prevailed, the position was not serious. What agriculture now needed was a reasonably stable level of prices; it required a period of recuperation from the financial difficulties which the three years of deflation had imposed upon it.

Unfortunately the signs of greater stability which appeared in 1924 proved to be only temporary and in the following year, and subsequently, ill prepared for it though they were, the farmers had to face a further fall in prices. From the beginning of 1925 there was a decline in the general price level which accompanied the raising of the dollar exchange to par, and from 1925 onward there has been a further and almost unbroken decline in commodity prices, in which agricultural prices have shared to a nearly equal amount.

We may now turn to some of the non-monetary factors in the situation. Apart from the fall in prices the other general factor affecting agriculture is the rise in wages. Under the Agricultural Wages Act of 1924 minimum rates of wages have been fixed in England and Wales which have had the effect of raising weekly earnings of agricultural labourers to a level of about 76 per cent above pre-war. Owing, however, to the shortening of hours which followed upon this legislation, the actual cash payment for hired labour per hour has risen substantially more than this. It has been estimated to be approximately double what it was before the war. We can now carry the analysis a step further. I have attached to this paper a table which compares the movement over the last ten years of the index of agricultural prices with that of general commodity prices, and have then added three columns to the table in which the agricultural index is split up into three components representing:

Firstly, "Live stock and live stock products," secondly, "Cereals and farm crops," thirdly, "Fruit and vegetables" (table 1).

These in turn are compared with the price indices of fertilisers, feeding stuffs, and wages. The table gives in exceedingly compressed form the summary of the agricultural depression in Great

Table 1. Percentage Increase of Prices Over Pre-War

(Base of Statist figures is 1913, of agricultural produce, feeding stuffs and fertilizers 1911-13, and of agricultural wages, 1914).

Year	All commodities (Statist)	Agricultural produce generally	Live stock and live stock products	Cereals and farm crops	Fruit and vegetables	Feeding stuffs	Fertilisers	Agricultural wages	Approximate cost of employing hired labor per hour
1920	195	192	192	185	247	173	159	—	
1921	82	119	128	90	176	81	120	—	
1922	54	69	76	49	90	46	47	74	
1923	52	57	66	28	103	36	23	56	
1924	64	61	63	54	75	54	19	56	
1925	60	59	64	44	92	52	14	72	100
1926	48	51	58	34	62	25	13	75	100
1927	44	44	44	39	65	39	10	76	100
1928	41 2	47	51	34	82	54	−2	76	100
1929	35·3	44	52	23	60	39	Nil	76	100
1930[1]	21.2[2]	36	49	6[3]	22[4]	6	2	76	100

[1] April only.
[2] March 31, 1930
[3] Excludes hops
[4] Vegetables only

Britain during the last ten years. I need not read it in full but the most significant features are the relatively slow fall in prices in the live stock and live stock products group, and the relatively rapid fall in the cereals and farm crops group. Today the position is approximately as follows:

All commodities	21 per cent above pre-war
Live stock and live stock products	49 per cent above pre-war
Cereals and farm crops	6 per cent above pre-war
Fruit and vegetables	22 per cent above pre-war
Wages per hour (approximate)	100 per cent above pre-war

In regard to the live stock group, the prices are substantially higher than the general price level partly owing to the good prices obtained for milk in the last few years. The chief disparity in this case is, of course, between prices and wages. But labour on the whole forms a smaller proportion in the total cost of production than in the cereals and farm crops group. Moreover, against a higher cost of labour must be set certain compensating advantages in the low costs of feeding stuffs, and the fact that the level of rents has been lower than the level of prices. This group represents about 70 per cent of the total output of British farms, and it seems a reasonable inference from the facts—which is confirmed by special investigation—that no serious depression exists today in this most important section of British farming.

When we turn to cereals and farm crops, a very different state of affairs is shown. All the factors which I have mentioned have tended to concentrate the depression mainly upon farmers engaged in the production of arable crops; not only have prices of cereals and other crops fallen, but they have fallen substantially faster than commodity prices. The relationship is the reverse in that of the live stock group. Further, in this group labour forms a relatively high proportion of the total costs and the low prices for fertilisers has gone but a little way toward compensating the farmer for the disparity between cereal prices and the cost of labour.

I need not refer at any length to the causes which have brought about the relatively heavy decline in the prices of arable crops since these are well known. From a table prepared by the International Institute of Agriculture it is easy to see the extent to which the chief wheat producing countries have contributed to the world's output during the five years prior to the war and during the four years, 1925-28 (table 2). It is clear that the main disturbance

shown in this table dated from the world's record harvest of 1928 The present low level in prices of barley and oats in Great Britain is partly due to the influence of the excessive supplies of wheat, partly to the heavy European production of feeding crops in 1928-29, and to some extent, in the case of oats, to the imports of so called bounty feed oats from Germany. A sharp fall in the prices of potatoes in 1929-30 which contributed to the low level of prices in the "cereals and farm crops" group was primarily due to over-production at home.

Such in general outline are the causes of the depression which has afflicted British agriculture during the last ten years. Today,

Table 2. World Production of Wheat During the Five Years Prior to the War, and During the Period, 1925-1928[1]
(Millions of quintals)

Country	*Average 1909–1913*	*1925*	*1926*	*1927*	*1928*	*Average 1925–1928*
Europe[2]	371	380	329	347	383	360
Canada	54	108	111	131	154	126
United States	188	184	226	239	246	224
Argentine	40	52	60	65	84	65
Australia	25	31	44	32	43	37
British Indies	96	90	88	91	79	87
Other countries[3]	49	60	57	62	62	60
Total[1]	823	905	915	967	1,051	959

[1] Not including the U S. S R. and China
[2] Not including the U S S R
[3] Not including China.

for the reasons I have given, it would not be true to say that the whole of our agriculture is suffering from depression. Indeed severe depression exists in an area covering not more than ten to twenty per cent of the total agricultural area. The remainder is on the whole in a fairly satisfactory condition. When we turn to the future after giving full weight to the difficulties arising out of the present wheat situation or the temporary over-producion of other products, we are still left with the general over-riding problem—important alike to Great Britain and all other gold standard countries—namely, the future purchasing power of gold.

For agriculture, as for all other branches of economic life, this seems to constitute the economic problem. If agriculture is to escape from the long-period alternations from prosperity to de-

pression, and again from depression to prosperity which have characterised the past, this problem must be solved. In an article in the Statist newspaper of May 11, 1929 entitled "Four Years of the Gold Standard" the following passage occurs:

"If the nations of the world, having returned to the gold standard, decide to work their currency systems in the way in which they worked them before the war, if they insist upon maintaining the traditional gold reserves, it stands to reason that we shall revert, as regards the general level of prices, to the position that we would not occupy had there been no war. This position, we may rest assured, is considerably nearer the pre-war level of prices than that which now obtains. If, therefore, the theoretical perfections of an absolutely automatic currency system are so exalted as to repress any attempt at intelligent control of the value of gold, we may well see during the next decade a continuation of the downward trend in prices that has been maintained, with slight temporary reactions, since 1920. Let us remember that between 1873 and 1896, during the whole of which period an essentially automatic gold standard was in operation, sterling prices were nearly halved, falling, according to the "Sauerbeck-Statist" figures from 111 to 61. The price paid for this steady twenty years' appreciation in the value of gold will be familiar to any student of the economic history of all big trading nations in the world during that period. (If the uncertainty, the artificial discouragement to industrial expansion, evident during those closing decades of the nineteenth century are to be avoided, intelligent international management of the gold standard must be attempted.)

This general view of the situation seems to me incontrovertible. The future now depends on the chances of "intelligent international management," and this unfortunately still remains very problematical. The first step towards this end, was taken in 1922 at the famous conference at Genoa, when general lines for international cooperation were proposed. Since then little has been done officially, though some believe that the establishment of the Bank of International Settlements may provide a common meeting ground where international cooperation in monetary policy may be developed. In the meantime the tide continues to ebb.

So far as agriculture is concerned, I think the correct inference from what we know about the present international monetary situation, is favourable for the near future, but unfavourable for

the more distant future. The correct assumption on the available facts is that in the absence of a more definite international monetary policy, monetary factors are likely, after a short time has elapsed, to continue the slow downward pressure on prices, rather than that prices will remain stable. We should therefore not be justified in assuming that this influence in the agricultural depression has ceased.

We have, however, to recognise that in recent years a great deal of knowledge has been acquired on monetary economics. The events of the war and post-war periods have thrown a flood of light on many questions which were obscure or controversial. The immense powers for good or ill which can be exercised by the central banks by virtue of their control of credit have become better understood, not only by economists, but by representatives of industry and trade, and I do not think there can be any doubt that principal central banking authorities, such as the Bank of England and the Federal Reserve Board, wish to secure monetary stability if they can. To us as agriculturalists the monetary factor, supremely important though it is, is unfortunately outside our control. I will only say in conclusion that it should never be outside our observation

THE PROBLEM OF AGRICULTURAL SURPLUSES IN THE UNITED STATES

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"THE Agricultural Surplus Problem" has been discussed ever since 1920. The Farm Board in the United States, the Paterson Plan in New Zealand, and parallel innovations in governmentally operated or supported economic activities in many other lands have been proposed or adopted to cope with the problem. Yet there is no general agreement as to just what an "agricultural surplus" is. It is therefore necessary to make clear the sense in which I shall use the term.

By a "surplus" of an agricultural product I shall mean the presence of a supply large enough to depress prices to such a point that the bulk of the producers of that commodity are not able to maintain standards of living, satisfactory to themselves. This definition affords no clear-cut criterion for the existence of a surplus, and attempts to refine it would lead us into lengthy discussions as to the meaning and significance of "standards of living"; yet it represents the general idea we have in mind perhaps as well as any other statement which has been suggested.

This is in line with the definition of an "economic surplus" suggested by the Food Research Institute.

"The term surplus has come to be commonly if somewhat vaguely applied to that fraction of the crop which prevents the marketing of the crop at prices remunerative to the growers as a whole. . . . . The higher one fixes the price to be regarded as remunerative, the larger will be the surplus whose existence prevents the attainment of the remunerative price. . . . . The volume of the surplus in this sense depends (for wheat) on world conditions of supply and demand."[1] It is evident that in this last definition, the "remunerative price" leaves the same room for argument that "satisfactory standard of living" leaves in the definition I am suggesting.

It should be noted that a surplus, as just defined, has no direct relation to export or import of a commodity. There have recently

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[1] "Wheat Under the Agricultural Marketing Act," Wheat Studies, Vol V, No 9, August, 1929, pp. 355-357.

been world-wide surplus situations in sugar and in wool, yet we import both of them; there have been serious surpluses in some years of crops such as potatoes, or watermelons, which do not enter into foreign trade in appreciable amounts; prices of both butter and sheep have been seriously depressed recently by the existence of surpluses, without significant export movement. Apple crops were so short last year that prices were high and no apple surplus could be said to exist; yet we exported considerable quantities of apples. An excess of supply above the quantity which can be disposed of at satisfactory prices, and not the place at which it is disposed of, seems the best criterion for the existence of a surplus.

The world-wide agricultural surplus problem goes back to the war and its consequences, and has been aggravated by the continually accelerating pace of technological improvements in agriculture.

The expansion of production here and elsewhere to meet the needs of war-torn and disorganized Europe has been generally recognized. What has been sometimes overlooked is that as Europe recovered her productive ability, no compensating reduction in production elsewhere could be either easily or readily made Figures recently compiled by the League of Nations give a rough numerical measurement of the magnitude of the post-war changes In 1923 and 1924, when European post-war recovery was already well under way, the food production of Europe was still 13 per cent below the pre-war level, whereas that of North America was 19 per cent above pre-war. By 1928, Europe had increased her output to 8 per cent above pre-war, and subsequently to even more; but North American production also increased, exceeding 25 per cent above pre-war in 1928. As a consequence, world production of foodstuffs, which in 1923 and 1924 was but 3 per cent above that of 1913, by 1928 had increased to 16½ per cent above 1913. World population, meanwhile, increased but 10 per cent from 1913 to 1928, leaving per capita production of food 6 per cent greater in 1928 than in 1913.[2] Meanwhile, the world-wide increase of urban population, and the continuing substitution of mechanical power for human muscle may have tended to reduce the per capita demands for food, at least for the cheaper

[2] All of these data exclude China, but include Russia.

energy-supplying grains and vegetables. The huge accumulations of wheat, cotton, butter, and feedstuffs, which this last crop year has witnessed, all bear witness to the world's ability to over-feed itself—and to its unwillingness to expand its waist-line to keep pace with food production.

It is true that the increased production of food has resulted in a reduction of under-nourishment; but a reduction in groups of such low purchasing power that they can increase consumption only at very low prices. The groups that are still under-nourished —as in India or China—are so inaccessible or at such low levels of subsistence as to be almost uninfluenced by world prices, no matter how low they should fall.

Improved methods of agricultural production, which have always been a factor in our agricultural evolution, have been adopted at an ever-increasing rate. Foremost is the general adoption of the tractor, which has reduced horses and mules on farms in this country by six million head—just 25 per cent—since 1913, and freed millions of acres for the production of products for sale instead of for feed for work animals. The improvements in methods of producing crops and livestock, and the development of still further perfected machinery, notably the combine harvester, have lowered costs and brought into crop production much new territory that previously was used for range and other less productive uses.

Unfortunately the sequence of lower costs, increased production, and reduced prices, does not automatically result in withdrawal from production of those producers who cannot reduce costs. Farmers in older producing territories, so situated that they cannot utilize the new methods, may find their margin of profits reduced or eliminated as a result of the lower prices; yet with all their capital tied up in their farms, with no training except for farming, and with no better alternative evident to them, they may struggle along for years, reducing their standards of living, impoverishing their soil, and living on their capital, while their buildings decay and their livestock dwindles away, before at last the pressure forces them out and agriculture fades into minor significance as it has already in so many areas in this northeastern section of the United States. So the net result of the lower costs is new expansion of production on the one hand, only partially and to a slight extent offset by contraction on the other. To date the rate of expansion has exceeded the rate of contraction.

Turning from this brief sketch of the forces which have developed the general surplus situation—to which industrial depression and accompanying under-consumption have recently been a significant addition—we may next consider the more vital question as to what can be done to improve the situation. This discussion falls into two broad parts; the prevention of the occurrence of surpluses, and the mitigation of their effects once they have occurred.

Prevention of the occurrence of surpluses presents itself as the soundest and most satisfactory solution which could be offered, and the only one which might be expected to work over a long series of years. Much of the basic information on which to base a program of surplus prevention is already at hand. The research work which has been done on the analysis of factors influencing the prices of farm products, and its practical application during the last eight years in the forecasting of future economic developments for each commodity in the Outlook Reports of the Department of Agriculture and of the agricultural colleges, have proved that economic developments in the major agricultural products can be judged from six months to a year and a half ahead with at least as great a degree of accuracy as weather can be forecasted a week ahead. But there are many difficulties in the way before this knowledge can be fully applied to secure a rational and conscious adjustment of agricultural production to the prospective demand, even within the wide limits of error which result from the influence of weather variations on output.

The limitations are of two sorts: (1) in getting the farmers to comprehend and follow the information; (2) in getting them to act on the facts, even when the situation is known. Let us take up this latter phase first. In attempting to adjust crop production, it is quite true, as Dr. W. J. Spillman has pointed out in his book, "Balancing the Farm Output," that the acreage of minor crops like potatoes, or of tobacco, or of cabbage, or of flaxseed, may be reduced to make the best adjustment to the prospective economic conditions, without materially influencing the prospects for major crops, such as corn, or wheat, or cotton, which might be substituted for them. But when we attempt to reduce wheat by substituting hay, we only shift the problem without improving the situation as a whole. The five major crops, corn, hay, wheat, cotton, and oats, occupied last year 320 of our 367 million acres of

crop land. The smallest of these major crops, oats, occupied 40 million acres; no crop, other than the five mentioned, occupies as much as 15 million acres. While it would be possible to prevent a surplus by reducing acreages of minor crops, and substituting major ones, continuous surplus production of the major crops could be prevented only by an absolute reduction in crop acreage as a whole, and not by readjustments between different crops.

A somewhat similar situation holds true among our livestock. Except for sheep, no major reduction in one class of livestock could be made without compensating increases in other classes. Shifting the use of feedstuffs from hogs to beef cattle, or to dairy cows, or to poultry, might relieve a surplus situation in one line by aggravating it in another, but it would not cure the situation as a whole. Of course, the length of the production process in livestock, the slowness with which producers can readjust production, and the consequent irregular cycles of over- and underproduction, lead sometimes to maladjustments of production between different classes of livestock which offer much room for improvement, and for profits to individual producers who are quick to grasp and meet the situation; but as a whole, the possible relief afforded by such readjustments is limited.

It may be noted in passing, however, that a pound of meat or of livestock products represents the feeding of the crops from a good deal larger area of land than is required to produce an equivalent quantity of food directly from grains or vegetables. If it were possible in some way to greatly increase our consumption of beef, for example, at the expense of some reduction in the consumption of crops directly for food, it would increase the crop area which would be needed to meet the demand, and so tend to relieve the chronic surplus situation. But unfortunately the general trend of our food habits is in the opposite direction, and the present industrial depression with the lower buying power of consumers has intensified this tendency. Hence, even if the package selling of meats and other changes in retailing methods should materially reduce retail meat prices, there is little likelihood that it could reverse the general course of consumption changes.

In spite of all the limitations which have been mentioned, adjustment of agricultural production so as best to meet the prospective demand, offers one of the most hopeful approaches to the surplus problem. A great deal of research and extension activity

has been devoted to the questions of how best to appraise the national and state outlook, how to interpret the general information in the light of specific local situations, how to combine the outlook with farm management fact and knowledge so as to assist farmers in making both short-time and long-time decisions for their own farms, and how to acquaint farmers with the continually changing economic facts and with the ways in which they could bring them to bear on their own farm problems. Much progress has been made, but much still remains to be done both in improving the accuracy of the information, and in getting it "across" to the farmers; perhaps one of the greatest services which the Farm Board will perform will lie in stimulating state and federal agencies to even more effective and adequate work in this direction.

But even though all farmers were fully acquainted with the outlook facts, the problem would still remain of getting them to act on those facts. And it is at precisely this point that one of the most difficult dilemmas of the entire surplus problem arises —a dilemma that has been dramatically called to the attention of the entire country by the wheat acreage campaign of Chairman Legge, and by his debates with Governor Reed.

It is true that if all the cotton, or all the potatoes, or all the beef cattle, were produced by one giant corporation, that restriction of production to some reasonable volume below the levels that have resulted in surplus production in the past, would increase the value of the product, and much increase the net income, even if some good land had to be left idle in the process But farm production is not run by such giant monopolies; each producer sees that his own individual production has no perceptible influence on the total product, and he is inevitably driven, by the grim necessity of paying his taxes, meeting his bills, and buying gas for his tractor and his auto, to use each acre of his farm in the way that promises to return the most for its use, in the light of all the factors as he sees them.

The fundamental difficulty arises in trying to make the economic theories of monopoly work under the conditions of the most highly individualistic of all industries. There are six million or more individual farm operators in this country, each deciding on how to run his farm in the light of his own interpretation of what will pay best. Even if it were true that reducing the acreage of some particular crop, such as wheat, might advance prices by a more

than compensating amount, an individual farmer who was not already losing money on the crop would not be certain to gain by such a reduction unless he had assurance that all the other producers of the product were reducing by an equivalent amount. If he were a low-cost producer, and it appeared to him that a larger operation would increase his profits even if prices should be somewhat lower, he would be an exceptional man if he were guided by considerations of general welfare, instead of following the course which promised him, as an individual, the greatest net returns.

Further development, localization, and energetic extension of outlook and farm management information can do much to widen the view which each individual farmer takes of the prospective situation, and to help him make sounder decisions; but for the present it seems that the most we can hope is that each individual farmer will decide on his operations in the light of what promises to pay him best as an individual producer—as our German friends would say, what would pay him best *an sich.*

Beyond the prevention of surpluses by readjustments of production between farm enterprises, and the voluntary reduction of acreage, lies the possibility of reducing production by better land utilization as between agriculture and other uses, and by the development of more rational and scientific national and state land policies to take submarginal land out of production. This problem will occupy an entire day at these sessions, and therefore I merely mention it now, so that it will not be overlooked as one of the long-time approaches to the prevention of agricultural surpluses.

But if we do not yet see how surpluses may be wholly prevented, it may still be possible to take measures to alleviate their effects once they have occurred. While this may be treating the symptom rather than the cause, it is after all the symptoms which cause the patient such great distress; perhaps that is why the greater part of the proposals for farm relief have had to do with alleviation rather than prevention.

One of the most satisfactory ways of alleviation, and one that produces the smallest amount of unfavorable consequence, is to improve the efficiency with which the product is marketed. This may be in improving the efficiency of marketing, improving quality, and reducing costs, and so increasing the net return to

the producer; or it may be in seeking out wider markets, making contacts with and developing new customers over a wider territory, and so expanding the demand for the product. Services of this sort were responsible for much of the success of the California citrus co-operatives, and for the brilliant record of the Land-O'Lakes association; it is partly with the hope of securing such benefits to the producers of all commodities that the Farm Board has followed a vigorous policy of encouraging the development of cooperative associations wherever there were reasonable prospects for their success.

It must be admitted, however, that there are limits to what people can eat or wear, and to the extent to which costs of distribution can be reduced, so in spite of all that cooperatives have accomplished or may yet be able to accomplish in these directions, there still remains a wide field for the mitigation of the effects of a surplus.

If the surplus is of a temporary character—as, for example, a heavy peach crop, or a single large crop of cotton, in a period when supplies are not otherwise excessive, or a heavy excess of butter supplies above current consumption, such as occurred last fall and winter—some measure of relief may be afforded by a stabilization operation, withdrawing part of the supply from the market at one period, and selling it at a subsequent period when supplies are shorter. Such an operation tends to keep prices from going as low as they otherwise would in the period during which the supply is withdrawn from the market, and from going as high as they otherwise would at the time they are released for sale. Stabilization operations, as Dr Davis has wittily pointed out in a paper read at the meeting of the Institute of Cooperatives at Columbus, Ohio, may be likened to the shock absorbers or stabilizers on an automobile, which prevent much of the jars and bounces from reaching the occupants or the machinery, and yet permit the machine to travel the way it is going—uphill and down, around curves or on the level. In the same way stabilization operations can neither horizontalize nor elevate the course of prices; they can merely smooth out their course, by ironing out some of the depressions and some of the peaks.

But where a surplus condition is not temporary but continuous, recurring year after year, stabilization operations alone can do but little to improve conditions. Economists have long pointed

out that once a supply of a commodity is in existence, it will continue to influence price, even if it has been withdrawn from the available supply. One major accomplishment of the Farm Board during its first year of existence has been to prove to the public that the economists knew what they were talking about—that withdrawing a portion of the supply of cotton or wheat from the market could not permanently neutralize its influence on prices, so long as it was in existence and available for future use.

With a continuous surplus—such as we have had with several major products since the war—the possibility of mitigating the effect depends on some arrangement which will secure a higher price in spite of the existence of the surplus. That means that in some way the economic situation must be so modified that the price is not established in the way it would be established under the usual competitive market conditions.

Under free competition, the price at which the last unit can be sold determines the price for the entire quantity which is sold. When supplies of any non-perishable commodity are in excess of the quantity which will be consumed during the crop year, prices drop until someone is willing to take the risk of buying the excess and carrying it over into the next season. Or for a perishable commodity, when supplies are in excess of the quantity which can be taken for consumption, prices drop to the prime costs required to complete the marketing process from the point where the surplus is available. The fruit on the trees, the potatoes in the ground, or the watermelons in the field, lose their entire value, and only the necessary costs of marketing are remunerated—and sometimes not even those.

The effects of continuous surpluses can be mitigated only by some method which prevents prices from being influenced by the surplus in the manner just described. Thus a higher return for the whole production could be obtained if in some way a "class price" could be established for part of the supply, so that the usual quantities would be taken by consumers at a price higher than would otherwise prevail under surplus conditions, while the surplus was being disposed of in some manner so as not to influence the prices for the bulk of the supply.

Class prices are well recognized in the case of services which are non-transferable, and which therefore can be sold at a higher price to one purchaser than to another. Surgeons' fees are the

classic illustration; varying railroad rates on different commodities are another. "Bargain sales" and "cut-rate stores" represent still another example, but these approach more closely to competition with the major outlet itself.

The "class price" idea has been successfully applied in the case of some agricultural products which have both a high-value and a low-value use, and where once a portion of the supply has been relegated to the low-value use, it is permanently removed from the supply for the high-value use. Fluid milk is the star example. Butter and cheese both offer lower priced outlets for disposing of the surplus product, and keeping the remaining supply of fluid milk low enough so as to maintain its price.

The same low-class disposition of surplus has been tried with other products, though with less marked success. In the case of many perishable or semi-perishable fruits and vegetables, the marketing of the low-quality or under-sized portion of the crop may reduce prices for all grades. Disposing of this surplus by canning or other processing eliminates it from the fresh market, and so results in a higher price for the remaining supply. Oranges, lemons, apples, grapefruit, and grapes are some of the products in which this method has been either tried or proposed. The grape-control plan now being put into operation in California, for example, contemplated withdrawing the surplus of grapes from the fresh-fruit market, and relegating them to grape concentrates and other manufactured products. It is expected that this will so maintain prices on the quantity sold fresh that even after paying the losses, if any, on the surplus-disposal operations, the growers will be much ahead. The fact that the 1,751,000 ton crop of 1929 brought California grape producers a total return 30 per cent larger than did the 2,366,000 ton crop of 1928, would seem to give ample basis for this expectation.[3]

[3] Production, Farm Price, and Total Farm Value of California Grapes, 1928 and 1929*

Year	Production	Average farm price	Total farm value
	(Tons)	(Dollars per ton)	(Dollars)
1928	2,366,000	16 06	35,538,000
1929	1,751,000	26 52	46,445,000

* PRELIMINARY DATA FROM CROPS AND MARKETS, DECEMBER, 1929.

To a certain extent, of course, operations such as those proposed for grapes represent spreading through an entire season a surplus which otherwise would depress prices only during the seasonal marketing period. To the extent that the manufactured products do not compete with fresh grapes, however, this does not complicate the situation for the grape producer, though it may for producers of other fruits for canning or processing.

It is possible that even with staple products, such as wheat, the surplus situation might be materially ameliorated by the relegation of part of the supply to an inferior use. Thus, if a considerable quantity of low-grade and cull wheats, which are always difficult to find markets for, were ground or mixed with other grains and sold at feed prices (which are ordinarily materially below wheat prices, except under such rare circumstances as this year's drought), the value of the total wheat supply might be increased by enough to more than pay the cost of the operation. The conversion of lard into soap, of short-staple cotton into paper or wall-board, and perhaps even of corn into alcohol to mix with gasoline as fuel for automobiles, are all illustrations of the possibility of disposing of a surplus by relegating it to an inferior use. Even though the product could be sold for only enough to pay its cost of manufacture, if the operation increased the total value of the supply, producers would still profit from the transaction. When the surplus to be disposed of is so large that the combined cost of harvesting, transportation, manufacture, and sale, is less than what the product is worth, it would seem more economical to work out some scheme of leaving part of the surplus unharvested on the farm, and yet allowing the grower to share in the benefits of the scheme. The California grape plan, as originally planned, had the disadvantage that each ton produced must be harvested and marketed, if the grower was to receive any return for it.[4] A system of differential prices to the producer, along the lines of those which will be discussed subsequently might be developed to meet this difficulty.

Many other expedients which have been proposed for ameliorating the effects of a surplus, such as by dumping the surplus abroad to raise domestic prices, also involve the question of getting a higher price for one portion of the supply than is obtained for the

[4] The final arrangements are not yet known, however.

balance. In these cases, however, operations such as dumping would relieve our own producers only at the expense of damage to foreign producers, and probably lead to retaliation of many sorts. In view of the tendency of other nations to follow our example, the question of what methods we adopt to ameliorate the effects of surpluses is a very serious one, and one that has world-wide significance. The United States cannot expect to solve its agricultural problem by any method which makes the problem worse for the rest of the world. This is an additional reason for preferring relegation to an inferior use, which improves the world market situation, to any form of disposal, such as export dumping, which would still further depress world markets.

Two considerations limit the extent to which devices such as those described might be employed to ameliorate the effects of the existence of a surplus. It costs money to dispose of a surplus, even by relegation to an inferior use; furthermore, some method must be provided for paying the expenses. The logical thing is for the cost to be borne by the producers who benefit. In the case of the grape plan, the cost is to be paid by an assessment on each ton of grapes, as arranged for by a voluntary agreement among the bulk of the producers. In the case of fluid milk, the cost is charged back pro-rata to the members of the cooperative association. Not unless there is some arrangement covering the great share of the producers, either by a voluntary agreement or by some compulsory form of payment such as an equalization fee, could such operations succeed. Otherwise, those outside the agreement would receive all of the benefits while paying none of the costs; their ranks might tend to increase while those who participated decreased, and the scheme would eventually fail.

The second difficulty lies in the influence of the higher price upon production. If no other corrective will prevent the existence of a surplus, low prices will do so through the harsh consequences of human suffering and failure. If the higher prices under a surplus-disposal plan resulted in increasing production, eventually the supply might become so large that even with the plan in operation prices would be disastrously low in any year of favorable weather conditions. Some fluid milk associations, notably for Philadelphia, Baltimore, and Connecticut, have met this difficulty with conspicuous success by using a class-price in paying producers as well as in selling the product. The producer gets one

price for that part of his production which is used as "basic milk," that is, for fluid use, while he receives a lower, or "surplus" price, for the excess portion which must be disposed of in other ways. In some cases, prices are so adjusted as to specially stimulate production during the season when supplies tend to be short, and to discourage production when the "surplus" above fluid requirements tends to be the greatest. By such modifications of the conventional competitive market structure, the fluid milk associations have succeeded in obtaining more remunerative prices for the producers, while at the same time production has been held within manageable bounds.

How far the system of selling other products can be modified so as to increase returns to producers while simultaneously restraining the production of a surplus remains to be seen. Dr. Spillman's "transferable-right" proposal, and Dr. Black's "domestic allotment" plan both have this element in them, of paying producers a lower price for their contribution to the surplus fraction of the crop than for the rest of their production. Both of these proposals are unsatisfactory insofar as they depend on the export market for disposing of the surplus. But if some such device for paying producers could be combined with some of the more promising ways of disposing of the surplus which have been sketched above, it might be possible even with major products to raise the price to producers, and yet restrain further increases in production.

In conclusion, I would like to emphasize that although I have devoted a good deal of time to discussing means of ameliorating the influences of a surplus, the most fundamental cure lies in the prevention of their production. Continued effort must be brought to bear on determining the outlook facts, on getting farmers to know and understand them, and in getting them to base their operations on such facts. It would certainly not be economic, in the broadest sense of the term, to encourage the continuous production of cotton to make paper, or of corn to make fuel, while wood-pulp and gasoline, respectively, could be produced at much less expenditure of effort and resources. Surplus disposal devices may be justified as expedients to meet a temporary situation or an occasional period of heavy yields, but as a continuous policy, proper adjustment of production is much more satisfactory.

So long as too much labor and resources are devoted to agricul-

tural production, the total product of all industry will be less than if the surplus productive ability were transferred to other fields. We may be able to develop devices by which this transfer can be made at less cost in human suffering and misery, and with fewer broken lives and blasted hopes, than it has involved in the past. But only if the process of readjustment does continue, and only if the various lines of production can be continually readjusted and balanced to make the most adequate use of the progressing technical improvements, can the conveniences and luxuries of modern life be extended to an ever wider group and to an ever greater extent to all classes of the population.

CAUSES AND PROBABLE DURATION OF THE AGRICULTURAL DEPRESSION

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THIS MONTH ends the tenth year of the worst agricultural depression ever known in America, but there is not yet general agreement as to its nature and cause. In popular opinion, the depression is caused by the supply of farm products or the demand for them. This view is also held by most economists.

CAUSES OF THE DEPRESSION

Some persons have argued that there is no depression,[1] but the majority now recognize the fact. Those who believe the depression due to supply, commonly attribute it to:

1. High production caused by the war.[2]

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[1] Ashby, F. B. An Aggregative Index of Farm Purchasing Power, Journal American Statistical Assn., Vol. XXIII, New Series, 161, pp. 49-54, March, 1928.

Friday, David. The Course of Agricultural Income During the Last Twenty-Five Years, American Economic Review, Vol. XIII, No. 1 Supplement, p. 156, March, 1923.

Johnson, Wm. Figures Do Lie, Country Gentleman, Vol. LXXXVIII, No. 16, pp. 3-4, April 21, 1923.

McFall, R. J. Economic Studies (Mimeographed) No. 10, p. 1, July 7, 1923.

The Great "Farm Depression" Myth, Standard Daily Trade Service, Vol. XXX, October 24, 1923, p. 215.

[2] Downie states: "In my judgment, the restrictive measures applied by the Federal Reserve System in 1920 were but a minor element in the whole situation. Agriculture, particularly the production of food products, was a greatly overextended industry. Not only had the whole farm area been extended, but the area of crops per farm had increased from 50 acres to 57 acres in the decade ending in 1919. The Agricultural Year Book for 1921 contains the following comment on this point: 'Our farmers are driving larger teams, using more efficient machinery, producing more per acre and per person than ever before. Each American farmer and farm laborer on the average is feeding nine people other than himself, in this country, and one more person living in foreign lands.' The writer in the Year Book further estimates that the productivity of the American farmer increased 15 per cent in the decade ending in 1921.

"My conclusions relative to the question as to whether the farmer was the victim of a deliberate deflation policy are: (1) That our banking policy was the occasion rather than the cause of the fall in the prices of agricultural products; (2) That the following are probably the principal factors ultimately responsible for the price deflation: (a) Over-stimulated agricultural production, arising out of abnormally high prices and our anxiety to win the war, including unwise colonization and attempts to farm unproductive lands. (b) Extraordinarily good crop conditions in 1920. (c) Extremely high production costs. (d) Dependence upon a hazardous export outlet. (e) Over-extended condition of farmers—heavy obligations, incurred for land and equipment on a peak price basis. (f) Failure to provide in 'fat' years for inevitable 'lean' ones to follow. (g) Investment of profits in land. (h) An overload of inexperienced and unbusinesslike farmers. (i) A very

2. Research and extension work resulting in scientific advances in the production of crops or animals.[3]

3. The use of machinery and other methods of increasing efficiency.[4]

4. Weak sellers in eastern Europe.[5]

5. The gasoline engine.[6]

Those who attempt to explain the depression on the demand side, attribute it to changes in:

1. American demand.[7]

heavy increase in the ratio of farm taxes to farm income." Dowrie, Geo W.· Did Deflation Ruin the Farmer and Would Inflation Save Him? Journal of Farm Economics, Vol VII, No. 1, pp. 69 and 74, January, 1925.

[3] Nourse states " . . . I shall announce my thesis curtly at the start in the following terms *The outlook for American agriculture is far from bright, the industry being faced by portentous technological changes while its organization and institutions are such as to make extremely difficult, indeed in large part impossible. a prompt and suitable adjustment to these circumstances.* Stated as a paradox, the outlook for agricultural production is so good that the outlook for agricultural prosperity is distinctly bad.

"I believe that the keynote of this problem on its technological side is to be found in the fact that we are only just now coming into the stage of effective and widespread application of scientific methods to the production of agricultural products as a whole." Nourse, E. G : The Outlook for Agriculture, Journal of Farm Economics, Vol IX, No 1, pp 21 and 23, January, 1927.

Black states "So far as the 'depression' itself is concerned -the inflation-deflation episode- agriculture climbed out of the depths in 1922 and 1923 along with urban industry But since then agricultural incomes have remained at virtually the same level. The year 1925 was better than has been any year since

"The explanation of this has much less to do with inflation and deflation than with a number of fundamental changes that have occurred in the economic environment of agriculture Most significant of these changes is the new trend toward larger agricultural production- essentially a world-wide movement- -which set in probably before 1910. The opening of new areas on the frontier has played a smaller part in this expansion than have technical improvements in agricultural production, notably the introduction of gasoline power " Black, John D Agricultural Reform in the United States, p. 480, 1929.

Seligman states "The actual depression of agriculture, moreover, is a world phenomenon For each of the fundamental causes- -increased acreage higher productivity, diminished demand and general economic changes—is operative everywhere, although in different proportions These fundamental causes, moreover, are only in part connected with the cataclysm of the War." Seligman, Edwin R. A.· The Economics of Farm Relief, A Survey of the Agricultural Problem, p. 24, 1929

[4] See footnotes 2 and 3.

[5] Schmidt, S. The Agricultural Depression in East Europe, with Special Reference to Poland. (See page 123 of this volume).

[6] King states: "It appears, then, that we are still justified in placing upon the gasoline engine a major responsibility for the continuance of the farm depression ushered in by the price deflation of 1920." King, W. I.· The Gasoline Engine and the Farmer's Income, Journal of Farm Economics, Vol. XI, No. 1, p. 72, January, 1929.

[7] Hansen says· "It is difficult to see that the low purchasing power of farm products in 1920-1922 can be attributed either to the European market or to overproduction. The explanation is to be found rather in the failure of *domestic de-*

2. Fundamental changes in demand.[8]

3. Changes in European buying power due to tariffs, reparation payments, and the like.[9]

Nearly all American economists attribute the depression to supply and demand.[10] The following statement by Edie agrees with

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mand. There was indeed a surplus that had to be disposed of in the foreign market, but the surplus was caused not by overproduction, but by the demand situation in the home market. Europe, in spite of the post-war situation, was able to absorb a much larger quantity of our products than before the war. It is true that an exceptionally low price was required to induce Europe to take these quantities, but it must not be forgotten that a correspondingly low price prevailed in the United States." Hansen adds the following footnote "It is undoubtedly true, however, that the large crop of 1920 made a bad situation worse" Hansen, A. H: The Effect of Price Fluctuations on Agriculture, The Journal of Political Economy, Vol. XXXIII, No. 2, p. 211, April, 1925.

[8] Dowrie quotes B. M. Anderson: "No one pulled prices down. They fell. . . . . It was not credit contraction but the collapse of the abnormal and unsound sources of demand." Journal of Farm Economics, Vol. VII, No. 1. p. 70, January, 1925. See also Seligman, reference 3.

[9] Sering says "According to an incontrovertible economic law the purchasing power of the ultimate buyer determines the price of any given quantity of goods available for consumption. Among all peoples dependent on agricultural imports the German is the most impoverished The German worker was then the ultimate buyer of grain and meat products, and the market was determined by his effective demand, which in turn was determined by how much of his small income he could spend for food." Sering, Max International Price Movements and the Condition of Agriculture in Non-Tropical Countries, p. 26, 1927.

Thompson says: "Want and distress, to repeat, are widely prevalent today—even, in some measure, in this fortunate country of ours. To a certain extent, therefore, the situation in which the farmer finds himself today is due to a condition of underconsumption rather than to a condition of overproduction" Thompson, John G.: The Cityward Movement, Journal of Farm Economics, Vol. IV, No. 2, 75, April, 1922.

Taylor states. "In the main, the sudden collapse of the market for farm products can be said to be due to under-consumption rather than overproduction." Taylor, H. C.: The Adjustment of the Farm Business to Declining Price Levels, Journal of Farm Economics, Vol. III, No. 1, p. 3, January, 1921

[10] Innumerable other references might be cited which explain the depression primarily on the basis of supply and demand. The following are a few of these

Boyle, J. E.: Farm Relief, p. 238, 1928.

Carr, L. F: America Challenged, 1929.

Carver, T. N Journal of Farm Economics, Vol. IX, No 1, p 33, January, 1927.

Davis, J. S.: America's Agricultural Position and Policy, Harvard Business Review, pp. 146-149, January, 1928.

Journal Farm Economics, Vol. X, No. 1, p. 25-26, January, 1928.

Ely, R. T.: (Quoted by Dowrie) Journal of Farm Economics, Vol VII, No. 1, p. 76, January, 1925.

Ezekiel, M. J. B.: (Page 73 of this volume).

Garlock, Fred L.: Journal of Farm Economics, Vol. VII, No. 1, pp. 79-83, January, 1925.

Grimes, W. E.: Our Shifting Agriculture, Journal of Farm Economics, Vol. IX, No. 3, pp. 333-339, July, 1927.

Haas, G. C.: Journal of Farm Economics, Vol. VI, No. 1, p. 60, January, 1924.

Hibbard, B. H.: The Farmers' Influence over Prices, Journal of Farm Economics, Vol V, No. 1, pp. 13, 14, January, 1923.

my own observations as well as with the previous papers on this program. ". . . . the American economists whose views I have encountered for the most part think of a downward pressure in prices due to deficiency of gold as a matter of very remote and theoretical interest. In sharp contrast, the great concern in England is how to put a stop to the stubborn fall in gold prices, and how to hold in check during the immediate future the alarming demand for gold in excess of supply."[11]

Few economists, of whom I am one, believe that the depression is due primarily to the rise in the value of gold, which is gradually approaching its pre-war value.[12] There was an over-supply of most

Holmes, C. L.: Readjustment in the Corn-belt, Journal of Farm Economics, Vol. VII, No. 2, pp. 233, 234, April, 1925.

Isely, C. C.: It is Languishing World Trade and Not Surplus, (Pamphlet) Board of Trade, Kansas City, Missouri.

Jardine, Wm. M.: (Address) Before Annual Meeting of Illinois Agricultural Association, Champaign, Ill., January 21, 1926 (Mimeographed)

Lippincott, Isaac What the Farmer Needs, 1928

McMillen, Wheeler. Too Many Farmers, 1929

Platt, F. C.: Is the Farmer Going Bankrupt? 1925

Quick, Herbert The Real Trouble with the Farmers, 1921

Russell, H. L.: A Leaf from Business for the Relief of Agriculture, American Bankers Assn Journal, pp. 861-864, June, 1927

Spillman, W. J (Page 807 of this volume)

Stine, O. C. Journal Farm Economics, Vol IX, No 1, p 15, January, 1927

Kelsey, R. W.: Farm Relief and Its Antecedents Handbook of Citizenship, Topical Supplements of Textbooks of American History and Government, No. 2, 1929

Murphy, A. M.: The Agricultural Depression and Proposed Measures for Its Relief. (A dissertation.) Published by the Catholic University of America, Washington, D.C., 1926.

Wallace, H. C. Our Debt and Duty to the Farmer, 1925

[11] Edie, Lionel D.: An International Viewpoint on Commodity Prices—Long Decline in Prospect, the Annalist, Vol 32, No. 826, p 773-774, November 16, 1928

[12] There seem to be few in America who consider the depression to be due primarily to monetary causes, but in Europe, Enfield, Lloyd, Cassell, Keynes, and others consider monetary causes as the major ones

Enfield, R. R.: The Agricultural Crisis. 1920-1923, pp. 59, 69 (See also page 60 of this volume.)

Lloyd, E. M. H.: (See page 40 of this volume).

Warren, G. F. and Pearson, F. A.: The Agricultural Situation, 1924

Journal of Farm Economics, p. 61, April, 1920, p. 28, January, 1924, p. 34, January, 1927; p. 1, January, 1928.

Prices of Farm Products in New York, Cornell University Agri. Exp. Sta. Bul. 416, 1923

Prices of Farm Products in the United States, United States Department of Agriculture, Bul. 999, 1921.

The Agricultural Depression, Quarterly Journal of Economics, Vol. XXXVIII, pp. 183-213, February, 1924

Warren, G. F. and Pearson, F. A.: The Agricultural Situation, 1924.

————: Farm Economics, pp. 35, 80-81, 92-97, 131, 186-187, 218, 229-230, 282, 347, 603-618, 697, 810, 1026, 1178-1193, 1298-1299, 1330-1338

farm products for a few years following 1920, but as indicated later in this paper, I believe that this is no longer an important factor in the depression.

Science enables one to predict what will happen under a given set of circumstances. How well the different theories enabled men to predict, gives some indication of the probability of the correctness of their theories.

It seems almost certain that so serious a thing as the agricultural depression would have been mentioned in the meetings of the American Economic Association, the American Farm Economic Association, and the American Statistical Association before it occurred, had it been foreseen. So far as I can find, few if any of those who now explain the agricultural depression on the basis of supply and demand are recorded as having anticipated the depression. Several of those who have used the monetary explanation did anticipate it.

WAS THE PRICE DECLINE ANTICIPATED?

During the days of inflation, a few economists predicted that money would return to its pre-war value, or that the course of prices would follow the experiences in the Civil War period.[13]

Edie, Lionel D An International Viewpoint on Commodity Prices—Long Decline in Prospect, The Annalist, Vol. 32, No 826, pp. 773-774, Nov 16, 1928

——— Money, Bank Credit and Prices, pp. 81-92, 282, 1928.

The following references also give attention to monetary influences on price relationships.

The Agricultural Crisis and Its Causes. Report of the Joint Commission of Agricultural Inquiry, 67th Congress, 1st Session, House of Representatives, Report 408, 1921.

The Agricultural Problem in the United States Published by National Industrial Conference Board, Inc., 1926.

The Condition of Agriculture in the United States and Measures for Its Improvement. Business Men's Commission on Agriculture, Published by the National Industrial Conference Board, Inc, and Chamber of Commerce of the United States of America, 1927.

[13] Warren, G F Why Are Prices High? Extension Service News Published by the New York State College of Agriculture at Cornell University, Vol II, No. 2, p. 1, February, 1919

"The increase in the amount of currency accounts for the general rise in prices

"Figure 2 shows the wholesale prices of all commodities during this war and during the Civil War. In each case, the five-year average before the war is 100. It will be seen that prices rose at about the same rate as during the Civil War. In each case nearly all of the rise in prices took place in three years, and in each case prices doubled. After the Civil War, it was twelve years before the general price level reached the pre-war basis.

"It does not necessarily follow that prices will drop at the same rate following this war. The rate of drop in the general price level depends primarily on the

After the depression came, many of those who used the supply and demand explanation thought that the depression would be over in a few years. For a number of years, the writer made a practice of privately asking the leading economists in attendance at the meetings of the American Economic Association, the American Farm Economic Association, and the American Statistical Association what they expected the price level would be in one, five, ten, and twenty years in the future. The replies were recorded. By asking the same men year after year, it was found that nearly all believed that the price level of that date, slightly affected by the recent tendency, would be the future price level.

The very few whose opinions conformed to what has happened were those who used the monetary explanation.

SOME GENERAL CONSIDERATIONS

Before taking up my thesis, it is necessary to clear the ground of some extraneous material or at least to challenge it.

When farmers produced for home use only, a large crop was a blessing. The farmer then had all he could eat, and could allow some to rot. The same situation still holds for a home garden. If there is too much, the family eats the best; and may give away, feed, or sell some, or let it rot. But as farming becomes a business, the farmer's income is dependent on quantity sold times the price of his product. Generally, the total agricultural income for a bumper crop is less than for an average or poor crop. Therefore, such a crop is a misfortune to agriculture, but is a benefit to cities which receive a large food supply for a small payment.

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financial policy that is followed. Ordinarily, the period when currency of all kinds will be at its maximum would be expected to come a few months after the floating of the last government loan.

" * * * It is possible that the highest general price level has been passed, but it is also possible that it may not be reached until a few months after the floating of the last large loan. As the volume of currency is contracted, prices will fall. A rather rapid drop in prices such as occurred after the Civil War is to be expected, followed by a gradual lowering of prices."

The figure referred to shows wholesale prices in the Civil War period returning to below the pre-war basis and shows prices for the World War period up to 1919.

For a statement of the credit policy subsequent to this quotation and its effects, see footnote 22.

(See also paper read November 12, 1919, Journal of Farm Economics, Vol. 2, No 2, pp 61-69, April, 1920).

Mitchell, W. C.· Prices and Reconstruction, American Economic Review, Sup. Vol X, No. 1, p. 151, March, 1920.

The Brookmire Economic Service evidently anticipated deflation. Brookmire's Forecaster, January 6, 1919, January 5, 1920, February 9, 1920; and February 23, 1920.

With specialized agriculture and a smaller percentage of the people on farms, the farmer is in business. He sells most of his products and buys most of his supplies, the same as other people do. Since a large production returns to agriculture less than a small production, the fluctuations due to weather and to cycles of over- and under-production are becoming increasingly serious. These fluctuations are comparable to the periods of high and low demand for labor resulting in unemployment in industry. The process of specialization which has made civilization possible has brought on two diseases—one in the city, and one in the country. The country disease results in periods of prosperity and depression for the farmers because of fluctuations in production. The city disease is unemployment because of fluctuations in the demand for labor. But these should not be confused with the sweeping fluctuations in the price of all commodities due to monetary considerations. When the whole price level is sweeping upward or downward, cycles are superimposed on the movement of the whole price structure. This may be compared with a tidal wave on which ordinary waves are superimposed.

There are very definite cycles of high and low production of livestock due to raising too many or too few animals. During the depression, we have had high and low production of cattle and two complete cycles for hogs and poultry. In a period of agricultural depression, these cycles are merely superimposed on the depression.

There seems to be a tendency for an agricultural cycle about a generation long in which persons leave farming, first too rapidly, and then not rapidly enough. There should, of course, be a net movement away from the farms, because of a steady increase in efficiency and because of the high birth rate on farms.

None of these things nor all of them combined were capable of making an agricultural depression that would have caused this topic to occupy a day and a half of the time of this Conference.

IS THERE A SURPLUS OF FOOD OR SHORTAGE OF GOLD?

American economists commonly use prices, acreages, and production which include cotton, and then begin at once to talk of the percentages thus derived in terms of possible stomach expansion as if these figures represented nothing but food.

Cotton should be excluded when food is being discussed. Cotton

prices do not follow food prices but go with industrial conditions. In the seven years, 1923 to 1929, cotton prices paid to farmers in the United States averaged 65 per cent above the five years before the war, whereas prices paid to farmers for food averaged only 43 per cent above pre-war.

This cotton price of 65 per cent above pre-war was much above the average of all wholesale prices, which were only 44 per cent above pre-war Certainly this does not indicate that there was over-production of cotton in these seven years. These high prices for cotton resulted in a great expansion in the cotton acreage. The Department of Agriculture estimated the acreage of cotton for 1919 as 33,566,000 and for 1929 as 45,793,000, or an increase of 36 per cent in ten years.

The substitution of the tractor for horses is an important cause of the depression in some hay-producing areas but has, at the same time, been of benefit to farms in hay-consuming areas

Dealing with the United States as a whole, the substitution of tractors for horses and mules has released about 6 per cent of the crop area for other purposes.[14]

If cotton is subtracted from the crop area, and if the pasture released is included, it is probable that the reduction in the number of horses has released an area equal to approximately 8 per cent of the area in crops other than cotton. A few economists attributed the depression to the horse feed released by the gasoline engine. This is, I believe, of more importance to American farmers than all other changes in supply and demand combined, but it is not the major cause of the depression.

The acreage of food and feed crops in the United States increased 14 per cent from 1909 to 1919. In this period population increased 21 per cent.[15]

In 1919, the acreage of food and feed crops was 319,037,000. In 1929, it was 314,633,000, or a decrease of 1 per cent. In this period population increased 16 per cent.[16]

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[14] Cavert, W L The Horse Situation, Farm Economics, No 61, p 1175, October, 1929.

[15] Fourteenth Census of the United States, Vol. V, pp. 700-701. Minor vegetables are omitted as the figures for the two periods were not comparable

[16] The 1929 acreages are for 38 crops from the United States Department of Agriculture Yearbook, 1930, p. 970, but omitting cotton, flaxseed, cloverseed, tobacco, broomcorn, hops, cane syrup and maple trees. If all crops except cotton and maple trees are included there is a decrease of 1 per cent. If cotton and all other crops

If the decrease in the acreage of food and feed crops of one per cent is deducted from the 8 per cent released by the substitution of tractors for horses and mules, we can say that the combined effect is equivalent to an increase of about 7 per cent, while population increased 16 per cent.

In 1920, the stores hoarded by the government began to be thrown on the market, the horse, beef and hog cycles were, by accident, coincidently at a peak, as three cycles of different lengths will inevitably be, occasionally. This peak would have occurred at about this time regardless of the war.

Even considering all of these factors combined, I believe that more than half of the depression was due to monetary causes.

Since then, we have had surpluses and shortages of almost every food crop, but the depression goes on.

To those who cite mechanization as a cause of the depression, I would like to call attention to the fact that efficiency in farming has no immediate effect on prices. It is only as the acreage or the yield per acre is changed that the supply is changed. More acres per man or larger farms do not cause a depression, unless total acreage or yield per acre is changed.

I want also to challenge the statement that the demand for food is as inelastic as is commonly supposed. Distributing charges are exceedingly inelastic so that retail prices are inelastic and the consumer does not get a chance to show what he would do if his prices fluctuated as farm prices do.

From 1890 to 1914, a 10 per cent increase in the total weight of hogs packed in the West (which includes most of the American production) resulted in a decrease of 2 per cent in the weighted retail price of lard, pork-chops, ham, and bacon.

From 1890 to 1922, an increase of 10 per cent in the receipts of cattle at Chicago, resulted in a 5 per cent decrease in the retail price of round steak in the United States.

From 1921 to 1925, an increase of 10 per cent in the production of potatoes in the United States resulted in a decreased retail price of 13 per cent in New York City. Prices in one New York City

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are included the increase from 1919 to 1929 is 3 per cent. Acreages for 1919 are from United States Department of Agriculture Yearbook, 1921, p. 770-771, except for crops not given on these pages, which are taken from the 1920 Census, Vol. V, pp. 701, 791 and 820. The census report includes only vegetables sold, hence the increase is a little less than the figures here used.

hotel were actually higher by 2 per cent in the years when potatoes were most abundant.[17]

Somehow the 10 per cent extra pork disappeared when retail prices dropped only 2 per cent and the beef disappeared when prices dropped 5 per cent. Conclusions on elasticity of the stomach from changes in farm prices are unreliable. Of course, farm prices fluctuated violently. The small changes in retail prices, of course, resulted in violent changes in farm prices.

For twenty years, following the Napoleonic Wars, Parliament had committees studying the situation. It presented hearings showing all the price changes and mental confusion to be just as at present. After twenty years, and volumes of published hearings, the House of Lords reported that it had not agreed on a report.[18]

Having at least challenged extraneous forces which so confuse as to make it impossible to discuss the subject, I will turn to my subject.

In popular opinion, low prices for food products indicate that something is wrong with the supply of food or the demand for it. But prices are a ratio of the value of gold to the value of another commodity. If John weighs twice as much as James, it does not follow that John is necessarily large, or James is necessarily small. If 60 pounds of wheat exchanges for only 23.22 grains of gold, it does not necessarily follow that wheat is abundant. Gold may be scarce. There is no way of arriving at a judgment that is worth a farthing unless some other comparison is made. If wheat has its usual exchange value when compared with the average of 550 other commodities, and if wheat and these 550 commodities have a low exchange value for gold, the logical conclusion is that gold is becoming more valuable.

What are the facts on the exchange values between food products and many kinds of commodities, not merely the one sacred commodity, gold? For the four years, 1921 to 1924, wholesale prices of the 550 commodities reported by the Bureau of Labor Statistics averaged 144 when pre-war is considered as 100 (table 1). Prices paid to farmers for food averaged only 125. The prices which farmers received were low compared with other wholesale

[17] Warren, G. F. and Pearson, F. A.· Interrelationships of Supply and Price, Cornell Agrl. Exp. Sta. Bul. 466, pp. 106, 112, 113, March, 1928.

[18] Warren, G F. and Pearson, F. A.: The Agricultural Situation, p. 252, 1924.

Table 1. Index Numbers of Prices in the United States*
(1910-1914=100)

Year	Wholesale prices of all commodities	Prices paid to farmers for food	Prices of food at retail	Cost of living	Cost of distributing food	Prices paid to farmers for cotton
1913	102	100	103	104	104	97
1914	99	105	106	104	105	85
1915	102	106	107	102	105	72
1916	125	117	117	112	110	109
1917	172	181	156	131	129	173
1918	192	200	180	160	159	238
1919	202	213	194	182	174	239
1920	226	207	207	212	202	259
1921	143	130	163	180	190	100
1922	141	121	150	168	175	152
1923	147	124	154	172	177	215
1924	143	126	153	170	180	216
1925	151	152	169	175	185	179
1926	146	154	174	176	192	122
1927	139	145	169	173	190	128
1928	143	149	170	171	190	150
1929	141	151	174	172	199	143
1930 (July only)	123	124	160	166	191	94

* Farm Economics No 67, page 1329 and 1332, August, 1930

prices. In this period, there was an over-production of food products relative to demand. This was a very important factor in the agricultural depression, but I do not believe that it was the major factor.

In the five years 1925-29 the wholesale prices of the 550 commodities averaged 144, whereas prices paid to farmers for food averaged 150. In July, 1930, after the drastic recent decline in prices and before the effects of the drought, wholesale prices of the 550 commodities averaged 123, and farm prices of food, 124.

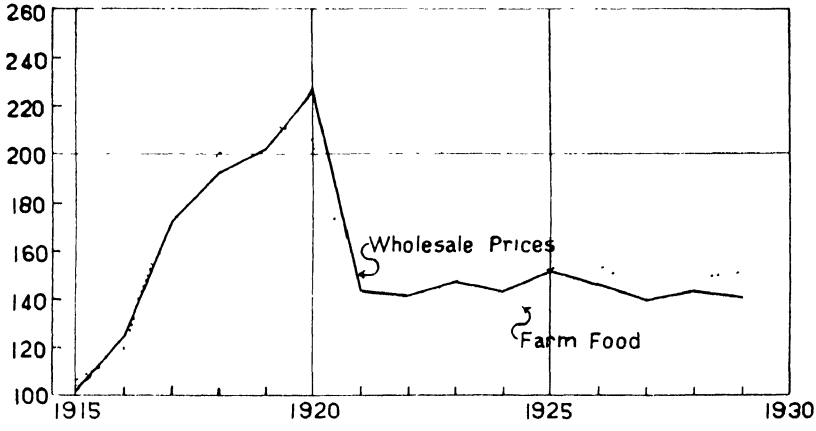

FIGURE 1. PRICES PAID TO FARMERS FOR FOOD AND WHOLESALE PRICES OF ALL COMMODITIES IN THE UNITED STATES
1910-14 = 100

Wholesale prices of food at the farm were higher than other wholesale prices from 1917 to 1919. From 1920 to 1924, food was below other wholesale prices. Apparently there was an oversupply of food. Since 1924, farm prices of food have been slightly higher than other wholesale prices. Apparently there is no longer a surplus of food.

If the supply of food products is high or the demand low, we must conclude that other commodities are in the same situation. To assume that all commodities are over-produced, and that only gold is stable, is like bringing the mountain to Mohammed.

In a period of financial deflation, producers' prices are always low compared with consumers' prices. Retail prices of food in the United States must, therefore, be compared with retail prices of other commodities, if we are to determine whether food is high or low. In the four years, 1921 to 1924, the retail price of food in the United States averaged 155, when pre-war is considered as 100.

The cost of living averaged 173. This indicates that food was relatively abundant.

In the five years, 1925-29, food at retail averaged 171 and the cost of living averaged 173. In 1929, food averaged 174 and the cost of living averaged 172.

Similar comparisons hold in England. Enfield states that in Great Britain, in 1929, agricultural prices (which in England are primarily food prices) were 44 per cent above pre-war. The average for all commodities was 35 per cent above pre-war.

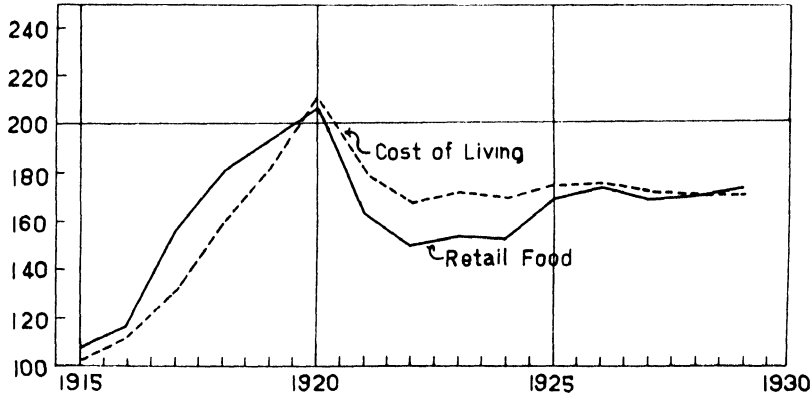

FIGURE 2 RETAIL PRICES OF FOOD AND THE COST OF LIVING IN THE UNITED STATES

1910-14 = 100

From 1915 to 1919, retail food prices were higher than the cost of living. From 1920 to 1924, food was much lower than other items in the cost of living, indicating that there was a relative surplus of food. Since 1924, food has been about as high as the cost of living. Apparently there is no longer a surplus of food.

MALADJUSTMENTS WITHIN THE PRICE STRUCTURE CAUSED BY DEFLATION

Whenever prices fall, regardless of the cause, producers' prices are thrown out of line with wages, with retail prices and with the cost of living. This makes it necessary for all producers to pay wages that are high compared with the price of the product which the producer has to sell. The laborers have a cost of living that is high compared with wholesale prices of the products of labor, but not high compared with wages.

Whenever prices rise, wages rise less rapidly. Whenever prices fall, wages fall less rapidly. Centuries ago, there were many

instances of rising and falling prices and these were always accompanied by lagging wages, when going up and when coming down. Labor is not a commodity. Its pay is influenced by innumerable forces that do not influence commodity prices. If a man employs two men and can pay only one-half as much wages as formerly he does not drop wages one-half. He drops one workman altogether and may possibly reduce the other's wages slightly. No such thing as this occurs with commodities.

Over a long period of time the buying power of wages rises approximately in proportion to the rise in the physical volume of

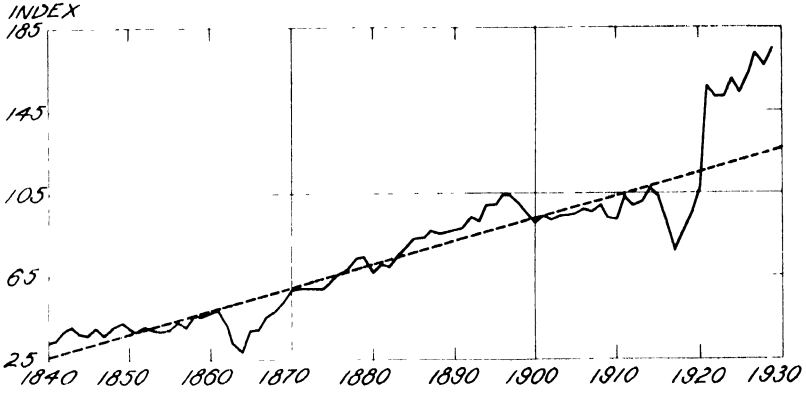

FIGURE 3 PURCHASING POWER OF WAGES IN THE UNITED STATES
1910-14 = 100

The purchasing power of wages doubled in about 60 years before the war, but its upward trend is decidedly affected by inflation and deflation. When prices rose in each war period, wages rose less rapidly, and therefore the purchasing power of wages declined. When prices fell in 1920, wages continued to rise and the buying power of wages went as far above the trend line as it had been below it.

production per capita. If financial inflation occurs, prices rise more rapidly than wages, and the rise in the buying power of wages is checked, or may be reduced. In a period of deflation, prices fall more rapidly than wages, and the buying power of wages is suddenly increased much more rapidly than the output of goods per capita.

If 1790 prices are called 100, wholesale prices in England in 1810 had risen to 188, but wages rose to only 169 (table 2). Twenty-one years later, prices had fallen to an index of 92, but wages were 143. Prices were cut in half, but wages declined only 15 per cent.

Table 2. Index Numbers of Wholesale Prices and Wages

England, Napoleonic War Period 1790 = 100			United States, Civil War Period 1856–60 = 100			United States, World War Period 1910–1914 = 100		
Year	Wholesale prices[1]	Wages[2]	Year	Wholesale prices[3]	Wages[4]	Year	Wholesale prices[5]	Wages[5]
1790	100	100	1860	94	99	1914	99	101
1795	134	114	1861	92	102	1915	102	104
1800	160	129	1862	109	105	1916	125	116
1805	155	144	1863	152	112	1917	172	132
1810	188	169	1864	193	128	1918	192	164
1816	125	160	1865	172	148	1919	202	190
1820	121	151	1866	175	156	1920	226	227
1824	106	156	1867	157	161	1921	143	207
1831	92	143	1868	153	166	1922	141	202
1840	102	139	1869	141	168	1923	147	220
1845	87	138	1870	130	171	1924	143	223
1850	77	142	1871	129	173	1925	151	228
1855	101	161	1872	131	176	1926	146	234
1860	99	161	1873	130	176	1927	139	236
			1874	125	171	1928	143	237
			1875	119	171	1929	141	242
			1876	108	163	1930 (July)	123	230
			1877	100	156			
			1878	92	153			
			1879	89	151			
			1880	99	153			

[1] Warren, G F and Pearson, F A : The Agricultural Situation, p 263, 1924
[2] Wood, G H : The Course of Average Wages Between 1790 and 1860, The Economic Journal, Vol IX, No 36, p 591, December, 1899
[3] Warren, G. F and Pearson, F A : Farm Economics, No 45, p 698, June, 1927
[4] Index Numbers of Wages per Hour, 1840–1926 Monthly Labor Review, Vol XXVI, No 2, p 332. February, 1928
[5] Farm Economics, No 67, p 1329, August, 1930

Similarly, following the Civil War in the United States, prices declined more than one-half from 1864 to 1879, but wages in 1879 were actually higher than in 1864. The peak in wages came in 1873. From this peak to 1879, wages declined only 14 per cent.

In the United States, in the World War period, prices reached a peak in 1920, but wages did not reach the peak until nine years later, just as they did following the Civil War, and although prices have declined nearly one-half, wages are higher than in 1920.

As a consequence of the lag in wages, distributing charges

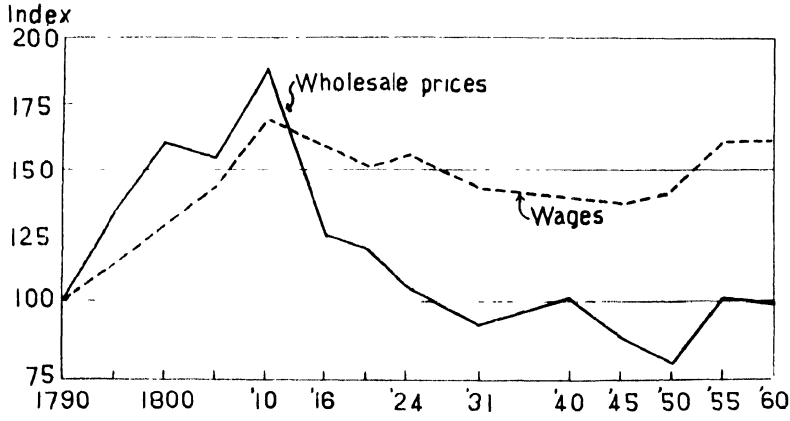

FIGURE 4. WHOLESALE PRICES AND WAGES IN ENGLAND
1790 = 100

When prices rose, wages rose less rapidly. Prices declined one-half from 1810 to 1831 but wages fell only 15 per cent. In 1845, wages began to rise. Apparently wages and prices were then in equilibrium due to the increased output per capita in the previous 50 years.

decline slowly and so leave consumers' prices high relative to producers' prices.

Table 3 shows that in the United States in 1917, food at retail prices was 56 per cent above pre-war, when the cost of living

Table 3. Cost of Living, Retail Prices of Food, Cost of Distribution, and Prices Paid to Farmers for Food in the United States
(From table 1)

	1910-1914	1917	1922	1929	1930 (July)
Cost of living	100	131	168	172	166
Retail prices of food	100	156	150	174	160
Prices paid to farmers for food	100	181	121	151	124
Cost of distribution	100	129	175	199	191

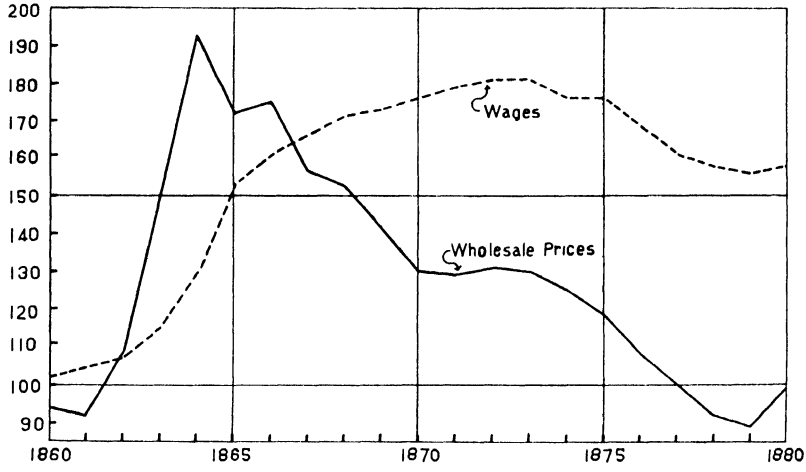

FIGURE 5. WHOLESALE PRICES AND WAGES IN THE UNITED STATES IN THE CIVIL WAR PERIOD
1856-60 = 100

When prices rose, wages rose less rapidly. Prices began to decline in 1864, but wages did not reach a peak until 9 years later. By 1879, prices had declined one-half, but wages fell only 14 per cent. By 1880, prices and wages appear to have been in equilibrium due to the increased output per capita. Wages then began to rise.

averaged only 31 per cent above. I have never heard an economist question the conclusion that food was either scarce or that demand was high.

In 1922, the retail index for food was 150 and the cost of living

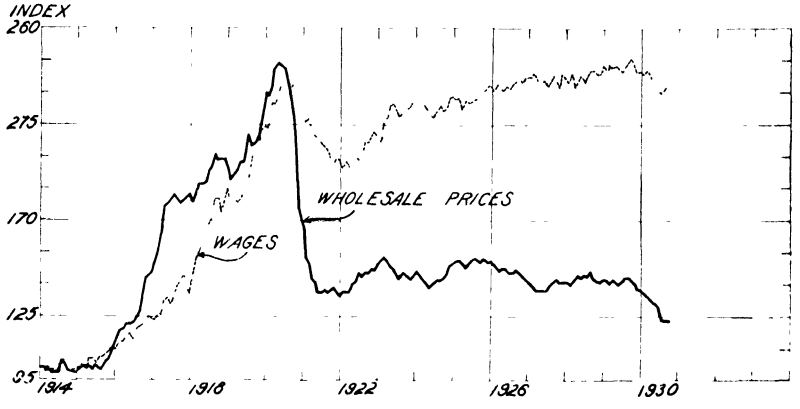

FIGURE 6. WHOLESALE PRICES AND WAGES IN THE UNITED STATES IN THE WORLD WAR PERIOD
1910-14 = 100

Prices fell in 1920, but wages continued to rise for 9 years just as they did following the Civil War. Little decline has occurred.

was 168. Again, I have never heard an economist question the statement that food was either abundant or demand was low.

In 1929, the index for food at retail was 174 and for the cost of living, 172. What is the conclusion as to supply of and demand for food?

In 1917, prices paid to farmers for food stood at 181. Was this or the retail price of 156 the measure of the shortage of food?

In 1929, the retail price of food was higher than in 1917, but the farm index instead of being 181 was 151. Although retail prices had risen 18 points, farm prices declined 30 points.

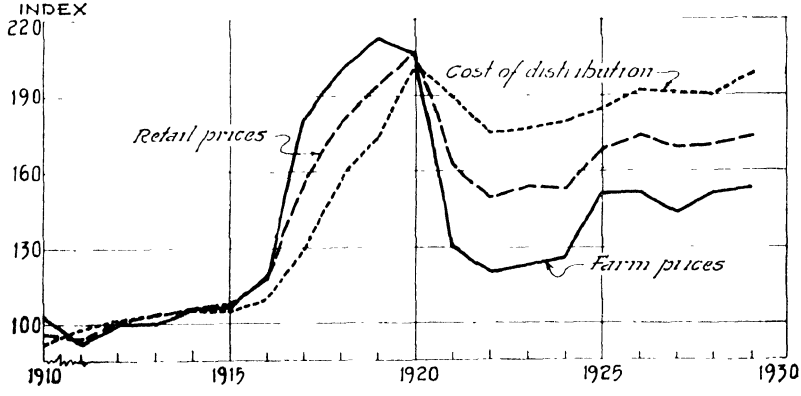

FIGURE 7. FARM PRICES OF FOOD PRODUCTS IN THE UNITED STATES, RETAIL PRICES OF THE SAME FOODS, AND THE COST OF DISTRIBUTION

1910-14 = 100

From 1915 to 1919, costs of distribution rose less rapidly than retail prices, hence farm prices rose more rapidly than retail prices. Since 1920, costs of distribution have remained high so that farm prices are unusually low compared with retail prices. In July, 1930, retail prices were higher than in 1917, but prices paid to farmers for the same food products dropped from an index of 181 to 124.

How can these be explained on the basis of supply of food and demand for it? They can instantly be explained by saying that in 1917 retail prices had risen 56 per cent, but that owing to inflation and the accompanying lag in wages, distributing charges were low so that the farmer got most of the increase in retail prices and received 81 per cent above his pre-war prices; and that in 1929, retail prices had risen, but owing to deflation and the consequent lag in wages and other costs of distribution, the cost of distributing food was so high that prices paid to the farmer had declined 30 points, even though retail prices of the same

food has risen 18 points. With a decided rise in retail prices, farm prices fell enough to change farm prosperity to depression.

This maladjustment within the price structure is the major trouble from a declining price level. It leaves prices to farmers and other producers low relative to wages, to retail prices, and to the cost of living. Debts and even taxes are minor in importance.

Since the charges for distribution become receipts for persons living in cities, a declining price level results in an enormous transfer of wealth from country to city. City persons must spend this extra income. A large share of it goes for better housing conditions. This results in a building boom in cities, while buildings in the country deteriorate. Such a building boom accompanied the declining prices in England following the Napoleonic Wars. A similar boom followed the Civil War in America. A world-wide building boom in cities has accompanied the present agricultural depression. A building boom cannot go on forever. When it is overdone, reaction occurs. Following the Civil War, the reaction came in 1873, nine years after deflation began. Following the World War, the reaction came nine years after deflation began.[19]

Declining prices put an enormous premium on efficiency in the use of labor. Many producing enterprises are so situated that it is impossible to make the necessary increase, and numerous business failures occur.

A period of falling prices results in violent price fluctuations. There may be periods of feverish activity, but there must also be periods of business depression and severe unemployment.

Now that society is so complicated that practically everyone buys most of his necessities, the inevitable discrepancies within the price structure when prices fall are of overwhelming importance. It is time that economists cease to think of debts as being of major importance, when prices fall, and give attention to the resulting maladjustment in the price structure. Farmers who were not in debt have experienced a severe depression. If debts were all the trouble, the problem would be solved by foreclosure and consequent sale to a new farmer at a low price.

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[19] Warren, G. F.· Relation of Cheap Food to the Building Boom, Farm Economics, No. 9, p 80, November, 1923.

Warren, G. F and Pearson, F. A.: The Agricultural Situation, p 272, 1924.

———— : Prices of Building Materials, Farm Economics, No. 42, pp. 611-612, February, 1927.

The failure of taxes to decline with falling prices is also far more important than the debt question. Farm taxes have followed wages, because taxes are spent for wages and teachers' salaries.

A declining price level must always result in a severe agricultural depression even if there are no debts and no taxes, and even if there is a shortage of farm products.

There are innumerable reasons why agriculture is injured more severely than industry by a declining price level. It is a biological industry and cannot close and open as can a factory.

The factory closes for a time and throws much of the burden on unemployed laborers. Farming is a family industry and closing down means the abandonment of home as well as occupation. It has a very slow turnover.

Farmers buy mostly at retail and sell at wholesale. Other producers of basic commodities generally buy their raw materials at wholesale prices so that they buy and sell at low prices. But the farmer sells at low prices and buys at high ones.

Nearly all distributing charges both for buying and selling are receipts to persons in cities and towns. Therefore, the farmer is in a region that gets none of the high charges as income to the region.

The best way to bring discussion of causes to a tangible basis is to reduce the discussion to figures. Estimates for the United States indicate that in 1921 at least half of the trouble was due to monetary causes such as lag in interest payments, lag in taxes, and lag in distributing charges.

The increase in farm indebtedness in the United States from 1910 to 1920 was $3,166,000,000. At the average interest rate of 6.1 per cent, this called for an increase of $193,000,000 per year in interest, in addition to payments on principal.[20] Probably about three-fourths of this was on farms of food producers, or about $145,000,000.

The increase in tax payments by farmers was estimated at $471,000,000. Probably about three-fourths of this was on farms of food producers, or $353,000,000.

In 1921, had farm prices of food had their usual relationship to retail prices (see table 1), the farmers would have received

[20] Warren, G. F: Journal of Farm Economics, Vol. X, No. 1, p. 7, January, 1928.

about $1,760,000,000 more than their receipts actually were. This is far more important than debts or taxes.

In the same year, had food been as high as the average cost of living index, farmers would have received an additional $1,170,000,000 (table 4).

Table 4. Approximate Losses to Food Producers in the United States in Millions of Dollars*

	1921	1926	July, 1929
Over-production—Discrepancy between retail prices of food and other items in the cost of living	$1,170+	$ 400	0
Monetary results:			
Increased interest payments	145	145	145–
Increased tax payments	353	353	353
Discrepancy between farm and retail price index numbers for food	1,760	1,080	1,000+

* Warren, G F. and Pearson, F A : The Agricultural Depression, Farm Economics, No 42, Feb 1927, pp. 603–611.

This figure understates the effect of over-production. The cost of living index includes food and therefore other products would be higher than the average. How much of this higher price for other things was due to supply and how much to lag in price decline, when sudden deflation occurred, it is not possible to state. If the whole decline in the cost of living is attributed to food surplus, this figure would be still less than the sum of the other factors listed. This source of error ceased to exist when retail prices of food and the cost of living became about equal, as they have been for five years.

In 1929, the prices of food at retail were higher than the cost of living, but the discrepancy between farm and retail prices continued. With the recent violent decline in prices of all kinds of commodities, distributing charges are again lagging, and in July, 1930, food at retail was bringing 60 per cent above pre-war prices, but farmers were receiving only 24 per cent above pre-war prices for it.

Prices of food at retail are now as high as other items in the cost of living in England and in the United States. Prices paid to farmers for food are as high as other wholesale prices. It is, therefore, difficult to see how over-production of food or low

demand can now be called important factors in the situation. *The most important factor now is discrepancy between farm and retail prices. Taxes are next in importance. Interest payments are distinctly secondary, but very important.*

For about five years, following the deflation of 1920, there was undoubtedly an over-supply of food. At the present time, I see no evidence that there is an over-supply. There are indications of an over-supply of some things, and an under-supply of other things. But prices of food at the farm, at wholesale, or at retail do not indicate that food is more abundant than other commodities

The overwhelmingly important cause of the agricultural depression is falling prices and consequent maladjustment between farm and retail prices. An agricultural depression is an inevitable result of a decline in the general price level.[21]

Scientific research, agricultural extension teaching, the use of

[21] Had inflation occurred with stabilization thereafter, no serious agricultural depression would have occurred. Had no inflation occurred, but the price level been cut in half, a serious agricultural depression would have resulted

Since it was almost certain that gold would return to its pre-war value, the cause of the depression may be pushed one step farther back by saying that inflation was the cause for deflation The inflation during the war was serious enough, but farmers and others anticipated that prices would fall after the war It was the inflation of 1919-1920 that caused the most trouble

The Report of the Joint Commission of Agricultural Inquiry gives a judicial presentation of this

"The Treasury Department was unwilling to undertake the flotation of the Victory loan at a rate of interest comparable with commercial rates on account of the possible effect which that action would have upon existing issues of private securities and its possible effect in requiring the refunding of the issues of Government bonds already floated.

"The discount policy of the Federal reserve banks was again subordinated to the Treasury policy in securing its credit requirements, although at this time the tendency toward expansion, speculation, and extravagance was beginning to be apparent.

"This was clearly the time for a policy of advancing the discount rates of the Federal reserve banks with a view of curtailing the expansion, speculation, and extravagance which was then beginning.

"It is the opinion of the commission that a policy of restriction of loans and discounts by advances in the discount rates of the Federal reserve banks could and should have been adopted in the early part of 1919, notwithstanding the difficulties which the Treasury Department anticipated in floating the Victory loan if such a policy were adopted

"It is also the opinion of the commission that had this policy been adopted in the early part of 1919 much of the expansion, speculation, and extravagance which characterized the postwar period could have been avoided.

"The commission also believes that had such a policy been adopted in 1919 the difficulties, hardships, and losses which occurred in 1920-1921 as a result of the process of deflation and liquidation would have been diminished.

'No action in the direction of restriction of expansion, inflation, and speculation by increases in discount rates was taken by the Federal reserve banks or the Federal Reserve Board until December, 1919, when slight advances were made in discount

improved machinery, greater output per man, are not the causes of the agricultural depression, but are the major ways in which the severity of the depression is being met.

IS THE DEPRESSION WORLD WIDE?

Those who say that the depression has been world-wide and due to world supply and demand must explain the fact that while the currency was still being inflated in France, that country was fixing prices of food to hold them down although there was a severe depression in England and America. Also they must explain the fact that in France where stabilization occurred rather than deflation, there is little agricultural depression.

Denmark deflated one year later than the United States, then inflated and deflated again. Her farmers had prosperity in the first year of the American depression, then had a depression which was followed by prosperity when inflation occurred, which was in turn followed by depression.[22]

It is also interesting to note that, in general, farmers who retail their products have had a prosperous ten-year period, also that regions near cities have had little or no depression. Southeastern New York and Southern New England have, as a whole, had a very prosperous period in the past ten years. Banks have had almost no foreclosures on farms in this territory. Whenever and wherever the farmer receives a price that shows a percentage increase above his pre-war price as high as the percentage increase in retail prices above pre-war retail prices, the region is prosperous.

HOW LONG WILL THE DEPRESSION LAST?

How long will the depression last?[23] Since the most important cause of the depression is price disparity brought about by deflation, it is to be expected that the depression will last as long

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tates, followed in January by more radical advances and by further increases during the remainder of 1920.

"In the meantime there began and continued a period of expansion, extravagance, and speculation, the like of which has never before been seen in this country or perhaps in the world."

Credit. Report of the Joint Commission of Agricultural Inquiry, 67th Congress, 1st Session, House of Representatives, Report 408, Part II, page 12, 1921.

[22] Warren, G F and Pearson, F A Farm Economics, No. 44, p. 667-8, April, 1927

[23] See footnote No. 13.

Edie, Lionel D.: An International Viewpoint of Commodity Prices—Long Decline in Prospect, The Annalist, Vol. 32, No 826, p. 773, November 16, 1928.

as deflation continues, and for a number of years thereafter. If deflation should discontinue now, the increased efficiency in farming, and in handling products, and the infinite number of adjustments in other prices might be expected to end the agricultural depression in ten years or possibly less. I believe, however, that prices will continue to decline to the pre-war level and probably will go below that level. When the decline stops, a number of years will be necessary to overcome the agricultural depression.

The depression will probably last several years after rapid deflation ends. This depends on how violently agriculture is being curtailed at the time when deflation ends, and on the weather. If

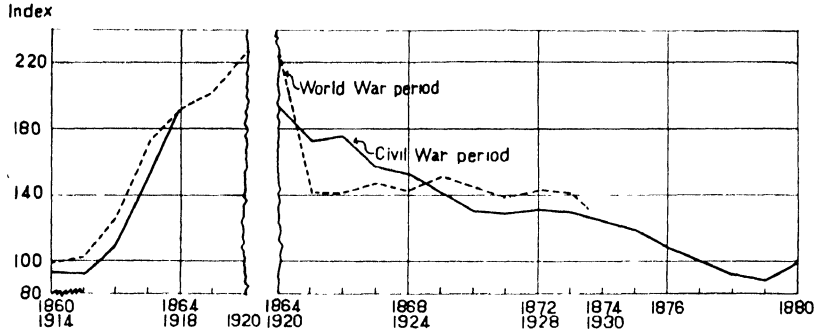

FIGURE 8. WHOLESALE PRICES, WORLD WAR AND CIVIL WAR PERIODS
In each case, 5 years before the war = 100

The writer expects prices to continue to follow the Civil War experience, or in other words expects prices to fall below the pre-war level.

it is somewhere near ready to end and a very severe drought should occur, this would turn the tide.

My guess is that wholesale prices will fall below pre-war, that is, gold will become more valuable than it was before the war, just as occurred after the Napoleonic Wars and after the Civil War. When it becomes valuable enough, it will be hunted for with vigor, and, in time, possibly enough will be found to raise prices.

In a period of depression, not all the years are bad years for all farmers. But good years are not so good as normal and bad ones are very bad. Several times in the past ten years, good times in some farming regions have led to the conclusion that the depression was over.

Young, A. A: Downward Price Trend Probable, Due to Hoarding of Gold by Central Banks, The Annalist, Vol. 33, No. 835, p. 96, January 18, 1929.

Warren, G. F. and Pearson, F. A.: The Agricultural Situation, pp. 254-264.

RELATION OF DIAGNOSIS TO REMEDIES

Some persons say it is immaterial whether the correct explanation is monetary, or supply and demand, but a correct diagnosis is absolutely essential. If the problem is over-supply, then reduced production is a complete and satisfactory solution and when it is attained, conditions will be ideal.

If there is no over-production of food, but merely a maladjustment between farm and retail prices, then if production is reduced to a point where farmers prosper, food will be higher than other items in the cost of living, and we will have another period of agitation concerning the high cost of living, and socialistic agitation in cities.

If the trouble is over-supply, production should be the point of attack. If it is high distributing charges, these must be the point of attack, (unless the currency is stabilized.)

If the trouble is over-production, the charge that scientific research work and extension work are to blame may be true, in part, but if the depression is due to monetary causes and if a reduced production is to bring on another period of high-cost-of-living, then scientific research should be pushed with vigor so as to reduce farm costs and be ready to meet any situation that may arise.

If my diagnosis is correct, the individual American farmer should anticipate a still lower price level, except for commodities that are already below pre-war prices. These will probably rise and later fall again. He should be careful about long-time debts, except for things that are below pre-war prices. He must reduce costs of production by the following and many other means: He should not buy land nor work land that does not produce a high output per hour of labor. He should rapidly substitute machinery for human labor. Even more important, he should make labor-saving plans of operation. He should have a business large enough fully to employ all his time and that of his labor. He should obtain high crop yields per acre by use of fertilizers which are cheap, and by discontinuing to operate land that does not give high yields. There are some apparent exceptions. For example, the combine enables a man to produce a large output of wheat per man in regions with low yields, but even here high yields per acre for the region are of unusual importance.

From the public standpoint, this is the time to push research work, extension work, and college teaching on the sciences of pro-

duction and farm management, in order to reduce costs and also be prepared to meet the period of high costs of living which will come after the agricultural depression is over.

But this is preeminently a time for business research on distribution. This is the most important single item that remains out of adjustment when deflation occurs. Great increases in efficiency in distribution are occurring, but they are not taking place rapidly enough. The whole distributing machinery should be studied and decidedly revised.

The study of cooperative marketing should be pushed. The primary need in such work is studies just like farm management on how to manage cooperatives and other businesses. These principles having been learned, they should be taught.

If the government wishes to aid farmers, it should encourage cooperative buying even more than it encourages cooperative selling, for the greatest price discrepancy is between wholesale and retail prices. Farmers buy at retail. There is a great spread between these prices and wholesale prices of the same commodities. Most of the selling cooperatives take products from the farm to wholesale markets. The spread here is much less, as this is the spread between two wholesale prices. The very fact that the spread on farm purchases is so high is the reason why so many concerns desire to see that cooperative buying is excluded from the credit acts. It is also important that selling cooperatives examine the possibility of reaching nearer to the consumer before selling. Thus far the mistake has been made of thinking that the major function of a cooperative is to hold products for some hoped-for rise in price.

The Farm Board began by lending to cooperatives to enable them to hold cotton and wheat. In a period of financial deflation, holding is unusually hazardous and is not likely to be successful except when prices are distinctly below the general price level. But efforts to reduce the costs of distribution offer great chances for profitable results.

This is the time to obtain sound legislation on land utilization, taxation, rural electrification and the like. I think it is wise to spend very little time worrying about a surplus as such, and spend a large amount of time on sound, long-time policy. This has at all times been the policy of the department with which I am connected. Whether or not it has been a wise policy, time will tell.

The agricultural economist should be ready with facts in advance of public interest. He should foresee the coming interest so that he can work in a quiet, scientific manner, assembling and publishing necessary data. Policies may differ. It is the function of the agricultural economist to furnish definite, scientific facts which will be accepted by all groups so that departure in policy will be from accepted facts rather than in controversy about the facts. But before he can know on what problems to work, he must know whether the disease is over-production, or deflation. The subjects on which different experiment stations are doing research work show how important this diagnosis is.

From the international viewpoint, pressure of Europe to sell and low consumption in Europe will in time correct themselves, but the adjustment will be delayed if gold continues to rise in value. These are debtor countries. Falling prices make the debts hard to pay. The world would be better off if the international debts were all written off. Most of them will probably never be collected.

Also, if depression is the disease, we will give attention to money in the hope of sometime inventing a stable measure of value. Great improvements could be made at any time if the money illusion did not exist.

When the public finds that tariffs, export bounties, credit, and so forth, will not cure the depression, probably it will turn to money, as it did in 1896. There is then danger that the movement will be to a currency less stable than gold. What is needed is a currency more stable than gold. If this diagnosis is correct, it is time now to educate the public on money. When the question becomes political, it will be too late for real study.

We now have stable measures of length and weight which are rather recent in the history of mankind. We are inventing all manner of new measures concerning radio, aëroplanes and the like. We are also adding new measures in farm management such as work units, production indexes, labor earnings, and so forth, but we have not yet invented a stable measure of value. No man and no group is to be blamed for this situation any more than we blame individuals for not having found a cure for cancer. Scientific progress has scarcely begun. Some day, we will know the cause of cancer and remedies for it. Some day, agricultural economists will be able to agree on the causes of the agricultural depression. Then we may begin to find remedies.

DISCUSSION OF THE CAUSES OF THE AGRICULTURAL DEPRESSION

Professor Sering.—I shall confine myself strictly to the question as to whether or not the present depression of agriculture and industry has been caused by a rise in the value of gold and of money. There is no doubt but that no inductive proof has ever been given for this assumption. On the contrary, there are important facts which are not in accordance with this assumption:

1. The amount of money in circulation and of deposits in all banks, nearly tripled in the United States from 1914 to 1929.[1] Money in circulation and deposits rose from 22.03 to 60.15 billions of dollars. A shrinkage of demand for goods due to monetary reasons could be said to exist only if the banks had actually given less credit than was necessary, at given prices, in relation to the increase in the volume of production But during the same period, 1914 to 1929, the volume of production in the United States was not much more than doubled.

2. It has been said that the gold is concentrated in the banks of the United States and the Bank of France, and that this gold is to a very large degree sterilized and especially is it not sufficiently used in international trade. Certainly such a concentration has its dangers. However, the percentage of gold which covers the amount of circulating medium in the United States was less in 1929 than in 1914; namely, 7.2 per cent against 8 9 per cent. Concerning the use of gold in international trade, it must be kept in mind that since 1913 the Federal Reserve Banks of the United States have been permitted to accept bills of exchange. The bills of exchange accepted by the great American banks are the principal means of making international payments and of supplying short-time credits to Europe. In Europe, the same bills of exchange are used in a manner similar to gold for covering the notes, for instance, of the German Reichsbank. In this way, the accepted bills of exchange take the place of gold lying in the banks of the United States.

3. Of course, a substantial decline of prices is not possible without a corresponding diminution of money in circulation. However, the causes of a price movement cannot be derived by the use of this necessary correlation. As a matter of fact, the decline of prices in 1929 and 1930 was the prior event Subsequently the banks recalled their loans or did not renew them. It was only in this way that the amount of money in circulation was diminished. The causal relation was therefore the reverse of that given by the monetary theorists.

[1] Money in Circulation and Deposits in all Banks in the United States, 1914-1929.
(BILLIONS OF DOLLARS)

	1914	1924	1929
Money in circulation	3 46	5 05	4 86
Deposits of all banks	18 57	45 83	55 29
Total	22 03	50 88	60 15

The above are some of the reasons why I cannot agree with those gentlemen who consider the restricted amount of money in circulation and the restricted amount of short-time credit, to be the principal causes of the present depression of prices. However, I am speaking only of the present depression. As to the future, I am in accordance with Mr. Ashby's fine article in the New York Times concerning the duty of the central banks to keep stabilized as much as possible, the value of the medium of exchange.

In general, I think that the change in the value of gold and money should be taken into consideration only after all other causes of the depression have been fully considered. The papers which we have been privileged to hear during this conference give sufficient explanation for the present depression. It was of great interest to me that Professor Warren was led by his studies to the opinion that one of the chief reasons for the depression of prices paid producers is to be found in the enormously increased costs of distribution, and that this rise was the consequence of the raised level of wages, which has followed every great war. This is perfectly in accordance with the experience which we have had in Germany. But of course, other reasons must be sought for the drastic decline of prices during the last two years.

I can also completely agree with Professor Warren that increased taxes have had a great deal to do with the depression. But there is a great difference between the United States and Europe in this regard. In the United States the taxes are destined to be used for purposes which increase the producing power of the country. Direct taxes are used principally for roads and schools. Such uses are an expression of the high standard of living in this country. A man who has not his own automobile considers himself as a proletarian. For this reason, the limit of profitableness in farming is on a very high level. In Germany we do not so much need the motorization of travel between country and city because Germany is only about four-sevenths of the size of Texas and 65,000,000 people live within this small area. The whole mode of life is much more localized, and, generally, we do not think that a style of living, such as is found in the United States, is a necessary condition of happiness. Nevertheless, the taxes which the farmer has to pay in Germany are about three times as high per acre as are taxes in the United States. I am the general reporter for a broad agricultural research project which has been carried on for three years in our country in accordance with a special law, and the above figures represent averages based on a large number of farms where accounts are kept. Now, of course, it must be kept in mind that land values are higher in Germany and that crop yields are higher than in the United States, but on the other hand, we are hard put by the fact that our taxes are used principally for consumptive or unproductive purposes. Here is one of the chief reasons why purchasing power in Germany is so much lower than in the United States. That is the point which I stressed in my paper read before the Conference, as a reason for the relatively low level of international prices for high grade or "semi-luxury" farm products such as butter, cheese, fruits, poultry and so forth. However, I do not want to re-

peat myself and I can only assure you that I have not said one word in my paper which I cannot prove.

Dr. Baker—May I ask Dr. Warren when the drop in the general commodity index of prices occurred. I note that the figures are the same for the period 1924-1928 as for the period 1921-1924, each being 144, but that the figure for 1929 is only 126. Doubtless the decline began before 1929. I ask this question because the rapid increase in agricultural production continued until 1926, and from 1922 to 1926 over-production appears to be a dominant factor in accounting for low prices of farm products. But in 1927 production declined, and since that date the continued low level of prices of farm products may be explained in large part by the monetary situation. It would be interesting to know whether the change in the general commodity index of prices took place about that time

Dr. Warren—The rapid drop in the general commodity price index did not begin until the latter part of 1929. In July, 1929 the index was 143, but in July this year it was 123.

Dr. L. C. Gray—I would be the last to imply that the influence of so-called deflation has not been an element in the agricultural depression of the past decade. From my point of view, however, I do not believe in stressing it as the sole factor and largely ignoring the influence of maladjustment in the equation of supply and demand, whether with reference to agricultural products as a whole or with reference to particular lines of production.

I think the influence of deflation and of the lags in adjustment to which Professor Warren calls attention were especially notable just after the drastic decline in 1920-21. The necessity of meeting obligations incurred during the period of inflated capital values in the face of a greatly reduced level of prices, and particularly a level which has continued lower than that of non-agricultural products, has been an especial source of difficulty to many thousands of farmers. This source of distress has been especially emphasized by the tendency for taxes of farm real estate, not only to remain on the high level reached during the period of inflation but also to increase notably during the decade.

With due respect to these elements of disadvantage, they do not explain satisfactorily all of the phenomena of the depression. In the first place, after the extreme decline of prices in 1920-21, the downward trend of the curve of farm prices has not been extreme enough to be mainly responsible in itself for the persistent discrepancy in the prices of farm products and the prices of other commodities. I except, of course, the extensive decrease of the present year, which is a recent manifestation and does not account for the persistence of the depression during the past 10 years. Granting that agricultural prices have remained lower than the prices of non-agricultural commodities considered as a group, it is necessary to explain why farmers have continued to accept this lower level instead of making readjustments through supply to such an extent that the disparity would be removed. This lack of adjustment in my judgment cannot be explained merely in terms of a slight decline in the trend of agricultural prices or of general prices during the period. It is necessary to direct

attention also to some of the major changes in the equation of supply and demand during the decade, such as the great expansion of wheat and cotton growing in semi-arid areas; drastic changes in domestic consumption, including the reduction in demand for feed due to the substitution of tractors for horses; modifications in foreign demand for agricultural products resulting from the development of self-sufficing policies in European countries; the influence of trade policies in America and elsewhere; the tendency for land policies and various forms of agricultural subsidies in many countries of the world, to stimulate agricultural expansion or to retard contraction, and the economic and social inertia which retard the contraction of agricultural production in many of the older areas where agriculture has become unprofitable.

No doubt there are still many farmers on the land who purchased their land and contracted their obligations at the high level of capital values which prevailed at the peak of inflation, but in general, agriculture is not now an attractive occupation even for those entering it afresh and able to take advantage of the greatly reduced costs of agricultural land and improvements. Land values for the nation as a whole have fallen more than the level of general commodity prices or the level of farm commodity prices, yet there are few parts of the country where there is an inclination for young people born on the farm or for bankers and business men to look upon farming as a promising occupation. For these reasons, therefore, I am not disposed to lay as much stress on deflation as does Professor Warren, although recognizing it as a notable influence in bringing about agricultural depression and contributing to its persistence.

Mr. Jensen—I take it that certain figures relating to Danish conditions might be of interest with respect to the question as to the relationship between monetary disturbances and agricultural prosperity and depression In other countries different causes have of course contributed to agricultural depression, but there can be no doubt that in Denmark the major cause of the agricultural depression experienced, especially in the years 1925-27, is to be found in the monetary disturbances during and following the World War. Had it not been for these disturbances the condition of agriculture would at no time have been so adverse as to justify the use of the term crisis.

During the war we had inflation in Denmark as did almost all other countries in the world. The inflation immediately following the war was allowed to go somewhat further in Denmark than in the United States or England. In order to get back to the gold basis, it was necessary, therefore, to go through a more severe period of deflation later on. While the deflation in the United States took place in 1920-21, it was not before 1925 that deflation was carried through in Denmark. To be sure some deflation set in during the period 1920-22, but it was not carried through. As a matter of fact, quite the opposite occurred. In 1923, inflation again took place. Not before 1924 was a definite policy of deflation embarked upon. In 1925 there was a strong deflation helped along by outside speculation anticipating what was coming. We thus had years of alternating inflation and deflation. How did agriculture fare through these years?

The Bureau of Farm Management (Det Landokonomiske Driftsbureau) has published certain figures showing the percentage return on the capital invested in agriculture (table 1).

When deflation set in during 1921, no return was made on the capital invested in agriculture, but when inflation was again allowed to get under way in 1923, good returns were again made at the very time when American agriculture was in the midst of a depression. When deflation was finally started, and in 1925 began to proceed rapidly, carrying the crown back to par in practically one year (increasing its value by one-third), a violent agricultural crisis set in and agriculture did not make a return on its investment for more than two years.

Table 1. Percentage Return on the Capital Invested in Agriculture in Denmark, 1916-17 to 1928-29

Year	*Percentage return on capital**
1916-17	7 3
1917-18	6 8
1918-19	8 3
1919-20	7 4
1920-21	5 8
1921-22	0 9
1922-23	4 5
1923-24	6 1
1924-25	6 4
1925-26	1 2
1926-27	1 1
1927-28	1 8
1928-29	6 2

* Percentage return on the market value of land, buildings and other means of production The figures as given present a too favorable picture since the "physical plant" is revalued each year and the capital investment figure was written down after 1925

Agriculture operates largely on borrowed capital and the turn-over of capital is slow. After a period of deflation the farmers' debts, contracted at a high price level, must be paid off with more valuable money. Many other factors enter, as for example, the slow adjustment of taxes and prices of agricultural supplies to the new and lower price level for agricultural products. However, the figures speak for themselves. I would prefer not to make further comment but leave it to you to draw your own conclusions.

Dr. King—I think it is possible that too much emphasis has been placed upon the effects of deflation *per se,* and too little upon the maladjustments that arise from inequalities in the rate of fall of the different elements of costs and of prices. Depression has been presumed to exist in agriculture as a general phenomenon. In point of fact, it is very unequal in its incidence. Farmers in some sections of my own area have felt it severely—others hardly at all. Again, agricultural wages have risen, even where profits have fallen.

It is by no means clear that general deflation, if it should affect the prices of all services and commodities in the same proportion would have of necessity any direct connection with depressed conditions. A lag between costs and returns may give rise to accounting losses, but not necessarily to real losses, since the purchasing power of money has risen in the meantime. But is it not rather the fact that during deflation, wages and other costs may fall less rapidly than prices? That explains the marked effects of deflation upon the real incomes of farming. Mortgages and loans also become more burdensome. But not all farmers, and not all types of farming suffer equally in these respects. It would be wrong, too, in maintaining a general theory of the effects of deflation, to ignore other causes operating at the same time. Machinery and easier transport each will have contributed to the difficulties of the farmers in the eastern consuming countries, and aided the agricultural development and prosperity of the countries of the West. Bad seasons may be a very real element in the farming situation, as in the late '70's and early '80's in England, and there will be other factors too. Probably less exception would be taken to the general principle enunciated by Mr. Enfield if deflation were considered, not as something predisposing to depression in itself, but as something which gives rise to maladjustments which may be very serious where industry and trade are based upon credit and dependent upon paid labor.

Professor von Dietze—I shall try to answer some of the questions Dr. Warren has raised, but I want to say first that the different opinions in regard to the influence of monetary changes upon agricultural and industrial conditions are quite familiar to us. In Germany the economists disagree on this question just as violently as they do in England and in America. The monetary theory seems to lose ground with us, however, and as for myself, I am inclined to share Professor Sering's point of view.

There can be no doubt but that monetary influences upon the agricultural situation have been important in former times, and I suppose that Professor Sering would also admit that. A more or less important part of the depression from 1875 to 1900 is to be attributed to monetary causes, and this holds true perhaps to even a greater degree for the depressions following the Napoleonic Wars and the World War, at least so far as the years 1920 to 1922 are concerned. But we are by no means certain as to the degree of influence exerted by this factor. And even assuming that its influence was very considerable in the past, there is still room left for very sincere doubt as to whether the monetary factor has been of the same importance in the depression of 1928-30 as in former times. Even the interesting figures given us showing returns on capital invested in agriculture in Denmark, cannot prove anything with regard to the new international depression through which we have been passing since 1928.

As to the causes of the recent depression, I cannot see sufficient reason to ascribe them to monetary factors, and in any case, such an explanation will not cover the point. It seems to me quite logical to assume that distress and bankruptcies may be caused by a rise in the value of gold. But if you admit only monetary influences as causes of the depression, you cannot

explain why farmers cannot be found who are willing to take over the land after the burden of debts has been lowered, or even cancelled, through foreclosure. The monetary theory will never be able to cover this problem which has been presented to us in many excellent papers. It cannot explain how the utilization of submarginal land has become a problem of the greatest importance.

Professor Jutila—The present agricultural depression is not the result of any one factor. There are many factors which differ in different countries In those countries in which great changes in the value of money have occurred, monetary causes have been of great importance. Rising tariff walls have also been a cause. Countries which formerly did not produce enough of certain products to meet home requirements have raised their tariff walls, and are now producing behind these walls, not only enough to meet their own needs, but in some cases they are actually producing a surplus which has been disposed of by "dumping" it on the world's markets.

It is also necessary to keep in mind that certain lines of production have been yielding good returns at the same time that production along other lines has resulted in losses For example, dairymen have been relatively well off during the same period in which grain producers have been passing through a severe depression.

Due to the mechanization and general increased efficiency of agriculture, and to the fact that population is increasing somewhat more slowly than heretofore, fewer persons are required in the agricultural industry. This means that there are a number of submarginal farmers who ought to be transferred into a line of activity other than farming. We can say that this sort of depression always exists in agriculture

The more important causes of the world crisis in agriculture are, in my opinion, as follows:

1. The rising value of gold.
2. The rapid mechanization of agriculture, and the greatly improved means of transportation.
3. High tariff walls.
4. The ever increasing burden of taxes on farmers.

Professor Ashby—In effect Dr. Warren stated that increase in production per man is not the cause of agricultural depression but the remedy for it. There is not and cannot be any single cause entirely responsible for such a depression as we are now experiencing But increase in efficiency and increase in production by reason of this increase, is one of the causes. In so far as Dr. Warren's statement is true, and just so far as there has been an increase in production per man and in general efficiency, the remedy should have become a preventive. The increase in production per man should have countered the tendency to depression, and kept conditions stable. It certainly has not done this. Dr. Warren may answer that the increase in production per man did not proceed far enough or fast enough. But having in mind American figures for estimates of increase in production per man one could scarcely accept this argument.

Now, in part Dr. Warren says that depression is due to monetary causes

—to disparity between the supply of goods and services, and the supply of circulating media available for exchanging goods and services. Increase in efficiency can only lead to potential increase in the supply of goods, and, in this case, of foodstuffs. The increase in production itself brings this increase in supplies. An increase in supplies of goods and services has the same effect on the price level as an equivalent decrease in the supply of "money" or circulating media. But Dr. Warren would put more goods on the market and thus cure the depression!

Further, it is worth while noting that Dr. Warren has mentioned that the level of prices of agricultural products has been lower than the general level of commodity prices. This disparity indicates that agricultural products have been in over-supply. The over-supply is due to increase in production which has been largely due to increase in efficiency.

But the most important point to notice is that unless effective demand rises with the level of efficiency, we can only raise efficiency while maintaining a stable price-level, or parity of agricultural with other prices, by reducing the number of persons engaged in production.

We know, and Dr. Warren knows quite well for New York State, that we do not reduce the number of persons engaged as rapidly as we increase efficiency. All of us know that agriculture in progressive regions carries redundant persons This is the meaning of submarginal land and submarginal farmers, for when we talk of submarginal land we also mean the submarginal farmers who farm it These submarginal farmers continue their production when it is no longer needed and they suffer and society suffers.

But supposing we said that we could reduce the number of persons engaged when we raise efficiency—supposing 10 per cent leave and look for jobs elsewhere at this moment—are we then to say that because these men have gone out of the industry there is no agricultural depression? If we are to call ourselves economists we must go farther, for agricultural economics is a social science We have to ask ourselves what becomes of these men and how their interests are protected. There is no sound reason why they should suffer when society makes progress and begins to get the benefits of improvements in production.

Increase in efficiency may be "the way out" for the individual, but it can never provide a wholly sufficient way out for the whole group which is concerned with the effects of depression

Mr. Enfield—With reference to the remarks of Professor Sering and Dr. Nourse, the intrinsic difficulties of interpreting the facts of agricultural history are very great unless the monetary factors are taken fully into account. There are many examples in the post-war period which cannot be adequately explained on the grounds of supply and demand alone.

In the case of the period at the end of the nineteenth century referred to by Professor Sering and Dr. Nourse, the same difficulties present themselves. The fall in commodity prices from 1873 onwards was attributed to intensification of production, building of railroads, improvement of ocean transportation, and so forth. But this intensification of production had been going on for twenty years before 1873, and during those years

prices had been *rising*. How was it that intensification of production in the first period was consistent with rising prices while in the second it *caused* falling prices? The difficulty in interpreting these facts was readily overcome if the monetary changes which took place about 1873 and afterwards were taken into account, namely, the spread of the gold standard to silver standard countries and elsewhere.

Again, the agricultural depression at that time was experienced by a large number of countries. However, there were two important exceptions, India and the Argentine. How was it that the depression felt by other countries was escaped by these two? What was the factor common to the depressed countries and not shared by India and the Argentine? The common factor was that the depressed countries had their currency upon a gold basis. India had a silver currency, and the Argentine a paper currency.

Dr. Warren—Distributing charges lag for the same reason that taxes remain high, i.e., because wages decline very little when prices fall one-half.

Increased efficiency will gradually occur, but it takes years to reduce distributing charges. The unusual activity in the reorganization of the retail business at the present time is due to the high charges. A decline in the price level such as occurred in 1920 must inevitably result in ten to fifteen years of agricultural depression because it takes that long to readjust agriculture and distributing charges. I have enumerated a few of the reasons why agriculture cannot adjust quickly.

The real remedy for the depression is, as I have indicated, a stable measure of value, but lacking this, the farmer has only three alternatives: increase efficiency so that an hour's labor will produce what an hour's time is worth, reduce his standard of living, or discontinue operation.

I will repeat that it is only acres times yield per acre that affects supply. If fewer men farm the acres, it does not mean increased supply.

I think the world has nothing to fear from increased efficiency. That is the way to a higher standard of living. It does require that many persons change their occupations. There is often pain in making the change, but those who change usually profit by it, particularly if they will make the change promptly. There would be no automobiles if some one had not changed his occupation. The old blacksmith who resisted the change, suffered, but the one who promptly became a garage man, prospered.

We have obtained records of the new occupations of several hundred farmers who have left farms in the abandoned farm areas. The most numerous group is farming on better land. Innumerable other occupations are included. There is little doubt but that the majority of these are much better off. It would be next to impossible to get any considerable percentage of them to buy a farm and return to the poor areas. For their own good they resist movement too strenuously.

THE AGRICULTURAL DEPRESSION IN EAST EUROPE WITH SPECIAL REFERENCE TO POLAND

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I WISH, in a brief statement, to call your attention to the situation in East Europe during recent phases of the world agricultural depression. In referring to East Europe, I mean particularly Jougoslavia, Roumania, Bulgaria, Hungary, and Poland. The political situation in Russia, although of great general interest, is such that she can hardly be compared, from the economic standpoint, with the remaining smaller countries.

The five countries of Jougoslavia, Roumania, Bulgaria, Hungary, and Poland cover an area of about 280 million acres, or something like Germany, Austria, and France taken together. The population is now in excess of 70 millions of people. Geographically, these countries differ from each other in many respects. However, in all cases agriculture is the principal industry. Unlike western and central Europe, they have a large rural population, and they all lack large cities. It was in East Europe that the greatest changes in international boundaries were made following the World War.

Cheap labor and the limited use of agricultural machinery are characteristic features of East European agriculture. Gentleman farming still plays an important rôle in Hungary and in some parts of Poland, although in the latter country it is decreasing in importance from year to year. With the foregoing exception, the whole area may be referred to as the domain of small and middle sized peasant farms. A low standard of living prevails, particularly in East Poland and Roumania.

Wheat and corn are the principal crops grown in Roumania and Jougoslavia, while in Poland, rye and potatoes predominate. Eggs and hogs are exported from all five countries to a certain extent. Cheap labor favors the production of root crops, and makes it particularly easy for Poland to compete in the production of beet sugar.

New international boundaries created a peculiar situation in East Europe during the period 1920-1924, a period during which the United States and many other countries of the world were suffering from a severe agricultural depression. In Poland, agriculture

in the former German division was suffering most, as it was hit by a sudden drop in prices. At the same time, prices in the former Russian division did not decline to any considerable extent. Similarly in Roumania and Jougoslavia, changes in international boundary lines make it impossible to make any general statements relative to the agricultural situation in these countries, during the period mentioned. For the above reason, official statistics, so far as they are available, are likely to misrepresent the true situation

The agricultural situation in East Europe during the above period was influenced by a number of factors. In general, agricultural production tended to decrease rather than to increase. As a result of the Agrarian Revolution, Roumania, which in pre-war times was an important wheat producing and exporting country, shifted to the production of corn. Yields and export sales declined immensely. Another check upon the expansion of production in East Europe was the enormously high interest rates, due primarily to unsettled political conditions. Last but not least, East European states dreamed of self-sufficiency. They were eager to create their own industries at any price. High tariff walls were built up everywhere, largely at the expense of agriculture. During this period one might easily have gained the impression that the agriculture of East Europe would hardly play an important rôle in the near future on European markets.

If I am not mistaken, however, conditions are rapidly changing. First of all, the countries of East Europe have awakened to the fact that the dream of artificial industrialization is not likely to be realized. Though high tariff walls have not been abandoned, it is generally recognized by East European countries that they are primarily agricultural, and therefore cannot afford to neglect this important industry. However, mistakes have been made in attempting to promote the industry. Intensive farming has risen to a kind of general creed. To raise agricultural production to the high levels of Denmark and Germany has become the goal of East Europe. Mussolini's grain "warship" was set as an example. Governments have in many cases brought unreasonable pressure to bear in attempting to bring about greater intensification of production. Little attention has been given to the question of whether or not conditions favor the building up of an intensive system of farming. Two years ago a bill was introduced in our parliament proposing to compel farmers to buy fertilizers. Fortunately

enough, it did not become a law. But similar steps, accompanied by a belief in the power of the government to enforce any economic policy, have been tried in almost every East European country.

In order to understand how the artificial stimulation of agricultural production worked, and how it affected the farmer, it is important to note that this movement started about the time when the prices of agricultural products, as pointed out by Professor Sering, were rising everywhere in Europe. At the same time several loans had been floated by East Europe, mostly in the United States. They served directly or indirectly to push forward agricultural production. Many a farmer at this time incurred heavy debts in spite of the high rate of interest because of comparatively easy money, or because of the hope that high prices would last forever, or even in order to meet taxation requirements.

What is going to be the result? Increased agricultural production, which I do not believe to be fully reflected in official statistics, together with the impossibility of buying industrial products at reasonable prices due to high tariffs, have forced the farmer to sell at low prices. Debts, previously incurred, have increased the pressure. We should not overlook the fact that no one in the world, farming on a commercial basis, can successfully compete with a peasant who is forced to sell his products to pay off his debts. It is not so much increased production as increased pressure to sell which is forcing the peasant of East Europe to throw his products on the market almost regardless of price. Until recently our local prices have not greatly influenced prices on the markets of Central Europe. Eastern grain remained at about the American price level or even higher. However, this relationship is apparently changing from year to year. It is my opinion that in the future, in years when crops in East Europe are good, as for example in 1929, prices on our local markets will rapidly decline, and that prices on the markets of Central Europe will be influenced more, comparatively speaking, by production in East Europe than by world production. Contrary to the experience that prices fluctuate less violently the nearer we approach the ultimate buyer, our prices are undergoing more violent fluctuations than are prices in the great transatlantic surplus areas. Seasonal price changes in East Europe are particularly violent.

We are selling goods that we could consume ourselves, but we are selling them because we cannot afford to consume them. This

is the case, for instance, with Polish eggs and with Polish hogs. In the course of the next few years, Russia may be back on the markets of Europe with large supplies of agricultural products despite the fact that her people may be living on a starvation level.

I agree entirely with Professor Sering that the weakened purchasing power of the European industrial population is forcing agricultural prices downward. However, I venture to express my opinion that the increasing pressure in East Europe to sell, almost regardless of price, will force prices even lower unless something is done to increase the purchasing power of the agricultural products of East Europe, and to enable the peasant to retain for himself a greater portion of those products in order that he may raise his standard of living. This would prevent the eastern peasant from becoming an increasingly keen competitor of commercialized agriculture. If this is not done, the agricultural depression may become still worse. The weakened purchasing power of the industrial population of Europe, together with the increasing pressure on East Europe to sell her agricultural products at almost any price, will make for still lower prices.

Everything which I have said with reference to East Europe holds true for Poland. Poland is more densely populated than the other agricultural countries and could easily make use of all the products which she now sells abroad. For some time she expected to be able to do so. She placed restrictions on the export of agricultural products and tried to develop industries of her own, but failed. In order to maintain a favorable balance of trade, she was forced to remove export restrictions. Poland realized that she was still an agricultural country. From 1926 to the present time, agricultural production has steadily increased, although high tariff walls on industrial articles have not been abolished.

As to the future, I am convinced that if the present political and economic situation in central Europe remains unchanged and if the mutual relations between central and eastern Europe do not improve, that the pressure of our agricultural exports will increase. This will come about even at the expense of further lowering our standard of living. Debts which have been incurred will have to be paid off. Tax requirements must be met in some way. Industrial articles must be imported, unless of course, foreign capital comes in to help develop our industries. Many people in Poland hope that the United States will help do this. The development of

our industries would increase the purchasing power of our people and would doubtless check entirely the pressure of our agricultural exports. It should be stated that something has been done in this direction by the United States. A loan was floated in the United States in 1927, following which Poland was able to stabilize her currency. The possibility of increasing her imports and the per capita consumption of her city population increased, largely as a result of floating the above mentioned loan. However, the effect was short lived, and since 1929 the pressure tending to force the sale of agriculture products has gradually increased, and we are confronted, together with other East European countries, with a severe agricultural depression.

A few figures will illustrate the present position of agriculture in Poland. We shall start with credit, since credit conditions exert such an important influence on agriculture. Sources of long-term loans are extremely limited. A gentleman farmer as well as a peasant must rely, for the most part, on short-term credit in the form of promissory notes to meet his credit needs. These notes are being constantly renewed. It is difficult to estimate the toll taken in the form of interest payments from indebted farmers. During the first part of the deflation, in 1924, interest rates on private loans (which were practically the only ones available to farmers) were as much as 15 per cent monthly. Subsequently, the rate of interest dropped. Comparatively easy money resulting from the floating of an American loan provided a further check. However, interest rates are still in the neighborhood of 12 per cent a year. The private discount rate on first class promissory notes at Lodz, the center of our textile industry, is given in table 1 for the period from July, 1927 to date. For agriculture, this discount rate varies from about 15 per cent in West Poland to 40 per cent in East Poland, 24 per cent being the approximate average.

Let us now consider the course of agricultural prices during the past few years. From 1924, which by the way was the year during which the new zloty currency was introduced, to 1929, the movement of agricultural prices was generally upward (figure 1). They were highest in 1924-25 after a poor harvest. They dropped in 1925-26, but again rose during 1927-28. During 1929 they again dropped to the level of 1924. The wholesale prices of small grains in Warsaw are given in table 2, together with the ratio of such prices, expressed as a percentage, to cash prices in the United

States. Index numbers of the prices of small grains are given in table 3 for each of the three former divisions of Poland. You will notice that for awhile the prices of small grains were higher in Poland than in the United States. Subsequently this differential began to disappear, and about harvest time, 1929, prices in Poland dropped below the American level (table 2). Wheat, which did not precisely conform to this general movement, can hardly be compared with the other grains since our production is low, and furthermore wheat is protected by tariff. However, if you will trace the movement of wheat prices in the remaining countries of East Europe, as well as the movement of corn prices, you will

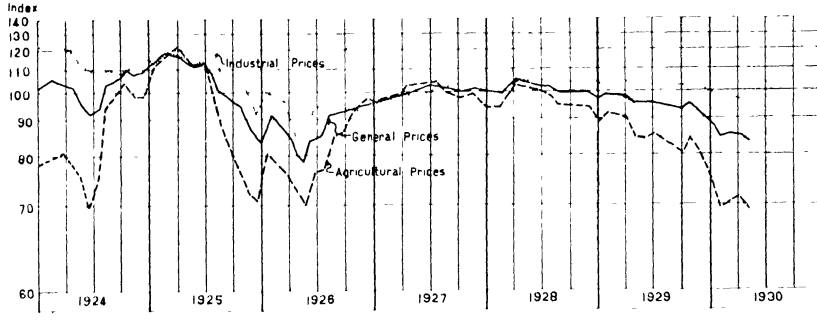

FIGURE 1. INDEX NUMBERS OF AGRICULTURAL, INDUSTRIAL, AND GENERAL WHOLESALE PRICES IN POLAND, JANUARY, 1924, TO MAY, 1930

1927 = 100

Logarithmic Scale

Polish Business Conditions, Vol. 2, No. 1, January, 1929, page 6; Vol. 3, No 3, March, 1930, page 115; Vol. 3, No. 6, June, 1930, page 186. Published by the Institute for Business Research, Warsaw, Poland.

find a similar dropping off in price during the latter part of 1929 and the early part of 1930.

Low costs of production on the North American continent have been blamed in East Europe for this development. A meeting of the representatives of East European countries is planned for the end of this month in Warsaw to consider some form of agrarian cooperation to protect East Europe against American competition. I do not challenge this cooperative endeavor as such, but I do not find any evidence to justify the statement that low costs of production on this continent caused the sudden decline of prices in Poland. The trouble lies with East Europe and with the general European economic situation. It may also be that the grain trade is taking into account in advance the already increasing

Table 1. Discount Rates in Poland, July, 1927 to May, 1930*

Year	Discount Rate		
	Bank of Poland	*Leading commercial banks*	*Private discount rate on first class promissory notes*
1927			
July.	8	12	33
August	8	12	29
September	8	12	27
October	8	12	23
November	8	12	19
December	8	12	24
1928			
January	8	12	23
February	8	12	18
March	8	12	19½
April	8	12	18
May	8	12	16¾
June	8	12	19¼
July	8	12	19
August	8	12	19
September	8	12	19
October.	8	12	19½
November	8	12	19¼
December	8	12	19½
1929			
January	8	12	19½
February	8	12	39
March	8	12	22¾
April	9	13	22½
May	9	13	20
June	9	13	20
July	9	13	19¾
August	9	13	18½
September	9	13	17½
October	9	13	17½
November	8½	13	17½
December	8½	13	17½
1930			
January	8	13	15
February	8	13	14¾
March	7	12	—
April	7	12	—
May	7	12	—

* Polish Business Conditions, Vol 1, Nos. 1–12, Vol. 2, Nos. 1–12, and Vol 3, Nos. 1–6, published by the Institute for Business Research, Warsaw, Poland.

Table 2. Wholesale Prices of Rye, Barley, Oats, and Wheat in Warsaw, and the Per Cent Which Such Prices Were of the Cash Sale Price of the Same Grains in the United States, 1927-1930*

Year	Rye		Barley		Oats		Wheat	
	Wholesale price in Warsaw	Per cent of cash sale price in the United States	Wholesale price in Warsaw	Per cent of cash sale price in the United States	Wholesale price in Warsaw	Per cent of cash sale price in the United States	Wholesale price in Warsaw	Per cent of cash sale price in the United States
Average 1927–28	$1 25	111	$1 12	136	$0 68	113	$1 65	119
Average 1928–29	0 98	95	0 91	108	0 57	105	1.46	123
1929								
January	0 98	94	0 87	132	0 54	104	1 39	115
February	1 02	89	0 88	128	0 55	102	1.39	109
March	1 03	95	0.89	135	0 59	116	1 53	123
April	1 01	102	0.91	142	0 60	120	1.53	130
May	0 89	100	0 90	152	0 56	120	1.49	138
June	0 82	98			0.47	102	1.41	128
July	0 79	76			0 46	95	1 54	117
August	0 77	74	0 74	92	0 42	91	1.47	113
September	0 71	70	0 72	110	0 39	78	1 22	77
October	0 70	66	0 70	113	0 39	80	1 20	93
November	0 72	72	0.70	107	0 40	87	1.23	102
December	0 71	67	0.71	107	0.39	84	1 21	96
1930								
January	0 64	66	0 68	106	0.34	73	1.17	95
February	0.58	71	0 62	98	0 31	70	1.11	94
March	0.52	81	0.58	95	0.28	63	1 09	104
April	0.62	98	0 55	90	0.31	73	1.20	111
May	0 50	84	0.49	84	0.29	71	1.29	126

* Based on data published by the Central Statistical office in Warsaw, Poland. Prices converted from zloty per quintal to dollars per bushel, by the writer

Table 3. Wholesale Prices of Rye, Barley, Oats, and Wheat at Warsaw Expressed as Index Numbers of Pre-War Prices in the German, Austrian, and Russian Divisions of Poland, 1927 to May, 1930*
1909-1913 = 100

Year	Rye			Barley			Oats			Wheat		
	German division	Austrian division	Russian division	German division	Austrian division	Russian division	German division	Austrian division	Russian division	German division	Austrian division	Russian division
1927–28	122	155	181	131	155	166	110	139	161	126	143	166
1928–29	96	122	143	106	126	133	92	117	136	111	126	147
1929												
January	96	122	143	101	121	127	88	111	129	107	121	140
February	98	125	146	102	122	128	89	112	130	107	121	140
March.	101	128	149	104	124	131	95	120	140	117	133	154
April ...	101	128	146	106	126	133	96	122	141	117	133	154
May ..	88	112	130	105	125	132	91	115	134	114	129	150
June ...	80	102	119	**	**	**	76	96	112	108	122	142
July.....	77	98	114	**	**	**	75	94	110	118	134	155
August .	76	96	112	87	103	123	68	86	100	113	128	148
September.	70	89	104	84	100	106	63	79	92	93	106	122
October.. .	68	87	101	81	97	102	63	80	93	91	104	120
November.. .	70	89	104	81	97	102	65	82	95	94	106	123
December .	69	88	103	82	98	103	64	80	94	92	105	121
1930												
January ...	63	79	93	79	94	100	55	69	81	89	101	118
February .	56	72	84	72	86	91	50	63	73	85	96	111
March.. . .	51	65	76	67	80	85	45	57	67	83	94	110
April	60	77	90	65	77	81	51	64	74	91	104	120
May.....	49	63	73	57	68	72	47	59	69	99	112	130

* For differences in the pre-war price level in the German, Austrian, and Russian divisions of Poland see Farm Economics, No. 53, page 942.
** Data not available.

output of Soviet Russia. At any rate, East European prices declined in 1929 several months before prices fell on the continent. This is illustrated in figure 2, which shows the course of wholesale prices of rye in Chicago, Berlin, and Poznan from December, 1929 to May, 1930.

Changes in wholesale prices do not, of course fully reflect changes in farming returns. The actual prices received for grains

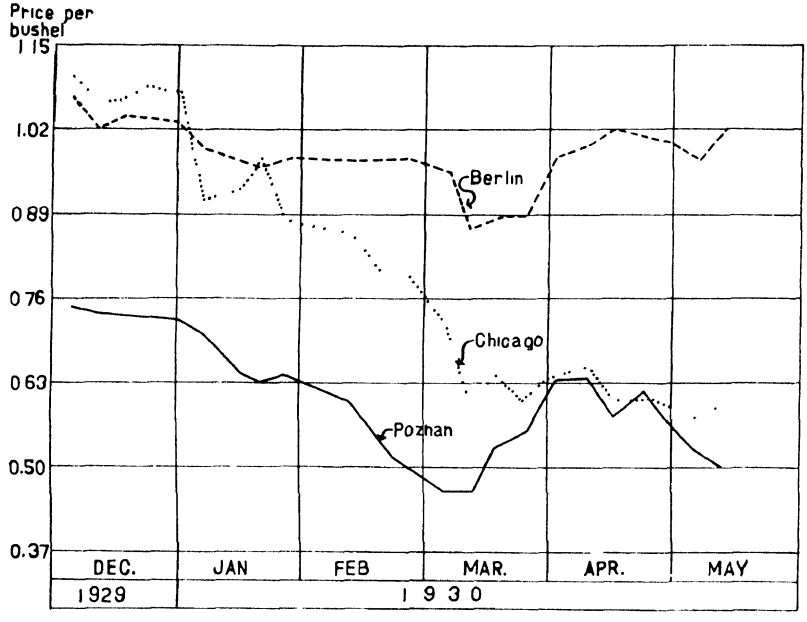

FIGURE 2. WHOLESALE PRICE OF RYE AT POZNAN, BERLIN, AND CHICAGO, DECEMBER, 1929, TO MAY, 1930

Polish Business Conditions, Vol. 3, No. 5, May, 1930, page 153. Published by the Institute for Business Research, Warsaw, Poland.

by producers in Poland and in the other countries of East Europe are far below the wholesale prices shown in table 2. Farm prices in East Europe are probably lower than anywhere else in the world. During several months of last year, rye and barley sold as low as 35 cents a bushel in many parts of Poland, and oats sold as low as 16 cents a bushel.

In considering the agricultural situation in Poland, special attention must be given the rye and potato crops. Due to natural conditions of soil and climate, these are the two most important crops grown in Poland and in East Germany. Shifts in consump-

tion habits among the city population following the World War resulted in a decreased demand for rye bread. An ever increasing surplus of rye influences the prices of other grains grown as foodstuffs. The rye problem is causing much trouble both in East Germany and in Poland. Both countries tried to solve the problem by putting on debentures which, in my opinion, was unfortunate because of the very limited market which exists for rye at the present time.

The surplus of potatoes is also growing. Our last year's crop sold in many parts of the country for as low as 9 cents per bushel, and many farmers were unable to sell their potatoes at any price.

Hogs are becoming more and more important in the exports of Poland. However, the production of hogs is increasing throughout the whole of eastern Europe, and Germany, which heretofore provided the principal market in central Europe for agricultural products, also finds herself with a surplus of hogs.

In concluding my paper, I wish once again to emphasize that if we in East Europe could raise our standard of living instead of lowering it, we would not face a general agricultural depression. What we particularly need is an agreement between East Europe and Central Europe relative to the mutual exchange of goods. If debts were lowered, such an agreement would be made much easier. The agreement would in turn further a better undertstanding between the respective nations and make for a true peace.

SOME RESULTS OF THE POST-WAR DEPRESSION ON FARM ORGANIZATION IN CANADA

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THE MORE curious students of the nature and origin of the post-war surplus abundance of farm products generally, and wheat in particular, have credited Canada with contributing largely to the present somewhat abnormal supply of the raw material of the staff of life. As this is undoubtedly the case, perhaps the expansion in Canada in this line of effort during what is generally termed the post-war depression in agriculture, may be of somewhat general interest. No detailed examination is here proposed yet some fairly recent figures are available which may shed some light on just how and why this development has taken place and more particularly the changes in methods which have resulted from the recent depression in the industry.

Even a superficial glance at recent developments require at least a brief historical background. It must be remembered that Canada comprises a number of geographic and economic units somewhat isolated from one another by physical barriers and varying widely both in adaptability to agriculture and in stage of development. There are really two Canadas to consider, one that of 1867 comprising only one-tenth the present area and settled partly during the time referred to by Sir John Seely in "The Expansion of England" as the century during which "we seem to have conquered and peopled half the world in a fit of absence of mind," and the other, the Canada of today which has been largely settled during the present century.[1]

Date of settlement combined with adaptability of soil and climate and natural resources have developed two sections, one with a well established system of farming catering largely to domestic needs, the other, youthful, sparsely settled, and dependent to a great degree on distant world markets.

World markets have always been important to Canadian agriculture. The somewhat unstable world market requirements of farm products have compelled a certain amount of versatility in Canadian farming. The repeal of the corn laws in 1846 turned

[1] Seely, J. R., The Expansion of England, p. 8, 1883.

the attention of the Canadian farmer to a market nearer home which was secured for a time by the Reciprocity Treaty of 1854. The abrogation of that treaty in 1866 hastened confederation the following year and renewed the movement of farm products from west to east. Even after the termination of that treaty, however, Canadians, perhaps with a partiality toward exportation of raw materials, maintained a considerable export of barley in the southerly direction. The McKinley tariff of 1890 dealt a death blow to this trade and assisted the development of a cheese and bacon export trade, the former of which is still important, the latter somewhat spasmodic. The Canadian farmer has had considerable practice both during the past century and the present in adapting his operations to world market demands. With such training perhaps even the post-war depression should not have found him helpless.

BASIS OF FARM ORGANIZATION

Abundance of land, adaptability of soil and climate, and small population are perhaps sufficient reasons to account for the organization of farming in the newer sections on the basis of the production of an export commodity which could physically and economically enter world markets. The endeavor to equate natural resources with world market demands has recently been strengthened considerably by fairly heavy international financial committments. Hence the question confronting Canadian farming, and more particularly that of the newer sections as yet sparsely settled, is not, shall world or domestic markets be catered to—although this question is now being debated in some lines—but rather, how may farming be organized and developed to retain and increase the proportion of the world market in some products adaptable *both* to the region and to international trade.

The importance of world markets to Canada in general and western Canada in particular indicates the necessity of adapting farm organization to world prices in such a way, if possible, as to allow some hope of profit. Declining world prices compel reorganization if the standard of living of the farmer is to be increased or even maintained. Reorganization of farming though continually taking place appears to be invariably a slow, tedious, and somewhat painful process. The factors mentioned, however, have compelled this reorganization to assume an accelerated pace.

Changes that have recently taken place should be of general interest as revealing what utilization of land has lately proved most profitable and what type of farm organization reveals at present the greatest vitality and hence the greatest prospect of survival.

While no detailed study is here proposed there is available some evidence of changes of far reaching significance, which indicates how farmers themselves have modified their practice to meet the changed conditions confronting the industry during the last decade.

UTILIZATION OF LAND

That part of Canada known as the prairie provinces cultivates annually at the present time, about two-thirds of the area devoted to field crops in the Dominion. That area approaches sixty million acres annually. With around sixty million acres devoted to field crops in the year 1929 over twenty-five million acres were devoted to wheat. All but about one million acres of this crop was grown in the prairie provinces, where particularly the less humid regions enjoy peculiar advantages in wheat growing. In the eastern and northern regions of more generous rainfall these advantages are shared with coarse grains. How the expansion of wheat growing has taken place during the past 60 years as well as during the past decade is presented in table 1, together with the farm price per bushel and the index number of wholesale prices

Figures on wheat production and value are simple to present in a table as bushels and dollars are fairly comparable over a period of years. The first comparison that we would direct your attention to is the farm price per bushel. Over the period of approximately sixty years, here somewhat sketchily portrayed, there is apparently no very definite long time trend notwithstanding somewhat violent fluctuations from year to year. That the price per bushel was one dollar in 1871 and considerably less than that today might lead one to suggest that the tendency is downward. Other years taken into consideration might lead to a somewhat different result. What is perhaps significant is that since 1881 the price has shown a tendency to decline as acreage increased, and that period approximated the advent into the industry of the grain binder.

It is, however, when we take into consideration the change in the value of money during the interval that we are compelled to concede that the tendency of the real value of wheat—the amount

of goods it will exchange for—is declining materially. In 1881 wheat was worth $1.20 per bushel when the index number (1913 base) was 109.9 while in 1924 and the following year, the price was about the same per bushel while the dollar was only about two thirds as valuable. In the year 1911 wheat was worth 80 cents per bushel and in 1928 it was the same price. But in 1911 the

Table 1. Acreage, Production, and Value of Wheat in Canada, Together with the Farm Price of Wheat Per Bushel and the Index Number of Wholesale Prices, 1871 to 1921*

Year	Acreage	Production of wheat	Value of wheat	Farm price per bushel	Index numbers of wholesale prices (1913 = 100)
	(millions of acres)	(millions of bushels)	(millions of dollars)	(dollars)	
1871	1 6	17	17	1 00	124.5
1881	2 4	32	39	1 20	109.9
1891	3.7	42	32	0 76	91.4
1901	4.2	56	36	0 65	84 5
1911	8 9	132	105	0 80	95 0
1921	23.0	301	243	0 81	171 8
1922	22 0	400	339	0 85	152.0
1923	22 0	474	317	0 67	153 0
1924	22 0	262	320	1 22	156.2
1925	22 0	395	488	1 23	160 3
1926	23.0	407	442	1 09	156.2
1927	22 0	480	478	1.00	152.6
1928	24.0	567	451	0.80	150.6
1929	25.0	300	347	1 16	146 0
1930.	25 0	—	—	—	136 5

*Dominion Bureau of Statistics.
Canada Year Books, 1929, Statistical Summary, pages 26–27.
Monthly Bulletin Agricultural Statistics, January 1923–1930.
Prices and Price Indices 1913–1928, page 22.

index number was 95.0 while in 1928 it stood at 150.6 showing that the real value of wheat was only about two thirds that of 1911 as it required a bushel and a half of wheat to secure the amount of other goods that one bushel secured in the earlier year.

EFFICIENCY OF THE WHEAT GROWER

No definite long time trend is discernible in the farm price per bushel of wheat in over half a century. And this notwithstanding that money in the meantime has become less powerful. This bears

eloquent testimony to the increased efficiency of the wheat grower. An industry which has, during the period, been able to sell its product at a similar or lower price per unit challenges comparison in respect to its efficiency. Further, such an industry may point the way to some industries which, by enhanced prices, have lost ground through the competition of substitutes. That the acceptance of the comparatively low price for wheat has been from necessity rather than voluntary we shall later note. In the meantime the important point is the comparison existing.

Considering more closely the post-war decade, a steady downward trend in price is apparent for the last half of the decade. It has been during this time that stocks have been accumulating. The carry over of wheat at the end of the crop year in Canada was less than twenty-five million bushels in 1925. Since that time, however, the carry over has increased annually, being some seventy-eight million bushels at the end of the 1927 crop year and over one hundred million bushels for the last two seasons. It is claimed that the reservoir of wheat formerly assured by the grain trade of Britain, a trade now somewhat disorganized, is not provided by the miller.[2] If this be correct, storage will necessarily be provided more largely by the grower.

It is essential that we should concede the importance of the tendency of farm products to decline relatively in value. It appears that the fear of a development in the opposite direction was one potent reason for earning for the subject we are interested in, the name of the dismal science. That fear has by no means entirely disappeared and many anticipate a sellers' market for farm products at some no very distant date. If the tendency is downward, however, this fact should have some influence on our policy of storing. We have noted that the increased carry over has developed with and during the decline in price. Storing under such circumstances is not a remunerative business and the trend during the last half of the decade in this particular commodity is decidedly against the disciples of Joseph.

Total production and total value afford a useful comparison during the years of the past decade. Three times during the period, namely, in the years 1923, 1926 and 1928, have larger crops secured less cash. In 1924, 262 million bushels proved more valuable than

[2] Hurst, A. H., "The Bread of Britain," pp. 54-57, Oxford University Press, 1930.

the previous harvest of 474 million bushels. The fact that small crops have sometimes brought greater returns has led some to the conclusion that all that is necessary to secure a sellers' market is to produce a small crop. These figures, however, do not support such a conclusion. Both in 1922 and in 1925 increased production coincided with a higher price while both last year and the present season prove that it is possible with a commodity so largely dependent on world markets, to have small crops and low prices at one and the same time.

Perhaps the most important point in the record as presented in this table is the influence of price on production. Our attention is often directed to the influence of production on price but rarely do we see much emphasis placed on the influence of price on production. The acreage given in round numbers of millions of acres, does not present the fluctuations which actually occurred. Even allowing for this the acreage presents a stability which is somewhat surprising considering the vagaries of price. Apparently prices of one or two years have no very great influence on acreage. The low price of 1923 did not reduce the acreage the following year nor did a price almost twice as high per bushel in the following year expand acreage. With the farm price of wheat 67 cents per bushel, and $1.22 per bushel, the acreage remained about normal. This probably would not occur in sections where wheat growing is carried on as a side line. But it is explained for sections where wheat growing is more of a specialty by the fact that farms are organized for growing wheat and when wheat is low in price other grains are lower and alternative opportunities less attractive.

It is over longer periods of time that the influence of price on production is clearly indicated. The comparatively low prices of 1921 and during the two following years, though not decreasing production, perceptibly, certainly prevented any expansion. The four years from 1924 to 1927 inclusive, years of dollar wheat or more at the farm, resulted in the expansion of acreage in 1928 and since that time. A price which insures an abundant supply is certainly an adequate price. In various endeavors to stabilize prices this simple fact appears to be frequently lost sight of.

The recent expansion in area devoted to wheat in the prairie provinces has not been attributable to any great degree to the expansion of total area but has been partly due to a shift from other crops. Wheat, oats and barley are the crops which occupy the

bulk of the area under consideration. A comparison of the areas of these crops with the total since 1920 is given in table 2.

An examination of the figures showing the utilization of the cropped land during the past decade indicates clearly at least three significant movements; first, that there has been no very rapid increase in total acreage during the decade, second, that the increase in the barley acreage is almost balanced by the decrease in the acreage devoted to oats, and third, that the wheat acreage has shown the greatest increase.

Expressed in percentages, wheat, which comprised 55 per cent of the total acreage devoted to the chief grain crops in 1920, in 1929

Table 2. Acreage of the Principal Field Crops Grown in the Prairie Provinces of Canada, 1920-29*

Year	Acreage (millions of acres)			
	Wheat, oats, barley, rye, and flax	*Wheat*	*Oats*	*Barley*
1920	31	17	10	2
1921	37	22	11	2
1922	34	21	9	2
1923	34	21	9	2
1924	35	21	9	3
1925	31	20	7	3
1926	34	22	7	3
1927	34	21	8	3
1928	37	23	8	4
1929	38	24	8	5

* Monthly Bulletins of Agricultural Statistics

comprised 63.2 per cent and has run over 63 per cent for the last half of the decade. Oats, accounting for 32.9 per cent of the acreage in 1920, by 1929 had decreased to 20.1 per cent while barley, during the period, increased its proportion from 6.0 per cent to 13.6 per cent.

Apparently during the past decade wheat has revealed the greatest tenacity in the competition of the survival of the fittest. The increase in area devoted to this crop is not entirely due to bringing in new land but is partly on account of the greater proportion of the land being cropped to wheat than formerly. This is not entirely on account of the advice given the grower. It is easy, however, to connect this with price and with the interim

payments of the pool which were 70 cents per bushel for wheat, 30 cents for oats and rye, and 25 cents for barley during the current year. A switch away from wheat growing is not at present imminent.

Wheat, perhaps on account of its importance in international trade, displays a tendency to monopolize the attention of the public. We hear much of the carry over of wheat but little of the present carry over of barley and rye which is at present perhaps a source of greater worry to the grain trade. Obviously there are other more important methods of disposing of coarse grains than

Table 3. Value of the Wheat Crop, Together with the Value of Dairy Products Produced in Canada, 1871 to 1929*

Year	*Value of the wheat crop*	*Value of dairy products*
	(millions of dollars)	(millions of dollars)
1871	17	15
1881.	39	23
1891	32	30
1901	36	66
1911	105	103
1921.	243	205
1922	339	198
1923.	317	239
1924.	320	218
1925.	488	241
1926	442	250
1927	478	254
928	451	297
1929	347	293

* Figures from Canada Year Books and Monthly Bulletins of Agricultural Statistics

direct sale and this brings us to the question of the expansion of the production of livestock and livestock products.

Wheat also usually receives major consideration in any discussion of Canadian farm production. There are other important lines of endeavor; a comparison of the values of wheat and dairy products is of special interest because seldom made (table 3).

Over long periods dairy products have been almost as valuable and have increased almost as rapidly as wheat production, though attracting much less attention. During the four years from 1925 to 1928 inclusive, a series of larger than average yields combined with higher than average prices, gave wheat a value almost double

that of dairy products for the period. The year 1929 (and 1930 probably) with less than an average yield of wheat combined with lower prices has, however, brought wheat and dairy products again within comparable range in aggregate value.

During the half decade 1921-26, in the prairie provinces, census figures record an increase of 67,750 milk cows, or a gain of 6.6 per cent and in hogs a gain of 560,227 head, or a gain of 53.7 per cent while the wheat acreage increased by 2,415,661 acres, or a gain of 12.5 per cent.

INCREASE IN SIZE OF FARMS

Perhaps even more interesting than what has been done is the method followed. During the half decade the number of occupied farms in the prairie provinces decreased from 255,651 to 248,162, a decrease of 7,489 or 2.93 per cent.[3] The decrease in number was greatest in Alberta, much less in Saskatchewan, while Manitoba retained practically the same number of farms in operation. The area in farms, however, increased during the period by one million acres in round numbers, the improved area by over four million acres, and the cropped area by two and three-quarters million acres. The average prairie farm comprised 344 acres in 1921 of which 175 acres were improved and 126 acres cropped. In 1926 the average prairie farm reached 358 acres, of which 198 acres were improved and 141 acres cropped. The size of the average holding increased in the five year period by 14 acres, the improved acreage per farm increased by 23 acres, and each farm cropped 15 acres more in 1926 than in 1921.

The average acreage devoted to wheat by the farms growing this crop in 1921 was 94.7 acres while in 1926 this was 102.9 acres, an addition of over 8 acres per farm on the average. Adding this area to the wheat crop per farm during the interval, however, apparently did not prevent an increase in dairying and hog raising per farm, as has been indicated.

The enlarged acreage during the post-war period of declining prices has enabled prairie farms to produce field crops more valuable in the aggregate in 1925 (and several succeeding years for that matter) than those of the war years when prices of farm products were much higher. That this was accomplished with

[3] Dominion Bureau of Statistics, Census of Provinces, 1926.

fewer farms in operation than in 1921 means increased returns per farm.

The increased size of the farm as revealed by the 1926 census may be by now quite out of date and possibly is important chiefly as a matter of history as the mechanization of farming has received a great impetus from the introduction of the combined harvester since 1926. This indicates that the movement started during the first half of the decade is moving forward now at an increasing pace. Evidence of this is at hand in the lessened dependence on transient labour for harvest during recent years.

CHANGES IN TENURE

The number of farm owners decreased from 200,656 to 171,768 during the half-decade. The number of tenants increased from 27,067 to 40,261, and the part-owners and part-tenants increased from 25,643 to 36,133. An area of seven million acres was transferred from ownership to leasehold during the interval. The increased size of the farm might be expected under normal conditions to make ownership more difficult on account of the larger amount of capital required. This explanation does not fit however in this case, as even the larger farms were less valuable in 1926 than were the smaller areas five years earlier, the difference being a decrease of $3,285 in value per farm in Manitoba, where the size did not increase, $2,409 in Saskatchewan, and $1,428 in Alberta. Even with the increased size of the unit in the two latter provinces, the total value or investment per farm decreased materially during the interval.

SIZE OF FARMS ABANDONED

Census figures of 1926 record the number of vacant or abandoned farms in the prairie provinces. The total number was 19,108 comprising 3,801 in Manitoba, 4,907 in Saskatchewan and 10,400 in Alberta. The acreage amounted to 667,679 acres in Manitoba, 1,020,277 in Saskatchewan and 2,337,715 acres in Alberta, a total of four million acres in round numbers.

Of these 19,108 farms, 14,139 were less than 161 acres in size, 4,576 were from 161 to 480 acres in size and 393 contained 481 acres or more. By comparing the number of vacant farms with those occupied we find among the units of less than 161 acres approximately one farm out of seven vacant; in the class from

161 to 480 acres, one out of twenty-five vacant; while among those farms of 481 acres or over, for every vacant farm, there were slightly over one hundred occupied.

Apparently the units displaying the greatest degree of tenacity in this area during this period are among the larger classes. The tendency to desert the smaller areas is in accord with the increase in size of the farms noted in Saskatchewan and Alberta. It is also apparent in Manitoba where farms did not increase in size during this interval. The movement in Manitoba when smaller areas than the whole province are considered, reveals a marked migration from the small and recently settled farms in the northern part of the province, to more hopeful prospects. Homesteads are generally 160 acres. Abandonment of recently settled homesteads means the abandonment of small areas. Proven regions have for some time past displayed a rather rapid tendency toward consolidation. The abandonment of small areas may be in some cases the giving up of land which is submarginal (perhaps temporarily) on account of the small area improved and lack of incentive to improvement under present conditions of the industry, and again it may be on account of the unit being too small to be operated profitably under present conditions.

Whatever the cause the important point is that this condition exists. We need not dwell on the cause or causes. Upon these we shall not be likely to agree in any case as we do not appear to display any marked unanimity of opinion as to the treatment necessary. This lack of agreement as to treatment indicates that we are not certain as to the cause or causes. Exposition is what is attempted, with the hope that this exposition may be interesting and perhaps useful to those who may be interested in the size of unit which has displayed the greatest tenacity during this time.

Whether this tendency is desirable or not is another point that need not delay us long at the moment. Almost everyone has pretty definite ideas on this point, ideas which are not kept secret. For this reason competition is pretty keen in the field of offering advice and proclaiming what should or should not be done. On the other hand there appear to be fewer engaged in the work of exposition, competition is less keen, and therefore the task more inviting at present.

Exposition, however, is frequently all that is required to reveal cause. The decade just past witnessed declining prices and rising

living standards. Greater returns were essential to secure the latter with small or negligible influence over the former. The problem was met by each individual increasing output. This is not the first time that this problem has been met in this way.

The decade from 1891 to 1901 was a period of depression in Canadian agriculture which would perhaps by comparison make the past ten years appear prosperous. A period of declining prices and increasing use of farm machinery resulted in an actual decline in the numbers engaged in the industry during the decade. The census of 1891 recorded 735,207 farm workers, and that of 1901, 716,860 farm workers, while during that time the occupied land increased by four and a half million acres, the improved area by

Table 4. Number of Vacant Farms in Eastern Canada, Sorted by Size, 1911*

Province	*Number of vacant farms*				
	5–10 *acres*	11–50 *acres*	51–100 *acres*	101 200 *acres*	*Over 200 acres*
Ontario	522	1,903	1,554	581	199
Quebec	84	236	215	93	37
New Brunswick	146	279	234	66	14
Nova Scotia	219	418	218	104	32
Prince Edward Island	5	73	47	10	2

* Fifth Census of Canada, 1911, Vol. 4, Introduction, page XXX.

two and a half million acres and the cropped area by four million acres, in round numbers. The average size of the farm increased during this decade from 98 to 125 acres.

The decade from 1901 to 1911 was not one of declining prices. It was, however, a period of rising standards of living and increased mechanization of farming. During this time the tendency toward abandoning farms in some of the older provinces appeared. This tendency was considered of sufficient importance or seriousness to secure attention in the census of 1911. The number of vacant farms classified according to size was recorded (table 4).

In every province the most popular size of farm to abandon was that between eleven and fifty acres, a class, by the way, which has never been numerous, the modal group being at that time the next larger class for all provinces. This earlier record is cited as an indication that the trend of the past decade is not an entirely new phenomenon nor one confined only to the grain growing sec-

tions. Where the type of farming does not permit of modification, and this is possible where population is small and markets distant, a rising standard of living for farmers demands increased individual production of the export products. This means in many cases an increased acreage operated per worker.

ECONOMIC FORCE *vs.* PUBLIC POLICY

Abandonment of the smaller areas indicates the elimination of the high cost producer and a gradual if perhaps slow and painful move in the direction of the rationalization of the farming industry. This tendency has resulted from the pressure of lower prices. This is the method by which society reaps the advantages of improvement in technique.

Two words have attained considerable prominence during the past decade. These are rationalization and stabilization. Rationalization refers usually to the industry and signifies the elimination of the high cost units from the industry. Stabilization on the other hand refers usually to price and where this is secured, signifies retaining the high cost unit in the industry.

Stabilizing prices is naturally the most popular. Rationalizing an industry comes only with the pressure of economic force. The tendency for fewer farmers to supply the needed quantity of their goods has probably been viewed with a greater degree of alarm than the generality of business changes. While the migration of some of these farmers to more hopeful prospects than their first location has been assisted by provincial governments both in western and eastern Canada, the movement to enlarge the unit generally has been unsuspected by demos and without the sanction of public policy.

The trend has indeed met with considerable opposition from influential people who worry over the question of why the boy leaves the farm. This question might be examined. The latest figures available give the classification of the gainfully employed according to age and vocation as shown in table 5.

Of those gainfully employed, less than 25 years of age, a greater proportion are employed in agriculture than the proportion of the total with which agriculture is credited. Of those from 25 to 50 years of age, the proportion is less. The answer to the question why does the boy leave the farm, is that he does not. The question might be why does the man leave the farm.

Table 5. Total Number of Persons Gainfully Employed, and Number Gainfully Employed in Agriculture in Canada, 1921*

Age	*Total number gainfully employed*	*Number gainfully employed in agriculture*	*Per cent of gainfully employed in agriculture*
10–13	7,729	6,257	81
14–15	50,345	30,261	60
16–17	112,050	56,311	50
18–19	132,771	58,331	44
20–24	324,102	124,751	38
25–34	663,919	219,675	33
35–49	845,278	292,374	35
50–64	421,158	172,777	41
65–over	125,167	62,969	50
Total	2,683,019	1,023,706	38

* Canada Year Book, 1929, page 140.

Naturally if those between the ages of 25 and 50 are still boys with farm boys' privileges the situation is somewhat self-explanatory.

Another common complaint among publicists is that Canadians of the present generation prefer other occupations to that of farming. The percentage of native born to total for the different industries was reported in 1921 as shown in table 6.

Canadian born males are more than proportionately represented in agriculture, logging and fishing, and finance; under-represented in mining, manufacturing, construction, transportation, and serv-

Table 6. Percentage Distribution of the Gainfully Employed Male Population of Canada in Specified Occupations, 1921*

Occupation	*Per cent of total population*	*Per cent of native born population*
Agriculture	38 2	40.9
Loggers and fishermen	2 6	3.0
Manufacturing	15.5	14.5
Mining	1.9	1 4
Construction	6 9	6.6
Transportation	8.4	8 0
Trade	9 3	9.3
Finance	1 7	1 8
Professional	3 1	3.1
Service	11 2	9.9

* Canada Year Book, 1929, page 147.

ice; while in the other classifications they appear to hold their own. Upon the assumption that too many of the "boys" leave the farm and that the native born prefer other occupations to that of farming, public policy has supported during the last decade an immigration policy stipulating that only those intending to enter agriculture should be encouraged to come to the country. This accounts for a reference in a recent book which discusses the mobility of labor, to the agricultural complex of the colonial governments in regard to immigration.[4]

Meeting the depression in agriculture by fewer workers producing more, prevents the industry from absorbing much labor. This method of meeting the difficulty has been largely from compulsion, the compulsion of the inevitable even if unwelcome pressure of economic force. The trend illustrates how this force usually in the long run vanquishes public policy when they oppose each other and may be useful in case you may have difficulty in finding as suitable an example nearer home.

SUMMARY AND CRITICISM

The first post-war decade of agricultural depression discloses some interesting changes in farm organization in Canada. In the rearrangement necessary to retain world markets at declining prices, and, if possible, retain profits at the same time, several trends have been revealed.

The survival of the wheat crop in this period of keen competition, the increase in the size of the farm, and the abandonment of the smaller units are plainly demonstrated. This indicates that the farming business is rationalizing itself similar to other industries. And by rationalization we mean the substitution of machine for man power, scrapping the inefficient plants, and increasing the size of the superior plants to decrease the overhead. Apparently this is exactly what is going on, perhaps in a slow way in farming, judging by the evidence. The result has been that fewer workers are producing more. With declining prices present and prospective, this appears to be the way to retain a profit.[5] This method appears to have worked in the prairie provinces where the value of field crops in 1925 exceeded that of any of the war

[4] Nisbet, J. W., A Case for Laissez-faire, p. 56—P. S. King & Son, London, 1929.
[5] Bureau of Agricultural Economics, Washington. "The World Wheat Outlook," July 3, 1930.

years of inflated prices. This method of meeting the depression appears to be not only the way, but the only way.

Other methods have been proposed and even attempted by these same farmers. For instance we hear much of the need for, and the endeavor to stabilize prices. How can prices be stabilized without stabilizing inefficiency? We have noted that the inefficient units, the high cost producers, have been eliminated by declining prices. If this be the case, then, any success that might be attained in stabilizing prices would retain in the business the high cost producer. It is naturally not surprising that we have considerable clamor for stabilized prices, more especially in wheat, when we consider the remarkable stability of the price of bread—but that is another matter.[6] There appears small progress to report thus far from any endeavor to stabilize prices of farm products. In a country dependent on world markets the endeavor appears vulnerable on two points, namely, it appears impossible, and if possible, quite possibly undesirable.

It does not appear necessary to dwell for long over the question of the desirability of stabilized prices, as for countries dependent on the world market, stabilization appears impossible in any case. Adam Smith in his elaborate and exhaustive enquiry into the nature and causes of the wealth of nations said:[7]

"Whoever examines with attention the history of the dearths and famines which have afflicted any part of Europe, during either the course of the present or that of the two preceding centuries, of several of which we have pretty exact accounts, will find, I believe, that a dearth never has arisen from any combination of the inland dealers in corn, nor from any other cause but a real scarcity, occasioned sometimes perhaps and in some particular places, by the waste of war, but in by far the greatest number of cases by the fault of the seasons; and that a famine has never arisen from any other cause but the violence of government attempting by improper means, to remedy the inconveniences of a dearth."

When that was written it was deemed periodically expedient to endeavor to lower the price of food and farm products. Recently it has been deemed expedient to endeavor to raise them. The change in the direction of public policy is in itself significant. The results so far, at least for those countries dependent on world markets, have, however, apparently been no more successful than

[6] Bureau of Statistics, Prices and Price Indices, 1913-1928, p. 136.
[7] Wealth of Nations, Book IV, Chap. V.

were those previously exerted in the opposite direction. Hence we might paraphrase the above quotation:

"Whoever examines with attention the history of the periods of surpluses of raw materials and farm products which have afflicted any part of the world during the last decade, and of several of these we have pretty exact accounts, will find, I believe, that depressed prices have never arisen from any other cause but an abundant supply, occasioned sometimes by unnecessary expansion, but in by far the greatest number of cases by the fault of the seasons; and that a troublesome surplus has never arisen from any other cause but the violence of government attempting by improper means, to remedy the supposed inconveniences of plenty."

MALADJUSTMENTS IN THE AGRICULTURAL BUSINESS OF THE WORLD

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IN DISCUSSING the topic of "Maladjustments in the Agricultural Business of the World" I shall only attempt to approach the subject from the South African angle and indicate some of the measures which I believe may assist in rectifying the maladjustments to some degree.

The value of an international conference of agricultural economists is that it provides an opportunity of viewing the international agricultural field from various angles, discovering the weak and strong points in the international agricultural system, and developing means and ways of strengthening the weak links so that the highest profits and the highest standard of living and life may be realized, not only for the farmers of one country, but for the farming population of all countries throughout the world

THE AGRICULTURE OF SOUTH AFRICA

The Union of South Africa lies at the extreme southern point of the continent of Africa. It has an area of 473,000 square miles, about one-sixth the area of the United States. The climate is subtropical. The rainfall varies from 40 to 50 inches on the southeastern border to a few inches per annum in some sections in the northwestern part of the country. The country has a winter-rainfall and a summer-rainfall area. The population consists of some six million negroes and some two million whites. Forty per cent of the European population, or some eight hundred thousand people, are classed as farming population. There are a few large centers of population—Johannesburg, Cape Town, Durban, Pretoria, Bloemfontem, Port Elizabeth and East London—and a number of smaller towns and villages. There are about one hundred thousand farms.

The average size of farm is 800 morgen or 1,600 acres. However, the farms vary in size from less than 100 acres to several thousand acres. Various types of farming are practised in different parts of the country; fruit, wheat, and dairy-farming in the southwestern corner; goat, sheep and cattle farming in the western and central

sections; corn in the north-central section; sugar-raising in the eastern section, and dairying, fruit, vegetable, tobacco, and cotton farming, in various parts of the country. The country has some forty million sheep, producing three hundred million pounds of wool. There are eleven million cattle. Eighty million bushels of corn are produced, of which forty million must be exported. Two and one-half billion dollars is invested in farming. The value of agricultural products produced on the farm is three hundred and fifty million dollars. Agricultural products to the value of one hundred and fifty million dollars are exported.

South Africa has its full share of agricultural difficulties, especially drought, animal diseases, and marketing problems. There are two faculties of agriculture and various agricultural schools. Various Departments of State provide services to the farming population. The Department of Agriculture has an annual budget of five million dollars and a staff of nineteen hundred, of which four hundred are technical officers.

In 1925 the Division of Agricultural Economics was created in the Department. A number of the officers of this division have received their training at Cornell University and other American institutions. Farm management studies, agricultural statistics and crop estimates, marketing, and cooperative organization, form the main branches of work of this division.

While there are many soil, plant, animal and management problems, one of the weakest links in South African agriculture is the foreign marketing situation. South Africa produces agricultural surpluses of various kinds and is dependent on overseas markets and world prices. The agricultural depression is being severely felt by the farmers due mainly to the fall in prices of wool and corn. Through cooperation, the formation of commodity boards, levies on export products, and the extension of overseas representation, the country is trying to alleviate the situation.

In travelling through Holland, Germany, Denmark and the United States, various evidences of the agricultural depression and the existence of an international marketing problem have been found, and the program and discussions of the International Conference of Agricultural Economists indicate that the international marketing problem is the most important difficulty with which the agricultural industry throughout the world has to deal today.

OUR CHANGING AGRICULTURAL TIMES

A bird's eye view over the past hundred years and over the face of the various continents will reveal the most amazing changes in agricultural developments. The World War, better and faster communications, new machinery, and agricultural science, have brought and are bringing the most revolutionary changes in our agricultural times.

INTERNATIONAL TRADE

Imagine yourself some 8,000 miles from here, at the southern extremity of the continent of Africa and at the top of Table Mountain, overlooking the city and harbour of Cape Town. What do you see in that harbour? Large ships with the flags of all nations. There you find ships transporting goods from Great Britain, Holland, Germany, and Italy, to South Africa and back; from Great Britain to Australia and back; from Japan to South America and North America and back, and from New York to South Africa and back.

Imagine yourselves on top of the Woolworth building in New York, overlooking the harbour of New York. There too you will see ships both small and large, commuting between all parts of the world.

What is true of Cape Town and New York is true of Antwerp, Hamburg, Southampton, Montreal, San Francisco, Yokohama, and Sydney.

THE SMALLER INTERDEPENDENT WORLD

South Africa is today, owing to the development of steamship transportation, cable service, radio and other mechanical inventions, nearer to the United States, than California was to New York fifty years ago. One national group is no longer independent of another; all nations are interdependent, agriculturally as well as in other ways. The ocean is no longer a barrier between nations, but it has become a great highway uniting the nations in a mutual exchange of goods and services.

The menu of any meal indicates how foodstuffs come from all parts of the globe—oranges from California, Spain and South Africa; bread from America, Russia, Australia; tea from India, and coffee from Brazil. Differences in climate, topography and soil types make certain areas of the world more economical for pro-

ducing certain agricultural commodities needed by mankind. A glance at the atlas of the "Geography of the World's Agriculture" published by the United States Department of Agriculture pictures this very clearly.

Over the oceans of the world, thousands of ships of a few thousand tons, and some as large as forty and fifty thousand tons, belonging to various nationalities, are continually steaming to transport the surplus productions of the various areas to satisfy the wants of other sections of mankind. Bigger and faster ships are being built to deal with this world trade. The competition and rivalry between nations is becoming keener.

AGRICULTURAL MARKETING

The surplus production of the various agricultural commodities —wheat, cotton, fruit, wool, cattle, dairy products and others— from various countries compete on the world markets and on the great exchanges in Chicago, Boston, Liverpool, London, Bradford and elsewhere. At these centers trade transactions are made and world prices determined.

In a great city, when the motor and other traffic becomes difficult of control, regulations in the form of traffic signals are employed. Everybody passing through or across such streets is supposed to conform to these signals. In this way the traffic is orderly and more satisfactory. Does international marketing not need similar international regulation and control?

LOCAL AND NATIONAL COOPERATIVES

Until not so many years ago, the farmers as original producers had very little say in controlling the sale of their products and in the determination of prices for their commodities. Through the development of cooperatives, not only local, but national and inter-dominion—The Canadian Wheat Pool, the California Citrus Exchange, and the Federated Farmers of the British Dominions —farmers have become a greater factor and power on the world markets.

GOVERNMENTAL MARKETING SERVICE MACHINERY

National governments have realized the need for organizing the producers of various agricultural commodities cooperatively both locally and nationally. The United States has passed a marketing

act creating a revolving fund of $500,000,000 and establishing a Federal Farm Board for assisting farmers to organize and market cooperatively. In Great Britain an Empire Marketing Board has been created on which there are representatives of the various dominion governments and a fund of $5,000,000 has been made available by the British Parliament for promoting agricultural research and marketing on behalf of the dominions of the British Commonwealth of Nations. In New Zealand, Australia, and in South Africa, Agricultural Commodity Councils or Boards with government and farmer representatives have been formed for promoting and controlling the export of surplus agricultural products. The International Institute of Agriculture at Rome, started as an idea in the mind of David Lubin, an American, and supported by some seventy nations, serves as a clearing station for collecting and distributing agricultural information for the world.

The changing agricultural times have called into being many new developments in the agricultural business, international agricultural marketing, and agricultural organization.

THE INTERNATIONAL MARKETING MALADY

MARKETING ILLS

The agricultural business throughout the world is suffering from many maladjustments or ills. All the minor pains pale into insignificance owing to the acute attacks today in the digestive or marketing system, and especially the international sections of the marketing field.

Any effort to cure the agricultural business patient, restore it to health and promote its sound development, must concentrate attention in the first place on the international areas of the marketing field, determine the international symptoms and prescribe and apply treatment which will adjust the international maladjustments and promote a balanced development internationally.

SYMPTOMS

An acute agricultural depression in various parts of the world—South Africa, Great Britain, Germany, Holland, the United States, and in many other countries; a great fall in the prices of many agricultural products, such as the drop in the price of wheat in the United States to 87 cents per bushel, of maize or corn in South

Africa to about 60 cents per bushel, and of wool to 25 cents per pound; the action of various countries—South Africa, Italy, the United States and others—in building higher tariff walls for the protection of farmers within their respective countries; the intensified effort among various nations to make their marketing machinery more effective and remunerative by increasing cooperation amongst farmers and getting more team work amongst those interested in any particular commodity by the establishment of commodity councils or boards; the development by national governments of improved internal and external marketing service machinery and the occurrence of a certain amount of heat in the international marketing field, all indicate the seriousness of "The International Marketing Problem," and the urgent need of developing more adequate remedies or machinery for dealing with this problem of maladjustment, or illness.

METHODS OF ATTACK

Hit and miss methods cannot be depended upon to bring a satisfactory solution. One sided attacks by national units are not sufficient to deal with an international malady involving international relationships and adjustments. There must be a concerted attack on the whole front internationally, otherwise successes at one angle may be counteracted by failures at another point and neutralize and frustrate all the good work. A chain is no stronger than its weakest link and as this marketing problem is of an international nature the weak links in the international chain must be determined and strengthened.

> "New times demand new measures, and new men.
> The world advances and in time outgrows
> The laws that in our fathers' days were best,
> And doubtless after us some better scheme
> Will be thought out by wiser men than we
> Made wiser by the steady growth of truth."

NEW AGRICULTURAL MEASURES

CHANGING TIMES DEMAND NEW ADJUSTMENTS

Further agricultural changes are taking place throughout the world. The new and changing relationships between nations and countries demand new adjustments. Like the parts of the human body, the various agricultural commodities and farming systems

in the various countries are all parts of the agricultural industry as a whole; of the large agricultural machine. In the international chain or power station the weak links must be strengthened if the international marketing power station is to develop a higher candle power of knowledge and a greater horsepower of service for each nation and for the world as a whole. Better and more efficient models of international machinery are required to meet the needs of more complex international relationships. New times demand new measures.

Just at present there are indications that various national groups in their efforts to attain greater self-sufficiency, and more national economic unity, by means of more national teamwork, higher tariffs, and more efficient governmental service machinery, may disorganize the international machinery and disrupt the effective team-work between the various parts. Partial attitudes by nations, and increasing one constituent alone in the international ration, will not produce a balanced ration. A balanced ration requires that all the factors, in the right proportions, must be harmonized.

Is it undesirable or impossible to get international team-work in the marketing of agricultural products, because the interests of various nations are totally opposed, or because there are other obstacles of distance, international ignorance and prejudice, national sentiment and aspirations, which are insuperable? At the Institute of Cooperation, held at Columbus, Ohio, about a month ago, and attended by some thousand leaders in American cooperation and five of the nine members of the Federal Farm Board, great stress was laid on the need of organizing agricultural commodities on a national basis. It is in the interest of each nation, just as of an individual, to do all in its power to provide adequate means for protecting its own interests as long as the interests of others are also respected. Some national groups like the United States and the British Commonwealth of Nations are so strong and are endowed with such a variety of natural resources that they can to a very large extent go their own way, regardless of the interests of smaller and less favourably endowed nations. If this happens, and it seems as though it is likely to happen, will it differ from the experience of local cooperatives with respect to the attitude of the larger growers in the cooperative to the smaller growers? To what will this all lead? Further agricultural provincialism, still higher tariff walls, more economic rivalry, greater continental

isolation and ultimately another world war of even greater dimensions than the last one of 1914-1918.

NO NATION SELF-SUFFICIENT

No nation or geographical area, whatever attempts might be made for controlling production and marketing, can become totally self-sufficient. Even the United States of America, the most highly endowed continental area in natural resources, is dependent for various articles of food, clothing, and shelter on other sections of the globe. Would it not cripple its own agricultural and manufacturing industries tremendously if it could not export its surplus products to various corners of the earth? Even today America exports one-sixth of all agricultural products sold from the farm, to foreign countries. Her total exports to the various dominions of the British Commonwealth of Nations—Great Britain, Union of South Africa, Australia, New Zealand, and Canada—alone, are more than two and one-half times the value of her total imports from those countries (2 billions of dollars of exports compared with eight hundred millions of dollars of imports, in 1929).

NEW METHODS OF SETTLING DISPUTES

It seems as though in international marketing, the same methods tend to be followed as in the past in regard to wars. Nations first did everything in their power to exterminate each other. Only after both sides were exhausted did they get together to evolve some method of ironing out their differences. Today efforts are being made to utilize a new procedure. When differences arise the parties are brought together under the aegis of some impartial chairman or institution and by reasoning together some form of compromise is obtained. Can this method not be followed to advantage in the international marketing sphere as well? When any nation thinks that international marketing relations are detrimental to its best interests, would it not be possible to get the parties concerned together and arrive at some agreement? Between South Africa and Rhodesia, this method has been followed several times with very great mutual benefit—each party knew exactly where it stood and could develop a policy accordingly.

This method of coming together and reasoning together has been applied with great advantage in recent times in disputes between capital and labor, in national and international periods of

crises—in the stock exchange crash of 1929, by the League of Nations, in international banking, and in the discussions of the agricultural problems of the United States since the World War.

In their agricultural relationships with one another, nations can follow one of two ways. Everyone can go his own way, regardless of the effects on the others, or they can explore possibilities of team-work as circumstances will allow. True freedom of action nationally, no less than individually, can only be obtained when there is obedience to certain definite regulations determining the interactions of individuals or groups.

THE TASK AND OPPORTUNITIES

The task is a difficult and stupendous one, but that should only be an incentive for greater ingenuity and effort. In the interests of the agricultural industry and mankind it is worth while to explore all the possibilities of international marketing cooperation. By emphasizing the resemblances rather than the differences, there is greater prospect for cooperation and progress. Every tree begins as a small seed or shoot. Some fifteen years ago, there existed hardly any separate course in marketing in the agricultural institutions of the United States or anywhere else. Today, there are a number of such courses in agricultural institutions and the United States is tackling the problem in a large national way with a national revolving fund of $500,000,000 and a Federal Farm Board.

The International Institute of Agriculture, various international agricultural organizations and international plans may still be immature in many respects, but these agencies contain potentialities for further development and fruition. Mr. Ford began with a very poor model of a motor-car some thirty years ago, but look what wonderful improvements have been made and others will, no doubt be made in the future.

The need of more adequate market information service in regard to foreign conditions is demonstrated by the developments that are taking place in the British Commonwealth of Nations and in the United States. These two groups of nations or states are feeling the need for more reliable information in regard to foreign agricultural and marketing situations from day to day and week to week. Through the Empire Marketing Board and the Federal Farm Board they are developing agencies which will pro-

vide them with the necessary data to construct more satisfactory policies and measures for the farmers of their respective countries. If these two great entities require more adequate services to enable them to make more satisfactory adjustments in their own production and marketing and purchasing, do the other dozens of national groups in South America, Europe, Africa and Asia not require similar services? Would it not be possible to supply these services by an international agency, either the International Institute of Agriculture, the League of Nations or some other agency, so that all may be enabled to benefit by these services and join forces in creating conditions which will be of mutual benefit?

The United States deserves credit for what she is trying to do through the Federal Farm Board and the United States Department of Agriculture to create more desirable conditions for the six million American farmers. Everybody must admire the courage and adventure shown in organizing national marketing agencies and promoting production control. However, even if America is one hundred per cent successful in this enterprise, could America ever raise such high tariff walls that her prices would not to some extent be influenced by world prices and surplus production in other parts of the world?

America believes in raising the level of living and culture of the whole mass of her population. Unless the level and culture of the whole mass of humanity can similarly be raised, may that weak link in the chain of nations not affect even the United States detrimentally?

AN INTERNATIONAL CENTRAL POWER STATION

Has the time not arrived for considering agricultural marketing from an international point of view and creating some international Central Power Station of a higher horsepower, which will be capable of conciliating the differences of the various nations and developing a system whereby justice will be done to each and all, and the welfare of each and all will be promoted to the highest extent? What the Federal Farm Board intends to be for the six million farmers of America, such a Central Power Station might be for the other millions of farmers of the world.

Where the price of any agricultural commodity is determined by the world price, dependent on the total world production and supply of and demand for that commodity, will there not be more

possibility of controlling supply by limiting production, and influencing price by cooperative marketing action, if some International Central Power Station could assist national central agencies in influencing and coordinating supply and demand? Is there not a community of interest between the wheat farmers in the United States, Canada, Argentine, Australia, and Russia? Where supplies in one country are influencing prices and living conditions in other countries, should such an industry not be coordinated on a world cooperative basis? Is not what is true of wheat, also true of corn or maize, wool, meat, fruit and other agricultural products? If cooperation is a sound principle for farmers producing a certain agricultural commodity locally and nationally, as is indicated by the policies adopted by various governments in the United States, South Africa, Great Britain, European countries and elsewhere, why is the principle not applicable to cooperative action by producers of the same agricultural commodity, on an international basis? If it has been possible to develop international agencies and agreements for preventing war, developing education, coordinating banking, prohibiting rivalry in naval shipbuilding, collecting and distributing agricultural information, why can there not be developed an International Central Power Station of a high degree of efficiency for promoting international agricultural marketing cooperation? Various steps or signboards might assist toward the attainment of this goal.

A WORLD MARKETING PICTURE BY NATIONAL AUTHORITIES

One method would be to make information relative to agricultural conditions and international marketing more generally available throughout the world. I would suggest the publication of a book on "World Agriculture and International Marketing," in which outstanding authorities or institutions in various parts of the world would contribute an article of say some twenty-five pages, describing the situation in that particular region. It might be called "Towards Agricultural Civilization" after the pattern of "Whither Mankind?" and "Towards Civilization."

The time has passed when one authority can give an adequate picture of the agricultural industry. It should be a cooperative picture by national authorities in various countries. Such a book would be really authoritative and would be of the greatest value to individuals, institutions, and the various nations.

WORLD STUDIES OF AGRICULTURAL COMMODITIES

In the second place would it not be possible to make world studies of all the main agricultural commodities by sending one or more investigators to all the principal producing countries to obtain a first-hand acquaintance? In the case of wool, The United States has done this to some extent by sending Mr. Walker, a prominent sheep farmer from Ohio, on a journey around the world. In sending Professor Powell, who is a son of the great Californian cooperator, Harold Powell, and now a professor at the University of Pretoria, South Africa, to visit all the main citrus areas, the Empire Marketing Board has done excellent pioneering work. Similar studies for other agricultural commodities by one or more outstanding authorities would be of the greatest advantage.

For several years now the Carnegie Corporation in the United States has provided means for the interchange of visitors along various lines between South Africa and the United States. Last year South Africa was fortunate in being visited by Dr. Kenyon L. Butterfield, who not only delivered a series of lectures on "The Rural Problem" but has written a report on "Rural Conditions and Sociological Problems in South Africa" which will be of the greatest value to South Africa. Why cannot similar exchanges of agricultural visitors between the various countries be arranged to the benefit of all parties?

INTERNATIONAL COOPERATIVE ACTION

Amongst the British Dominions efforts have been made, especially in the case of wool between Australia and South Africa, to get cooperative action in the selling of the crop. Would it not be possible to get cooperative action, at least to some degree, between producers of the same commodity throughout the world?

AN INTERNATIONAL CONGRESS OF FARMERS

A scheme is at present under way, initiated by the central organization of the farmers in South Africa, for holding a congress of dominion farmers in South Africa in 1932, to discuss common problems and common action. Australia and New Zealand have already consented to support this scheme. Would it not be possible in the near future to get an international congress of farmers for similar purposes? For some time "farmers' tours" have been

made between the British Dominions. Why not farmers' tours between other nations?

INTERNATIONAL AGRICULTURAL SCIENCE CONFERENCES

Last year a very successful Pan-African Agricultural Conference, attended by representatives from all over Africa, was held in the Union of South Africa.

Next month a Pan-American Agricultural Conference is scheduled to take place in Washington, D.C. Every year there is in the United States a meeting of the Association of American Agricultural Colleges and Experiment Stations. Every five years amongst the British Commonwealth of Nations, an Imperial Agricultural Conference is held. Various international agricultural meetings of a more or less specialized nature take place from time to time. Would it not be possible to coordinate these conferences in some way or other and get a few representatives from all, meeting at regular intervals of say five years?

Just like the British Association for the Advancement of Science, would it not be possible to have an International Association for the Advancement of the Agricultural Industry? I know that through the International Institute of Agriculture something of this nature already takes place, but is it not possible to obtain a more representative and effective organization by extending the scope of the present conferences and institutions?

COOPERATION BETWEEN INTERNATIONAL REPRESENTATIVES

Nations have commercial and agricultural representatives in various countries. Why should not these representatives cooperate with local authorities for the mutual benefit of their countries? When recently in Berlin, I was very pleased to find that Mr Steere, the representative of the Division of Agricultural Economics of the United States Department of Agriculture, met with the Institute of Marketing of the Agricultural High School for discussions in their seminar.

From the Chief of the Division of Agricultural Economics, at Washington, D.C., I understand that that division will send further foreign representatives to other countries and also probably one to South Africa. I have expressed the wish to Mr. Olsen that there might be the closest cooperation between that repre-

sentative and the Division of Agricultural Economics in South Africa, so that both may benefit for the welfare of the two countries—the United States of America, and the Union of South Africa.

"FORDIZE" THE AGRICULTURAL INDUSTRY

The various nations of the world will have to continue to sell their surplus productions to each other. As other industries are "Fordized," why not "Fordize" the agricultural industry? If one nation must become a greater consumer of the products of another, consuming power and purchasing power must be increased, and a partnership interest must be developed.

INTERNATIONAL UNDERSTANDING AND TEAM WORK

If farmers, individuals, organizations, cooperatives, and institutions from different countries could come together, they would be able to discuss ways and means of eliminating unnecessary competition and duplication, and assisting one another.

These are some of the possibilities occurring to me that may assist in helping to solve the international marketing problem and improve the relationships between the producers of the various countries. These and other ways are worth trying for developing international marketing health. Time will reveal other and even more effective ways.

BETTER AGRICULTURAL SCHEMES

The new adjustments needed in our changing agricultural times and during the agricultural crisis that our world is passing through, especially in the international marketing field, will require new agricultural leadership.

The agricultural business is suffering from an acute attack in the digestive or marketing system. The links of mutual needs bind the nations together in production and transportation. Farmers producing any particular commodity are mutually influenced by surpluses and methods of marketing. If cooperation is a sound principle locally and nationally, why not internationally? Various organizations, both national and international point the way to further team-work internationally. Various steps can be taken to promote the development. Greater effort, wider outlook and leadership are some of the keys.

WIDER NATIONAL BOUNDARIES

Dr. Finley, Associate Editor of the "New York Times," recently in a Fourth of July address, laid stress on the need of the United States and all other countries of expanding their boundaries to include the whole world, and becoming all-inclusive. In international marketing this is probably more necessary than in any other field of international activity.

INTERNATIONAL LEADERSHIP

One of the main headings at the meeting of the National Education Association at Columbus, Ohio, this year, was "The International Point of View as a Vital Value in Education." National and international speakers stressed the need and necessity of this attitude. One speaker very eloquently stated that what the world needed to-day was not more naval ships but more world citizenship, statesmanship, and leadership. In the field of international agricultural business and agricultural marketing where there are so many maladjustments, the need for international statesmanship, international leadership, and international team-work is no less urgent. As America and the rest of the world has produced international leadership in matters of international peace, international law, international banking, why not in international marketing?

WHO WILL LEAD INTERNATIONALLY?

Who will take the lead in developing an International Central Power Station of higher effectiveness and service to the world as a whole? Will the League of Nations, the International Institute of Agriculture, the United States Department of Agriculture, some other department of agriculture, or national institution, some international agricultural association, some private institution or some individual? This international marketing problem is our international task and provides an opportunity, not only to benefit ourselves and our own nations, but to benefit the various nations of the world.

Where there is no vision the people perish. Where there is no vision our civilization and agricultural civilization may perish. A pessimist is one who sees in every opportunity a difficulty. An optimist is one who sees in every difficulty an opportunity. This

is a new field for a Columbus, for pioneering, adventure and discovery.

Only by exploring and developing new possibilities and potentialities of coordination and cooperation between the agricultural interests of the various nations and continents, can a better balanced ration, a higher standard of profits, and a higher standard of living and of life be attained for the farming population of all countries of the world.

SOME RECENT DANISH PROBLEMS IN AGRICULTURAL ECONOMICS

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DENMARK has so often been cited to farmers of other countries as an example of a country where rural organization has been successfully carried out, that it might be assumed that all of the economic problems of Danish agriculture had been satisfactorily solved long ago. It is not necessary to say to an audience such as the present that this is not the case, and furthermore that it is not likely to be the case in Denmark or in any other important agricultural country which has taken its place in the great common household of the world. Business in the industrial areas which Denmark provides with food products may become depressed; a wave of protectionism may put great obstacles to recovery in the way and decrease the ability of the industrial population to buy freely food products, in the production of which, this agricultural country specializes. Improved transportation facilities and improved technique in production may make it possible to develop new areas and to rapidly increase the supply of agricultural products. New methods may be introduced into older regions, establishing production on a considerably different basis. The result is the same. The economic system is thrown out of equilibrium and often comes to rest only after considerable change has taken place, and frequently comes to rest on new levels of production and prices.

Such are the economic conditions under which production is carried on in regions of commercialized agriculture such as Denmark. Great benefits are to be derived from world-wide specialization in production. Specialization is, however, constantly opposed by local or sectional interests seeking to put obstacles in the way of its development. The disadvantages of specialization lie in the susceptibility of each specialized area to the effects of changes in other areas. Specialization carries with it the necessity of constantly making new adjustments to changing "economic weather," so to speak. Such adjustments must be made as rapidly and as effectively as possible in order to fully utilize the opportunities offered and often, in the case of farmers who are farming at the time such changes occur, to prevent bankruptcy.

In these basic facts are to be found the need for the development of the economics of agriculture, the need for the teaching of economic principles as they apply to agriculture, and the need for carrying out research work, in order that we may have a thorough understanding at all times of what is really going on, and how, at any time, to make the best possible adjustment to changing conditions. The present paper will indicate a few of the problems which Danish farmers are faced with, and will discuss, briefly, some of the methods used in their analysis.

Denmark is an example of a country which has a commercialized system of agricultural production. While Denmark does not specialize in the production of a single product, she does have a specialized system of production with butter and bacon as the principal products, and with beef—which is an important item—eggs, beet sugar, and seeds as secondary products. Recent developments in Danish agriculture have been in the direction of still more pronounced specialization along these lines—lines which have been followed by Danish farmers since the seventies. Nevertheless, there are some important problems to be solved at the present time in adjusting production to meet changed conditions. Before proceeding to a discussion of these problems, it may be well to make a few remarks regarding the natural basis of Danish agriculture.

Denmark is a small country with an area of only a little over 10.5 million acres. It is made up of the Jutland peninsula and a few large, and many small islands in the waters between the North Sea and the Baltic. The straits between the islands, and between the islands and the peninsula, form the inlet to the Baltic.

It is all lowland, on the fringe of the North-European plain, but nevertheless there are within its boundaries important differences both in soil and climate. In the central and western parts of the peninsula there are large areas of glacial outwash plains where the soils, which are light and sandy, are often rather poor. Even the best of these soils have only been brought under cultivation within the past 50 to 75 years. The soils of the eastern part of the peninsula and of the islands, have been cultivated for many centuries. They are very good fertile soils, and have always been the basis of the country's economy.

Denmark has an enormous coast line with numerous fjords extending deep into the country, providing good harbors. No part

of the country is more than 30 miles from the ocean, and most parts are less than that distance.

In the western part of the country near the North Sea, the climate is somewhat more raw, windy, and moist, than is the case in the eastern part of Jutland and on the islands. The eastern part of Denmark has always been the grain producing area of the country, while the western part has been largely given over to the production of pasturage for livestock. Beef production has always been important in this section. It retained much of its importance in this area even though agriculture in this region took part in the general specialization in the production of butter and bacon during the last 50 years.

In the western part of the country Shorthorn cattle have been the prevailing type, and beef production for the German market has been an important enterprise. Increases in German import duties have changed the outlook for beef production in this area, and have disturbed the former balance between dairying and beef production.

ADJUSTMENT OF PRODUCTION

Dairying is now being expanded throughout the western part of the country. The Red Danish cattle, a better milking breed than the Shorthorn, are increasing in numbers on the peninsula, superseding the Shorthorn and also the native Jutland breed of the Holstein type. These changes call for considerable adjustment in methods of handling livestock and in the growing of feed crops for livestock.

Still more pronounced, however, are the changes taking place in South Jutland, the southern part of the peninsula. Prior to 1920, the agriculture of this region had been carried on for 56 years within German tariff walls and the production of grain and beef had become important. For political reasons, there had been heavy emigration to the United States. Labor was rather scarce in this region while land was rather plentiful. An extensive system of agriculture was followed. Almost 60 per cent of the agricultural land was used for the production of hay and pasture. When this region, after a plebiscite in 1920, was reunited with Denmark, the farmers had to adjust their production to conditions of so-called "free trade," and production for markets which were much more sensitive to world-wide influences. More dairying and

less beef production was now called for. It was natural to assume that Danish farmers, all the time working under conditions of "free trade" and production for the world's markets, should have worked out a system of farming suited to such conditions, and that a change to the system of farming previously worked out in other parts of the country, was all that was required in South Jutland. However, it is only in the eastern part of South Jutland that natural conditions are the same as on the Danish islands. The remainder of South Jutland has, like western Jutland farther to the north, a somewhat more raw, windy, and moist climate, and furthermore, it has areas of lowlands naturally suited for use as pasture. The old established Danish system of farming cannot, therefore, simply be transferred to South Jutland. Further adjustments will have to be made.

The islands themselves are not entirely free from similar problems of adjustment. With recent prices of sugar, the production of sugar beets seems not to be able to hold its own against dairying, but here the adjustment simply calls for a transfer to a system of production followed in neighboring localities.

For the country as a whole it may be said that the somewhat higher wages of the later years call for increased economy in the use of labor. Yet, if the efficiency of labor is taken into consideration, it cannot be said that wages are high; the case is quite the opposite. The prices of the products of Danish agriculture, however, have not risen as much as prices generally, and to obtain a satisfactory income, a larger production per man is necessary. Such an increase has actually come about during recent years. Although the agricultural population has remained about constant for the past fifty years, agricultural production has increased very considerably, even during the past few years.

To assist in making the proper adjustments to changed economic conditions, information relative to the agricultural industry is necessary, and if it is to be of much value as a basis for making decisions, it must be rather detailed, and furthermore, it must be based upon well chosen samples. The need for such information has been recognized in Denmark. A Bureau of Farm Management (Det Landokonomiske Driftsbureau) was created in 1916, and since that date, it has assembled a large volume of useful data. It has assembled and analyzed accounts from the farm accounting associations and from a number of farms whose accounting is done

under the direct supervision of the Bureau. It issues annual reports, as well as special reports, giving analyses of these accounts. So far, the publications by the Bureau represent the only material available in this field.

The objects of the Bureau as stated at the time of its foundation, were as follows:

1. To further farm accounting.
2. To present the results of farm accounting in such a way as to illustrate the economic importance of various types of farm organization, and the economic effects of governmental interference.
3. To present farm economy in such a way as to enable the farmers to improve the economy of their farms.

It will be seen that the objectives of the Farm Bureau were broad, and that it was thought that they could be reached through making analyses of farm accounts. It was assumed that the relative profitableness of the various crop and livestock enterprises could be determined through an analysis of carefully kept farm accounts, and that the most profitable enterprises could be increased while the less profitable ones would be decreased or even abandoned.

However, the interdependence of crop and livestock enterprises, and of different livestock enterprises and different crop enterprises, makes it virtually impossible to determine the profitableness of a single crop or livestock enterprise. The whole reasoning, furthermore, is based upon the idea that the most profitable organization is reached when the average return per unit of money outlay on the different crop and livestock enterprises is reached, while, as a matter of fact, the adjustment must go on until the *marginal* returns balance. Moreover, in the process of computing such cost figures, too much arbitrary allocation of costs is necessary, and the appearance of great accuracy is often misleading. It is now realized that in many branches of manufacturing and still more so in farming, it is difficult to fix a certain cost figure on a unit of production.

The cost of production system, seemingly very exact, under which the cost of everything in the farm business was computed—the cost of oats per bushel, the cost per heifer "delivered to the herd," the cost per hog marketed, and so forth—is therefore losing ground. It was found necessary to explain away many of the results obtained. The root crops, for example, once caused con-

siderable concern because they showed small profits. Yet the farmers have gone on expanding the area in root crops and probably rightly so. In recent years more attention has been paid to the method of presenting results of accounts, grouped as to success or lack of success, and in finding out which features, with respect to farm organization and management, are associated with success or failure. This is obviously a much more fruitful approach to the problem.

PRODUCTION CYCLES

The cycle in the production and prices of pork products is a real problem in Denmark. There are violent fluctuations in the Danish production of pork products. Such fluctuations reduce considerably the profitableness of the enterprise and have recently taken on greater importance than formerly. The Danish farmer is quick to make improvements if their merits are clear to him. While a good statistical service would not likely abolish the cycle, it might at least reduce it materially. It is recognized, of course, that the cycle is not restricted within national boundaries. Even if the cycle were reduced in Denmark, prices would still vary due to variations in supplies in other countries. Such variations are, of course, beyond the control of Danish farmers. They can only contribute their share toward building up the best possible statistical service. The yearly census of Danish agriculture makes available information as to the more important developments in the agriculture of the country. Through the development of sampling procedures the Danish Bureau of the Census has already conducted investigations concerning agriculture which would otherwise have been too costly. By the use of similar methods, it should be possible to enumerate the number and composition of the hog population every third month so that changes which are under way could be discovered early enough to permit of taking action. Such data should also yield material which would help toward clearer understanding of the hog cycle.

PROBLEMS OF PRICE RESEARCH

Danish agriculture is highly commercialized. Purchases of additional raw materials such as feeding-stuffs, fertilizers, and so forth, are large, as are sales of finished products, and there is only a small margin of profit on the turnover. Production is many

times greater than the home market can absorb, and the larger part of the agricultural products of the country are sold in the world's markets where they are subject to competition from everywhere, and to trade regulations and tariff measures which, in some cases, are such as to prohibit trade. Under such circumstances, prices, and variations in prices, take on added importance. It is self-evident that everything which can be done to provide the farmer with the best possible information on which to base his judgment as to probable future prices, should be done. Whether such work is called price forecasting or something else is of minor importance.

The importance of price problems becomes apparent upon examination of the wide variations which occur in the prices of butter, bacon, and other pork products. To what extent are these price variations due to changes in the general price level? How much is due to changes in consumers' demand? What is back of such changes—are they temporary or permanent? Or, we may look at the forces at work on the supply side. Are they due to changes in large competing areas of the world, or do they represent temporary movements—perhaps a so-called production cycle? To date, little has been done in Denmark in dealing with such problems.

MARKETING PROBLEMS

The marketing machinery of Denmark, of which a large part is cooperative, is well developed. However, many marketing problems still present themselves, and so far little has been done to solve them. The question of price quotations has recently come up for discussion. It was found in Denmark, as in many other countries, that the quotations given were none too good. Better representation of sellers, i.e., the farmers, on price quoting boards has been asked for. What is really needed is a thorough market analysis and a proper statistical treatment of the actual data as to prices paid, the quality and quantity of products sold and so forth, followed by prompt publication of the results. Different quotations for the various stages of the marketing process may be needed.

Recently, market quotations on livestock have been the object of criticism. Market quotations on butter have been the object of criticism for many years. Conditions were such with regard to this quotation that the cooperative creameries were led to establish

an office for the assembling and publishing of data on prices actually paid creameries for butter.

Closely related to the question of price quotations are the questions relating to the establishment of market grades. Standardization, even of Danish butter, is by no means complete, and the problem of establishing grades corresponding to differences in quality, which in turn is bound up with differences in price, is a real one. A further question may be raised as to how these prices are related to various brands and classes, and to prices paid for such brands and classes by the consumer.

In such problems there is a gradual shading off on the one hand into problems of supply, and on the other, into problems of demand, and the factors which go to make up that demand.

PROBLEMS OF AGRICULTURAL POLICY

Some rather important problems in agricultural policy have recently come up for discussion. The establishment of small holdings was a movement toward social improvement, originally started to help improve the lot of the agricultural laborers by assisting them to secure a few acres of land on which at least a part of the family's food supply could be produced by the workers themselves and members of their families. The holdings originally created contained, on the average, from 8 to 9 acres. Later, however, there was a change to a movement for the creation of holdings large enough to provide a living for a family without the necessity of outside work, and this movement has been continued largely for political reasons. It finds its support among the city parties and among the smallholders themselves. State subsidies of about $2,000 per holding have been utilized to further the creation of these somewhat larger holdings which average from 18 to 20 acres in size.

Recently, criticism of this program has seemed to gather force. It is contended that such holdings are too small to be efficiently operated except by men of more than usual ability, in which case, of course, so small an enterprise offers too little scope for them. The whole movement is closely interwoven with Henry George's idea that every man has a right to a piece of land on which to make a living, a philosophy which largely belongs to a bygone system of economy. Present-day economy offers many other opportunities for making a living, and it is just as important that these other

opportunities be kept open for all. Industrial labor is constantly faring better. It is mostly from habit that economists go on talking about the factory worker and how his conditions may be improved. In those parts of Europe where industrial workers are strongly organized, they have ceased to be the class with the lowest incomes. Small independent "entrepreneurs," retailers, and tradesmen, are the class which today receive the smallest incomes. The question is raised as to why state subsidies should be used to start a class of small, independent "entrepreneurs" on farms too small to enable them to make a living comparable with that which an able worker can make elsewhere. Such a policy may not make for the best utilization of the country's resources, and may not be in the real interest of the people it is intended to help. Furthermore, it is not certain that every worker in agriculture should have his own enterprise. Such has never been the case in the past, and it is doubtful if it will be the case in the future. Such a system is contrary to the simple rules of economy in the use of labor and managerial ability and of economy in the use of power, equipment, land, and buildings. The buying of farm supplies, and the selling of farm products takes place, for the most part, through cooperatives of which both large farmers and small farmers are members. In this way the higher cost of handling small quantities of supplies and farm products is partly covered up and is borne, in some degree at least, by the larger farms. The question may well be raised as to whether all of the handicaps under which the small holder labors can be overcome by the magic of owning his own enterprise. Obviously there are great dangers in creating farms which are too small.

The Bureau of Farm Management (Det Landokonomiske Driftsbureau) has not been able to secure the data necessary to give an answer to the above question. The data available are not representative as the small holdings included in the sample are decidedly much more above the average of their group than are the reporting middle-sized and larger holdings within their groups. Many of the small holdings on which reports are secured are operated by men who would be able to earn better incomes in other walks of life, or on larger farms. The figures available, seem to indicate that a farm of a size somewhere in the lower range of sizes of the middle-sized farms, a farm of 40-80 acres, is the best economic unit.

A state policy as to land ownership and size of farms must be a long run policy; it must look into the future. The growth of population in Denmark is not such that future wage levels are likely to be low. The next twenty years do not point to much increase in the prices of agricultural products, and it will take a rather good-sized farm unit to provide an income equivalent to that which can be earned in other industries. Dairy production can easily be made too intensive, and this is often done on small holdings. There are indications that hog and poultry production can be successfully organized in larger units. Also for these reasons there is obviously a real danger of not making the newly created holdings large enough.

Another basic policy which is up for discussion is that of the form of land ownership. A characteristic feature of land tenure in Denmark has been the purely capitalistic system of "free ownership" of land, subject, however, to state regulations designed to preserve the middle-sized holdings, which regulations, within recent years, have been colored by the small holdings policy. Denmark has always been, and still is, largely a country of middle-sized farms. It is true that the number of small holdings bulks large, and they have been the object of much outside interest and comment, but the middle-sized farms of from 40 to 150 acres, outweigh by far the small holdings and large estates, both with respect to the utilization of the country's land resources, and to no less a degree, with respect to the volume of production.[1]

Under a system of free ownership of land, a well developed system of cooperative farm mortgage credit associations, and middle-sized farms, Danish agriculture has flourished, and continues to do so. Recently, however, these bases of Denmark's agriculture have been questioned. The Act of 1919 provides that small holdings created by the use of state subsidies should be owned by the state, the operator holding tenure for life. The question arises as to whether or not the advantages of private initiative, and long-time policies with respect to land utilization can be preserved under a system of state ownership of land. It may be possible to preserve these advantages, and in any case there is nothing wrong about the state's retaining ownership of some of its former lands. Ob-

[1] About 65 per cent of the country's land resources are in middle-sized farms. The remainder is about equally divided between large and small holdings.

viously, however, such a system needs a free land market to establish a rent. Political higgling instead of the market might otherwise determine rents.

In conclusion, it may be said that Denmark is faced with the problem of making immediate adjustments in her agricultural production, not only on farms but in her cooperatives as well. This raises a host of questions as to future developments in teaching and research in production and marketing, in price research and in outlook work. There are far reaching questions of agricultural policy with regard to the form of land ownership, the type of agricultural holding, and so forth—questions which involve the form of rural life, and the form of rural enterprise, dependent as they must be upon the people attracted to the industry in the future. It is to be hoped that these problems will be considered, not in the light of immediate political advantage, but from a long time point of view; not in terms of farms and farmers alone, but in terms of the well-being of the whole population.

POST-WAR INTERRELATIONS BETWEEN AGRICULTURE AND BUSINESS

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MANY GENERALIZATIONS have been uttered in the United States in the past ten years concerning the relation between agriculture and business. The most common generalization is that the national welfare depends upon agricultural prosperity. Another view, not as commonly expressed but probably as widely held is that agriculture has already declined to a point where it is no longer a major factor in our highly industrialized economy. It is the purpose of this paper to present certain selected facts bearing on the complex economic interdependence of agriculture and business in the United States which gave rise to these diverse views.

These facts, we shall find, indicate, first, that the prosperity of only certain industries is intimately dependent on the farmer's financial condition and that the welfare of a larger section of industry is dependent more on the farmer's output than on his income; second, that the variations in the industrial and financial activity of the country are real and important elements in the farmer's well being; and third, that the factors which make for agricultural depressions, particularly over-production, may have a temporary stimulating effect on national prosperity and the factors which give the appearance of agricultural prosperity, such as relatively high farm product prices, may help to bring on industrial depression.

Out of the processes of farm production, arises one set of interrelationships between farmers and those industries which supply certain goods and services such as fertilizer, feed, equipment and credit. Another set arises from the process of exchanging the farmer's net income for the necessaries of life such as food, clothing and household goods. Many of these enterprises went to pieces when the great price deflation and business depression of 1920-21, reduced the agricultural cash income in the United States from the very high level of nearly 13 billion dollars in 1919-20 to only 7 billion dollars in 1921-22. Since then, as we shall point out presently, these industries have shared in the agricultural improvement and in the year to year variations in farm income.

For these and for the many allied industries and interests which supply agriculture with commodities and services for use both in production and in the farm home, it may be said without qualification that their welfare rises and falls with the ups and downs in the farmer's buying power.

In the marketing of the farmer's product there are engaged a number of enterprises which, unlike those already referred to, do not depend directly on the farmer's buying power, but rather on the volume of his production. Among these are the country elevators and warehouses, the railroads, the commission men, the speculative exchanges, the flour mills, the packing houses, the cotton mills, the wholesalers, retailers and exporters. It is a general characteristic of these intermediaries between the farmer and the consumer that it is to their interests primarily to handle as large a volume of traffic as possible. Only incidentally are they concerned with the farmer's prices or the farmer's financial rewards for large crops. In fact, for some, particularly the processors of farm products, or manufacturers whose raw materials are partly agricultural, there is a distinct advantage in low agricultural prices and large volume. Illustrative of these general facts we shall find that in the past decade agriculture has in certain years contributed substantially toward the maintenance of industrial activity although receiving for that contribution a niggardly reward.

In addition to those industries whose interests are promoted by large output at low prices and adversely affected by small output at high prices, there are all of the other enterprises and consumers in general who benefit from abundant food and clothing materials at low prices, for relatively low living costs release a greater share of consumers' income for non-agricultural goods. Illustrating this fact, it will be pointed out that the relatively low agricultural prices of the first half of the post-war period which contributed toward our recent prosperity were succeeded by relatively high agricultural prices as a result of a rise in agricultural prices and of a decline in non-agricultural prices. This relative rise in agricultural prices appears to have marked an end of a period of prosperity just as similar shifts appear to have done in the past 55 years.

In the agricultural-business interrelationships, we have not only the dependence of some on the farmer's income, and of others on his output, but also the reverse, the dependence of agriculture on general industrial prosperity. For, inasmuch as the bulk of our

farm production is sold in the United States, the condition of the domestic market, or rather the buying power of consumers as a whole, is a factor in the farmer's prices and income. The farmer is concerned with the domestic demand for his products just as certain industries are concerned with the farm demand for their goods. Furthermore, industrial conditions affect the prices of goods and services which farmers buy for use on the farm or in the farm home.

The effects of general business activity on the farmer's gross income operating through the condition of domestic demand were most drastically felt in 1920-21 and in 1929-30. In these extreme years there were some offsetting influences such as lower farm wages brought about by large numbers of unemployed seeking jobs on the farms and lower prices of goods bought by farmers. But they have been of minor importance compared with the effects of business depressions on agricultural incomes.

Let us now examine the facts which give rise to these conclusions.

EFFECT OF AGRICULTURAL INCOME ON THE PROSPERITY OF CERTAIN INDUSTRIES

The dependence of certain industries on agricultural income can readily be illustrated with data relating to the fertilizer, farm implement and automobile industries as representative of those who sell goods for use in farm production.

The income from farm production in any given year in a large measure determines purchases in the following season. Stated differently, farmers tend to buy on the basis of income already earned rather than on prospective incomes. The fertilizer industry finds the farmer a good prospect or a poor one depending on what the harvest has brought. This is obvious when the annual gross money income from the cotton crops are compared with the following year's expenditures for fertilizer by farmers in the cotton states. The unusually high farm returns of 1919 brought unusually high expenditures for fertilizer in 1920 and the greatly reduced incomes from the 1921 and 1926 crops resulted in greatly reduced fertilizer purchases in 1922 and 1927 respectively. On the average, fertilizer expenditures in the South amount to about one-tenth of the cash income from the cotton crop (figure 1).

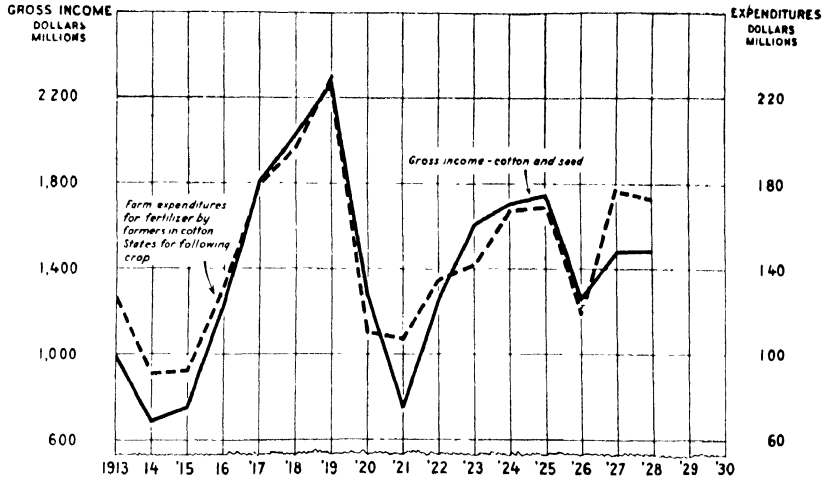

FIGURE 1 RELATION BETWEEN GROSS INCOME FROM COTTON AND FERTILIZER EXPENDITURES IN COTTON STATES FOR THE FOLLOWING CROP

The welfare of the fertilizer industry is very closely related to farm cash returns from the cotton crop. On the average about one-tenth of the returns from the cotton crop represents the expenditures for fertilizer in the cotton-producing states in the following year.

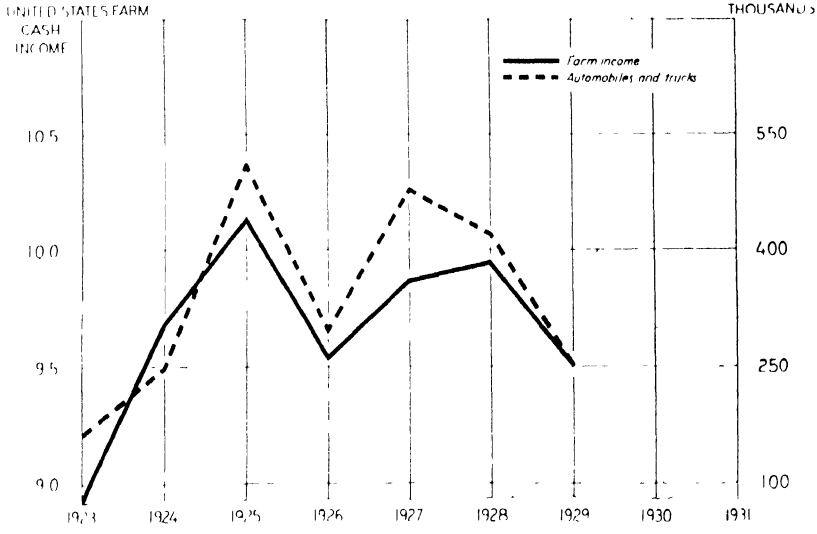

FIGURE 2. UNITED STATES CASH INCOME FROM FARM PRODUCTION AND ANNUAL INCREASE IN NUMBER OF AUTOMOBILES AND TRUCKS ON FARMS

Up to January, 1930, there has been an annual increase in the number of automobiles and trucks on farms, but the rate of increase has varied with the cash income from farm production. The cash income for the crop years beginning in the years 1923 to 1929 inclusive are here compared with changes in numbers between one January and the next.

Similarly a part of the farm implement industry is dependent on the returns from the grain crops. Since 1921 for example, there has been a very high correspondence between the income from the grain harvest of one year with the deliveries of farm implements and vehicles in the following year.

Purchases of automobiles and trucks by farmers have also in recent years reflected farm incomes. In the past 10 years there has been a marked increase in the number of automobiles and trucks on farms which has been greater than the improvement in farm income. Although the process of mechanization has gone on at a very rapid rate, that rate has been accelerated in years of good incomes, and retarded in years of reduced incomes. Thus, after the improved returns from the 1924 and 1925 farm production there was a greater increase in automobiles and trucks on farms at the end of the year than after the reduced incomes of 1926 and 1929 (figure 2).

Such direct influences of farm income on the industries immediately concerned with the farm market, represent also indirect effects on others not in direct contact with agriculture. For example, the activity of the farm machinery industry, resting as it does largely on the money income of domestic agriculture, determines the earnings of its employees who in turn are the consumers of products of other industries. A similar indirect effect on general business is passed on by those enterprises engaged in handling, financing, packing, milling and exporting the annual farm output, for on them depend many other industries.

Agriculture exerts still another indirect effect on general business through its influence on the cost of food and clothing of the city as well as country consumers, for the market for non-agricultural goods is increased as the share of the consumer's income spent for food and clothing is reduced, and contracted when higher agricultural prices require a larger portion of the consumer's budget for food and clothing. Although this indirect influence on business is too complex for quantitative measurement, its importance can be sensed from the fact that about half of the money value of retail trade carried on in the larger cities of the East and West is in agricultural products of food and clothing. Assuming a total volume of retail trade of about 40 billion dollars of which food represents one-third, a rise in the retail level of food prices alone of 10 or 15 per cent, such as took place between 1921-23 and

1928-29 represents a greater contraction in purchasing power for non-agricultural products than takes place in the course of an ordinary business depression, assuming of course that consumers do not curtail the quantities they purchase.

RELATION OF AGRICULTURAL OUTPUT TO BUSINESS PROSPERITY

The industries engaged in the distribution and processing of farm products are concerned more with the volume of farm output than with the money value of farm income. This distinction between output and income is a necessary one because large output may or may not mean large income. A large crop of wheat may bring a large income as, for example, in 1924. In that year the effect on both the industries dependent on the farmer's income and those dependent on the volume of traffic was identical. Or a large crop of wheat may bring a low income as it did in 1928, when the railroads and middle men only were favorably affected. Large crops of potatoes and cotton usually mean smaller incomes and in those instances the effect of income on business is not identical with the effect of volume.

Among the distributors of farm products whose prosperity rises and falls with farm output rather than with farm income the railroads may be cited as the outstanding example. Ordinarily, with freight rates practically unchanged from year to year, revenue tends to be determined by the volume of traffic handled. In the 10 years from 1920 to 1929 inclusive, the marketings of farm products have been relatively heavy in years when freight from other sources declined. This may be inferred from a comparison between the annual variations in manufacturing output and in crop marketings in the past 10 years (figure 3). We find here a very definite inverse correlation. The heaviest movements of farm products occurred in 1921, 1922, 1924, 1927 and 1928. From the standpoint of transportation and industry, these large volumes were well timed for in these years they served as partial offsets to business activity below normal. Similarly the lighter movement of farm products in 1920, 1923, 1925 and 1929 coincided with business activity above normal.

The physical contribution of agriculture to the business cycle in recent years may be further observed by differentiating between those manufacturing industries which use agricultural and those which use non-agricultural products. If in the former we include

the textile, food and leather industries and in the latter such basic industries as iron and steel, automobiles, cement, and so forth, markedly different fluctuations show up (figure 4). The latter group appears to be the one which gives shape to the great de-

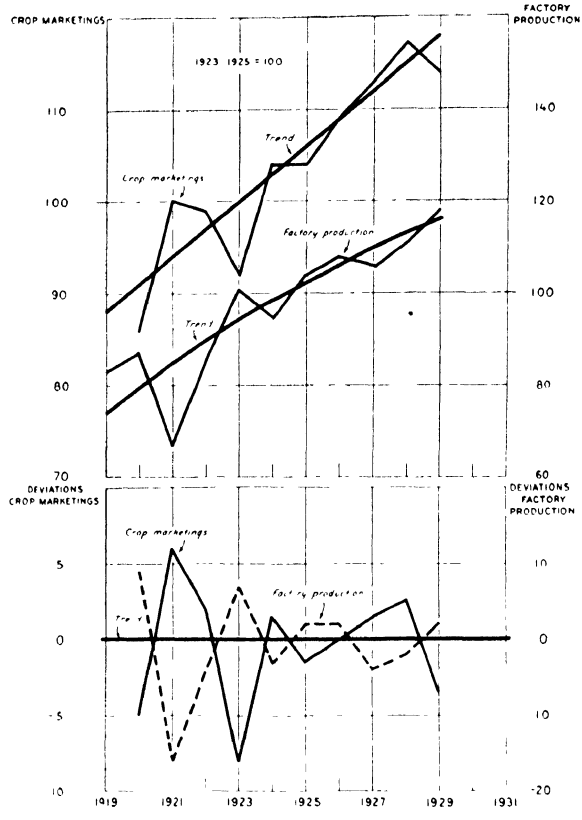

FIGURE 3. INDEXES OF CROP MARKETING AND OF FACTORY PRODUCTION, 1919-1929

In the post-war period 1920-1929, the volume of crop marketings has been above normal (trend) in years when factory production was below normal and vice versa. Particularly in 1921 and 1922 agriculture contributed large physical volume to industrial activity although its purchasing power was greatly reduced.

pression of 1921, the sharp depression of 1924 and 1929 and the moderate depression of 1927. The group of industries using organic materials was the first to experience the depression of 1920, but also the first to recover. In fact, in the years 1919 to 1924 the fluctuation in this group tended to precede the fluctuations in the latter, but not since then. In 1927 the agricultural or organic group

of industries were relatively more active, but in the first half of 1930 less active.

Among the organic or agricultural industries the cotton textile industry is unique. It stands between agricultural and other industries being affected at times mostly by one or the other. Usually cotton mill activity reflects general business activity and the industrial demand for cotton. Sometimes, however, it is domi-

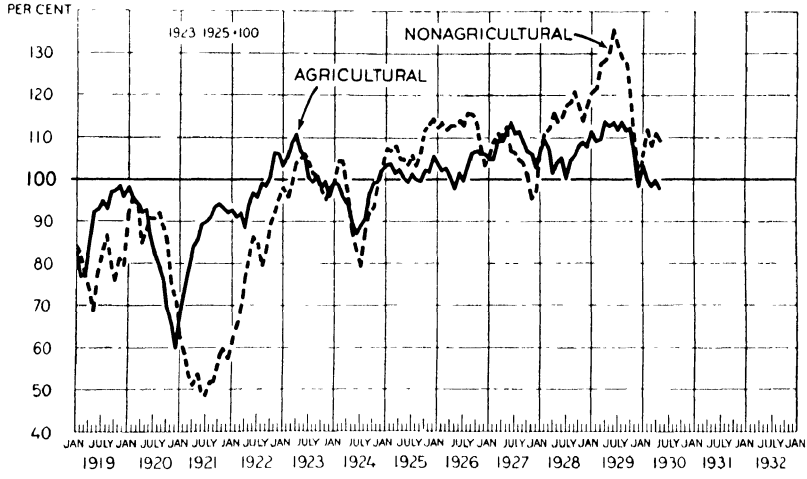

FIGURE 4. INDEXES OF PRODUCTION IN FACTORIES USING AGRICULTURAL AND NON-AGRICULTURAL MATERIALS

Since 1920 the fluctuations in production of factories using industrial raw materials have been greater than that of factories using agricultural raw materials. The latter tended to precede the changes in the industrial group between 1919 and 1924. In two periods, 1921 and 1927, factories using agricultural products were sustaining factors in the general level of business while the others were still tending downward.

Agricultural materials—Federal Reserve Board groups of foods, textiles, tobacco, and leather products to which has been added an index of creamery butter production.

Non-agricultural materials—all other groups of the Federal Reserve Board index of manufacturers (iron and steel; automobiles; cement, brick and glass; non-ferrous metals; petroleum; rubber tires; paper and printing.)

nated by the supply or price of cotton. In the eleven years 1919-29 there have been two years of very low cotton prices, 1920 and 1926. Both of these situations created rather wide profit margins for the manufacturers and thus reflected themselves in a great expansion in cotton mill activity (right half, figure 5). The net influence of the low prices paid for the 1920 crop was to stimulate an increase in cotton mill consumption of about 25 per cent in the calendar year 1921, this in the face of generally declining

business activity. In 1926, the cotton growers, partly by intention, partly by the aid of nature produced the largest crop on record. Lacking a proper organization for the handling of the crop, farmers marketed as usual, unloading a very large portion of this large crop onto the spot markets during the winter months of 1926 with disastrous effects on prices. When prices had declined and mills had stocked up on cheap cotton, it gave such an impetus to the textile industry that it reached record levels in the summer of

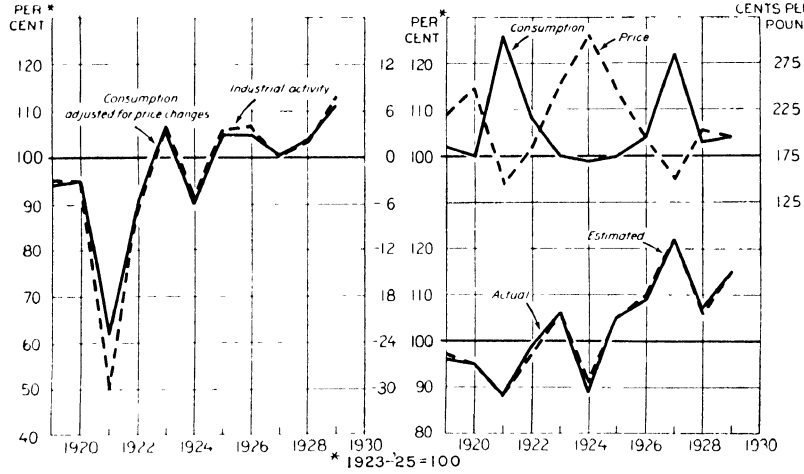

FIGURE 5. UNITED STATES MILL CONSUMPTION OF COTTON RELATED TO COTTON PRICES AND INDUSTRIAL ACTIVITY, 1919-1929

Cotton consumption, adjusted for changes in the price of raw cotton, reflects a very close dependence on industrial activity (adjusted for trend). The low prices of the 1920 and the 1926 crops resulted in considerable expansion in cotton consumption in the calendar years 1921 and 1927. The effect of business conditions and of the preceding crop-year price of cotton together account for most of the calendar year changes in cotton consumption (compare indexes of estimated and actual consumption 1923-25 equals 100.)

1927. This too took place in the face of declining business activity. The net influence of the low price of cotton in 1926 was an increase in consumption of about 20 per cent in 1927. In both of these situations of 1921 and 1926 it may be argued that the plight of the cotton farmer temporarily helped the textile and other associated industries. On the other hand the very low returns to the growers naturally reduced the amount of business done by the fertilizer industry and by others catering to the farm market in the South.

In this chain of enterprises, concerned chiefly with the handling,

transporting, financing, processing, and distributing of farm products to consumers, there is another type of enterprise that may be said to have benefited at times from both large and small farm output. This is the group of enterprises centering around the speculative commodity exchanges. They embrace not only those actually engaged in futures trading, but also the many allied activities that derive support from the volume of trading in the exchanges, as for example, brokerage concerns and banks. It is, of course, well known that speculative activity thrives on instability and that they whose profits are derived from speculation are usually in opposition to and often vociferous critics of any attempts to guide economic progress, whether agricultural or non-agricultural, more nearly along a normal course. In the grain exchanges during the post-war period the greatest activity occurred in the years of high prices. The very high prices in the 1924-25 season produced by the small corn crop and again the high prices in 1927 and 1928, were accompanied by trading in corn futures of around 600 million bushels per month. During the periods of lower corn prices of 1922, 1923 and 1926 the volume of trading fell to half that level. Similarly in the wheat market, the high prices of 1924-25 were accompanied by futures trading in wheat in excess of 1,200 million bushels per month or more than twice the size of the commercial wheat crop of that year. The lower prices in all other seasons except 1929 were accompanied by considerably lower volumes of trading. The volume of futures trading in cotton also has risen and fallen with the major trends in the price of cotton. As cotton prices rose from the low levels of 1921 to the very high levels of 1923 and 1924, and down again to recent levels, the volume of cotton futures trading rose and fell. These comments on cotton, wheat, and corn, refer, of course, only to the major trends in prices and in futures trading and not to the short time monthly or daily fluctuations where the movements may be in the same or in the opposite direction. The chief point is that speculative activity thrives on price fluctuations.

EFFECT OF BUSINESS CONDITIONS ON FARM PROSPERITY

The ways in which business conditions exert their influence on farm prosperity are perhaps more complicated than the relations that have been discussed so far. If, under the general heading of "business conditions" we include monetary conditions, and the

credit policies of banks, which are factors intimately related to business activity, to speculation in commodities and securities, to the buying power of money in relation to goods, and to foreign trade in American products, the interrelations between business and agriculture are hopelessly inextricable except for the purposes of theoretical discussion. Statistically and quantitatively the play of these general domestic and international economic forces on agriculture is not readily measurable, as was well illustrated in the discussion that followed the papers by Messrs. Enfield, Lloyd and Warren, last week. We shall not attempt to add to their statements on the effects of national and international monetary conditions on agricultural prices and incomes. However, it may be helpful to examine certain facts in which the influences of business on agriculture may reasonably be expected to show up.

Examining first the movements of agricultural prices in general since 1919 and noting the similarity in the behavior of agricultural and other prices in the period of inflation in 1919 and in the two periods of deflation of 1920-21 and 1929-30, it is clear that agricultural prices have shared in the effects of international and domestic credit policies and business conditions. In fact, they appear to have borne somewhat more than their share, both in these periods of rapidly falling prices and in the intervening periods of rising prices. So far, it has not been feasible to determine the extent to which the greater variability in agricultural prices has been due to variations in production and to variations in business and financal conditions. In contrast to the behavior of other prices since 1921, there are two outstanding features: The trend of agricultural prices has been upward between 1922 and 1929, while the trend in other prices has been downward during this period; and the short time cycles in agricultural prices have been on the whole more pronounced than the non-agricultural, particularly during the course of the two business cycles from 1924 to 1927 and from 1927 to 1930. In the period 1921 to 1924, both agricultural and non-agricultural prices reflected the changes in business conditions, but the non-agricultural price cycle was much more pronounced, largely because of a relative scarcity of industrial products compared with surpluses of agricultural products. Since then the more rapid increase in industrial production relative to the volume of agricultural production appears to be one of the chief reasons for the declining trend in non-agricultural prices.

Food prices particularly have reflected in a large measure the recent fluctuations in business activity and the buying power of consumers. The combination of greatly reduced earnings and increased farm marketings resulted in very low food prices (meat and dairy products) in the early months of 1922 (figure 6). The subsequent expansion in consumer buying power and its decline in 1924, another expansion in 1925 and decline in 1927, and also the expansion in 1928 and the decline in 1930 are all reflected in

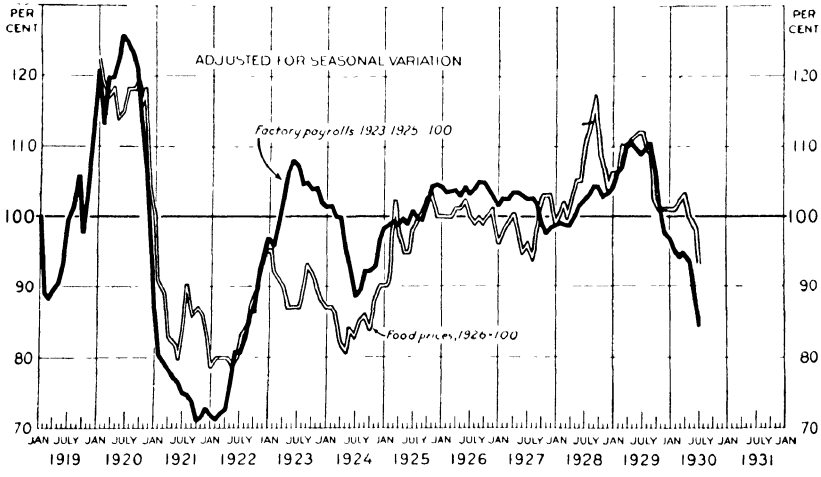

FIGURE 6. INDEXES OF WHOLESALE PRICES OF MEATS AND DAIRY PRODUCTS, AND PAYROLLS

Since 1920 the major changes in wholesale prices of meats and dairy products have reflected the money buying power of consumers, as well as domestic supply and foreign demand conditions. In 1922-23 food prices did not rise as fast as factory payrolls because of very heavy surpluses of food products. The peak prices of 1928 were due to a shortage of cattle.

the aggregate changes in food prices, though the correspondence is far from exact. The submerged food price cycle of 1921-24 as already indicated, was the result of very large supplies. A more rapid rise in 1928 was due to the great cattle shortage, and the greater decline in 1927 appears to have reflected a reduced foreign demand and a reduced demand in the Southern States, following the unprofitable cotton crop in 1926.

Another indication of the effect of changes in the buying power of consumers, lies in a comparison between changes in annual factory pay rolls and farmer's cash income from the sale of livestock, 95 per cent of which is usually consumed in the domestic

markets (figure 7). Since 1923 there has been a fair correspondence between factory payroll variations and farm income from livestock sales, and since the aggregate quantities of livestock marketed annually have been practically constant since 1924, the variations in farm cash income may be taken to reflect the changes in the buying power of consumers, and the changes in the amounts that packers and dealers have been able to pay farmers. In these seven years, the annual cash returns to livestock producers have varied somewhat more than factory payrolls.

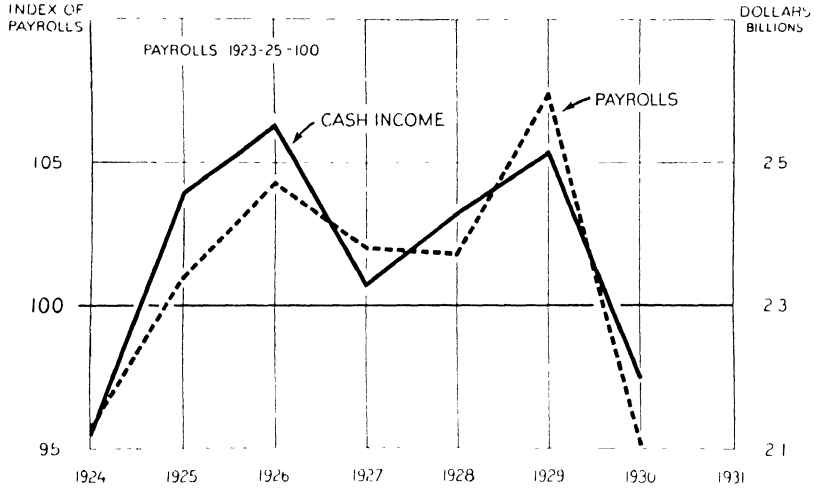

FIGURE 7. FACTORY PAYROLLS AND CASH FARM INCOME FROM LIVESTOCK, 1924-1930

The variations in the buying power of consumers has been an important factor in the farmer's income from the sale of cattle, hogs and sheep. Livestock sales were greater in 1926 and in 1929 when factory payrolls were high, than in 1924 and 1930 when they were considerably lower.

Other studies in the response of prices of individual commodities, such as cattle, hogs, sheep, potatoes, truck crops, cotton, butter and eggs, to changes in business conditions also reveal the effects of changes in consumer buying power. There are, of course, differences in the degree of response. The price of hogs for example, appears to have been more sensitive to business conditions than the price of cattle. But together they warrant the generalization that consumers pay more or less for food products depending on the state of their earnings.

The ups and downs in business activity have also created varia-

tions in the industrial consumption of farm products as raw materials, and therefore, in the industrial demand for them.

Cotton, the outstanding farm product used as a raw material in many industries, notably in the automobile industry, serves as an admirable illustration of this type of influence of business on agriculture. We have already referred to the stimulating effect of low cotton prices on the mill consumption of cotton in the United States. If the influence of price is removed from the annual variations in cotton consumption, the result is found to bear a most striking resemblance to the variations in business activity after adjustments have been made for trend (left half, figure 5). In 1921 the consumption of cotton would have been most drastically cut had the low prices of the preceding year not served as an offsetting factor. Similarly in 1927 the consumption of cotton would have shown a falling off of about 5 per cent, but for the stimulating effect of the low cotton prices of 1926. On the average, a change of 10 per cent in manufacturing production has caused a 15 per cent variation in the mill consumption of cotton.

The effect of this dependence of the farmer's markets for cotton on the industrial situation, may reflect itself in several ways. A falling off in business activity while the crop is being marketed tends to lower the mill demand for cotton. And a continuation of a business depression such as we have had for the past 10 months, accompanied by a low level of cotton consumption, increases the carryover which in turn becomes a factor in the prices received for the succeeding season's crop. Such adverse influences are facing the cotton grower at the present moment.

In addition to the effects of the business cycle on agriculture arising through variations in industrial demand and in the buying power of consumers, there are also effects on the costs of farm production and the costs of living on the farm. These arise from changes in such items as commodity prices, city wage levels, and interest rates, which fluctuate with the business cycle. Insofar as these items of costs are passed on to farmers they tend to reduce the farmer's net income in times of business prosperity, and to increase it in times of depression. The behavior of country prices of goods and services in the post-war period indicates that changes in the city wholesale markets are only partly and tardily reflected in the country but our factual information on these items is at present meager.

However, one influence of business on farm costs which we can measure, is the influence of city employment on farm labor and farm wages. The supply of farm labor in the past decade, as in former ones, has fluctuated inversely with industrial employment, and at the present time, the low volume of city employment has so enlarged the supply of labor that the level of farm wages declined sharply from that of 1929 (figure 8). Although in one sense this tends toward reducing the costs of farm production, it by no means offsets the great damage done to the farmer's cash income

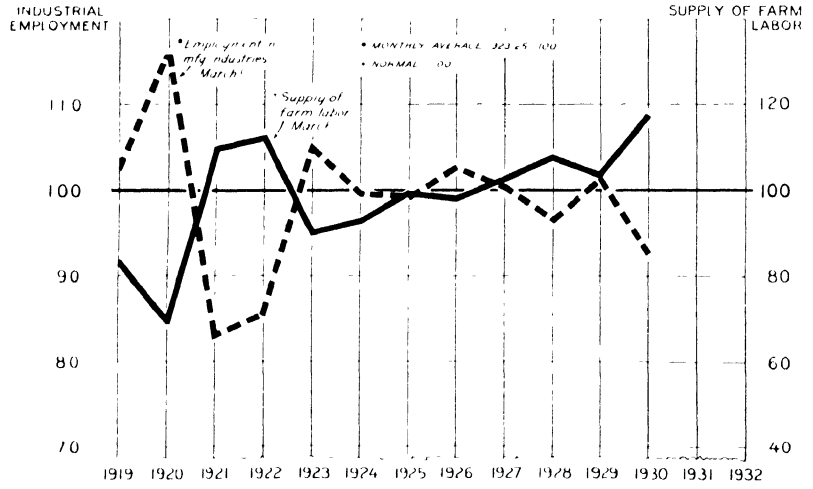

FIGURE 8 SUPPLY OF FARM LABOR AND INDUSTRIAL EMPLOYMENT, 1919-1930

The relative supply of farm labor (and also the level of farm wages) depends to a large extent on the industrial employment situation. The industrial depressions of 1921, 1922, and 1930 increased the number seeking jobs on farms, while the industrial booms of 1920 and 1923 created relative scarcity of farm labor.

by the reduced buying power of city consumers, resulting from widespread unemployment.

This movement of population between city and farm has another aspect in relation to agriculture in that it serves to complicate the problem of adjusting farm production. In the past few years as many as one million five hundred thousand people have moved to the farm in one year of business depression, compared with only one million in a year of prosperity. This year there are probably many more than a million and a half people driven to look for farming opportunities (figure 9).

Conversely, the movement of the farm population to the cities

is also accelerated in years of reduced farm incomes and retarded in years of increased incomes. In recent years the movement of farm population to the cities has been as high as 2,155,000 in a year of

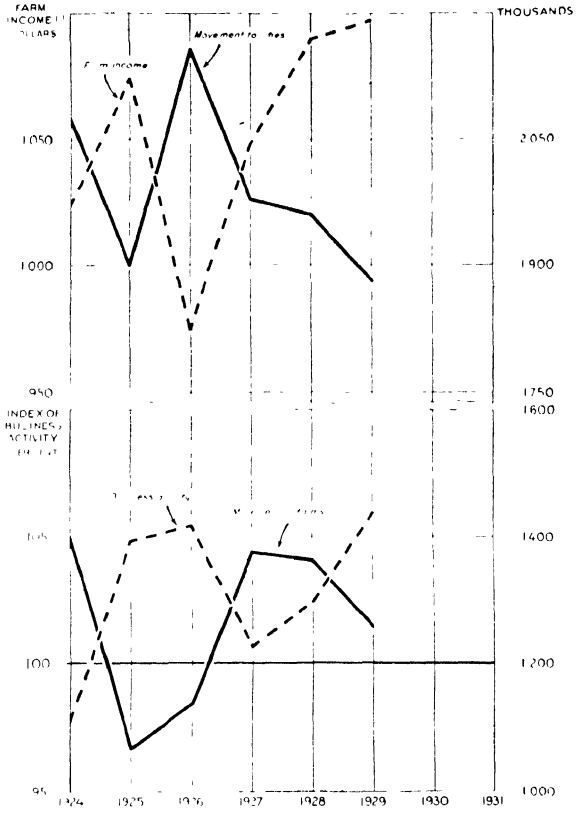

FIGURE 9. FARM INCOME, BUSINESS ACTIVITY, AND POPULATION MOVEMENT, 1924-1929

In the recent population shifts, changes in farm income are largely responsible for the changes in the rate of movement from farms to cities, and changes in industrial activity are responsible to a large extent for the variations in the movement from cities to farms.

(1) Farm returns, receipts less cash outlay.

(2) Federal Reserve Board index of productive activity (100=normal).

reduced income, and as low as 1,875,000 in a year of improved income. Thus in recent years there has been a constant flow of population to and from the farms and cities, the rate of flow from each source accelerated or retarded by yearly variations in farm and industrial conditions.

RELATION OF AGRICULTURAL PRICE CYCLES AND BUSINESS CYCLES

What we have said so far concerning the ways in which variations in agricultural income, production, and prices affect different segments of business may help us to understand the apparent relationships that appear to have existed between agricultural price cycles and business cycles during the past 55 years. We refer to the fact that, contrary to common observation, periods of relatively high agricultural prices have been followed by periods of industrial

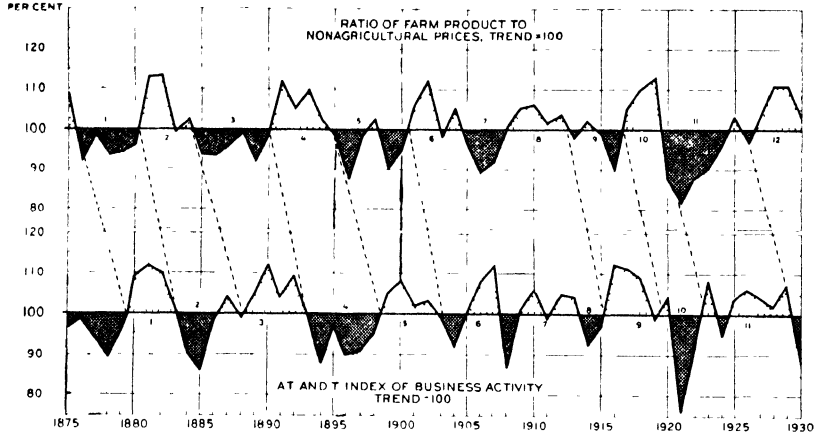

FIGURE 10. AGRICULTURAL PRICE CYCLES AND BUSINESS CYCLES

Since 1875 there have been six periods of relatively low agricultural prices. These have generally been accompanied by rising industrial activity or followed by industrial prosperity. There have also been five periods of relatively high agricultural prices, each of which has been followed by declining or depressed industrial activity. The relatively high prices of 1928 and 1929 suggest that subnormal industrial conditions may prevail in 1931 as well as in 1930.

depression, and that periods of relatively low agricultural prices have been followed by industrial prosperity (figure 10).

By agricultural price cycles we mean here, prices of major farm products in wholesale markets, compared with prices of non-agricultural products; in other words, the relative purchasing power of agricultural prices in exchange for industrial products. During the past 55 years there have been alternating periods of relatively high and low agricultural prices. These almost periodic fluctuations have taken place around an upward trend for most of the fifty-five year period. In the sense used here, relatively high agricultural prices may be the result of high agricultural prices, low

non-agricultural prices, or a combination of both such as occurred in the period 1926-29.

Business activity during this same 55 year period has also fluctuated around an upward trend of growth. When the cyclical fluctuations on the purchasing power of agricultural products are compared with the cycles of business activity, the first impression is that prosperous or depressed general business conditions create relatively high or low agricultural prices respectively, for we find that in a general way, low agricultural prices have been associated with low business activity, and high agricultural prices with high business activity, the latter preceding somewhat, the comparable periods of agricultural prices. But a closer examination shows that each period of relatively high agricultural prices was followed by a period of depressed business activity, and periods of low agricultural prices were followed by industrial prosperity. When analyzed in more detail, the following observations may be made:

1. Since 1875 there have been six periods of relatively low agricultural prices. Each of these except one has been followed by a period of industrial recovery and prosperity.

2. During the same fifty-five years there have been five periods of relatively high agricultural prices, four of which have been followd by periods of business depression; a sixth period, that of 1926-29, has also been followed by the present business depression.

This illustration is not intended as an explanation of variations in business activity. Business cycles appear to be related to many complicated forces, and the importance of these forces is subject to a wide range of disagreement among students of business economics. Furthermore, the fact that some positive relation also exists between agricultural price cycles and business cycles does not justify stressing the negative relation beyond reason. We are, however, inclined to the belief that the paradoxical negative relation between agricultural price cycles and business cycles is greater than the positive influence of business cycles on agricultural price cycles.

How may we explain these paradoxical sequences? It will be obvious from what has already been said that cyclical fluctuations in agricultural prices are largely the result of changes in production. Consequently, periods of low prices (or large farm output) stimulate those activities which are engaged in financing, transporting, warehousing, manufacturing, distributing and exporting farm prod-

ucts. Industrial employment and the purchasing power of urban consumers consequently tend to increase, and while food prices remain relatively low, the urban market for non-agricultural products is increased. As industrial recovery continues, it tends to strengthen agricultural prices and to improve the buying power of the farming population.

In periods of relatively high agricultural prices these factors tend to work in the opposite direction. Reduced farm production as reflected in high prices, tends to reduce the physical volume of business done by all the enterprises which handle, process, and distribute farm products. That in itself tends to affect adversely the purchasing power of consumers through reduced employment. Furthermore, the higher prices of food products diminish the ability of city consumers to buy non-agricultural goods, and the higher prices of non-agricultural raw materials adversely affect the profit margins of certain manufacturing industries. At the same time the industries depending on the farm market as an outlet for their goods are affected favorably or unfavorably, depending on whether the smaller farm output has resulted in larger or reduced farm income.

The relations between business and agriculture are not so readily summarized in a few sentences as are the relations between agriculture and business. Such a discussion would lead us into the complicated effects of international financial and business conditions on domestic agricultural prices, production, and income, a field which we have purposely avoided in this discussion It would also lead us into the influences of international factors in our business cycles, another subject about which we know all too little. Consequently, the only generalization that we are justified in making concerning the business influences on agriculture is that those influences exist; that they at times assume a very real and predominant importance in agricultural welfare; and that they are of sufficient magnitude at frequent intervals to be considered in any agricultural program for the United States. Agricultural stability, it seems to us, can not be accomplished without reference to business stability in the United States and to financial stability in other countries.

For the purpose of concluding this paper, the question may be raised whether in view of the continued decline in the agricultural population in the United States, agriculture will in the future

continue to play the rôle it appears to have played in the past. Since 1900 the number of persons gainfully occupied in pursuits largely agricultural, declined from 38 per cent of the total population to 27 per cent in 1920 and to nearly 20 per cent at the present time. Farm production of foods, textiles and tobacco alone, which in 1899 supplied the raw materials for 32 per cent of the total number of factory wage earners, still supply raw material for about 30 per cent of all factory wage earners. If in this comparison we include the lumber and leather industries, it may be said that agriculture still supplies the raw materials for industries that employ 40 per cent or more of the total number of factory wage earners. Another fact indicative of the magnitude of agriculture in our industrial life is that about 50 per cent of the money value of all retail trade in our large centers of population is agricultural, that is, food and clothing, and a rise of 10 per cent in the price of food and clothing may mean as much in curtailed purchasing power for non-agricultural goods as a decline in factory employment and pay rolls in an ordinary business depression. Furthermore, it should be recognized that agriculture as a market for non-agricultural goods now receives only about 10 per cent of the national income. These facts indicate that the importance of agricultural output to industry is still very large although the importance of the rural market has declined; that agriculture promises to continue as a major source of the nation's food supply; and inasmuch as agricultural production will continue to fluctuate primarily in response to climatic conditions and in part to high and low prices, general business activity will undoubtedly continue to show corresponding changes even though all other disturbing influences in our national business activity were stabilized; and finally, until a greater degree of business stability is accomplished, we may expect that farmers' incomes will continue to be drastically influenced by domestic and foreign business conditions as well as by domestic and foreign agricultural production.

A SUMMARY OF STATE PROGRAMS IN ADJUSTMENT TO THE AGRICULTURAL SITUATION

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THE SUBJECT as stated might be interpreted to include special efforts of the agricultural colleges, experiment stations, and extension services, as well as legislative and administrative efforts of the more formal governmental variety. For example, the so-called Agricultural Adjustment Conferences inaugurated in Illinois in 1928 under the leadership of Dean H. W. Mumford and the somewhat similar developments in other states, some earlier, some later, afford a temptation to give considerable space to descriptive analysis. To confine the discussion to more strictly governmental activity is believed desirable, however, partly because the opportunity to obtain information from colleges as to their special efforts is clearly open to all and has been taken advantage of by many, while, in general, studies of agricultural administration and legislation, national and state, have attracted the sustained attention of but few of our agricultural college people.

The present effort at a summary of certain features of state governmental activity affecting agriculture can but turn a single furrow in a wide and, for this country, all but unbroken field. How many bumble bees may be turned up by any effort to plow in this old pasture, whether on the state or national side of it, is one feature which adds to the interest if not to the activity displayed in this field.

The states may be said to get the first chance at the control of the production and marketing of an overwhelming proportion of practically all of the agricultural products raised in the United States for domestic and foreign consumption. It is true that there is an area of unappropriated and unreserved federal land and a nearly equal area in national forest reservations which together contain nearly a third of a billion acres, or almost the same acreage as is devoted to crop production on all the farms of the country. The unreserved and unappropriated federal lands are diminishing while the federal forest lands are increasing. However, federal lands play a considerable part in affording pasture to livestock in the eleven western states. Use of the grazing resources of the national forests under a system of allotment per-

mits, and unauthorized use of the grazing resources of the unappropriated and unreserved federal lands, has been made by stockmen whose livestock and livestock products are primarily subject to state jurisdiction.

When a movement into interstate or foreign commerce takes place federal authority applies. When public health is in danger federal as well as state authority is frequently involved. In general, however, it is state authority which is dominant at the point of production of all of our farm products. This influence bears upon the quality of many products and extends to quantity as well.

DISTRIBUTION OF THE SUBJECT MATTER OF STATE LEGISLATION AFFECTING AGRICULTURE DURING THE PAST TEN YEARS

The International Institute of Agriculture has rendered a valuable service almost from the time of its foundation in publishing the "International Yearbook of Agricultural Legislation." However, if one turns to this yearbook hoping to get a fairly complete picture of the legislative enactments of the 48 states during the period of the agricultural depression, he will be disappointed. Enactments of the various states for the years 1920 to 1922 are available in the French editions with about the same degree of incompleteness as that which characterizes the listings in the English edition for the years 1923 to 1926. For the four years for which the English edition is available no enactments are shown for 20 of the states, and the list of enactments for the remaining 28 states is far from complete. The number of enactments listed for all states included in the International Yearbook was as follows: 1923, 153; 1924, 13; 1925, 141; and 1926, 9. Practically no information concerning enactments in the individual states is to be found in the Yearbooks for the years 1927, 1928, or 1929.

In order to obtain for the years 1927, 1928, and 1929 at least a rough idea of the volume and distribution of state enactments framed in the interest of agriculture, an examination was made of state session laws. Probably less than ten per cent of the enactments were omitted in this survey. There were 5,582 enactments catalogued, an average of 116 for each state, or, expressed on an annual basis, 1,861 for the 48 states, or 39 per state. The amount of such legislation is believed to have been somewhat larger during

the years 1927 to 1929, inclusive, than during any similar period in the decade. The annual grist of such laws has not been growing smaller even in states where agricultural production and marketing is not ordinarily thought of as being prominent, relative to other activities.

States having the largest number of new laws affecting agriculture out of the total of 5,582 laws examined, were as follows: New York, 336, or 6.0 per cent of the total number of laws examined; Idaho, 303, or 5.4 per cent; California, 282, or 5.1 per cent; and Florida, 279, or 5.0 per cent. The eight states which had enacted the smallest number of laws affecting agriculture during these three years were: West Virginia, with 21 laws; Kentucky, 23; Arizona, 31; New Mexico, 34; Utah, 45; Alabama and Oklahoma, 54 each; and Ohio, 55. No one of these states contributed more than one per cent of all the enactments examined.

In the 48 states as a whole, out of every 100 laws enacted in the interest of agriculture during the three years under consideration, 25 were for the protection of animals, dealing with such matters as hunting, fishing, and the trade in fish and game. Between 12 and 13 per cent of the laws were in one or another of the ten fields dealing more strictly with agricultural marketing. Next in order of prominence came laws for assisting in land improvement, the purchase and transfer of farm real estate, and land settlement. These three groups of laws together accounted for about 20 per cent of all laws passed in the interest of agriculture.

Some of the differences in the laws enacted by the five principal groups of states may be of interest. The North Central States have enacted a larger number of laws than have the Northeastern and Far Western States. Enactments have been less numerous in the South Atlantic, and in the South Central States.

There has been considerable emphasis upon land improvement and land settlement in the laws passed in the Far Western and South Atlantic States. The emphasis upon the marketing of foodstuffs and agricultural raw materials has been marked in the Far Western and Northeastern States. Legislation designed to protect game, animals, fish, and so forth, has been relatively prominent among the laws passed in the South Atlantic and Northeastern States. A distribution, according to subject matter, of the laws affecting agriculture (enacted during the years 1927 to 1929, inclusive) is given in table 1.

Table 1. Distribution According to Subject Matter of State Legislation Affecting Agriculture Enacted During the Calendar Years, 1927, 1928 and 1929

	Group of States					
	United States	North-eastern	South Atlantic	North Central	South Central	Far Western
Number of laws enacted	5,582	1,333	976	1,490	490	1,293
Subject matter field	Per cent of laws enacted					
Special census of agriculture, etc	0 6	0 9	0 2	0 9	-	0 3
Marketing of foodstuffs, etc.	12 5	12 8	11 1	11 6	11 4	14 6
Anti-monopoly legislation, etc	6	.3	.9	.6	.8	.5
Regulation of transportation, etc	.7	.8	.2	.7	.4	1 0
Exchanges, markets, etc	1 6	1 1	.2	3.7	3 3	1 6
Taxes on articles of consumption, etc	.3	—	.8	0 3	.2	.1
Taxation of real estate	2 4	3 2	1.6	2 1	1 8	2 9
Taxation of income, etc	8	.5	1 1	2	3 3	.7
Regulation as to special crops, etc	.1	1	—	2	—	1
Control of water courses	5 9	6 7	2 8	5 7	7 3	6 9
Forestry and forest products	3 7	3 7	3 4	5.0	2 0	3 1
Land improvement	8 7	3 4	9 7	9 0	9 8	12.7
Stock breeding	1 5	0.6	1 4	1 1	1.6	3.0
Diseases of animals	3 5	4 0	2 6	3 3	5.3	3 6
Protection of animals, etc	25 08	32 6	37.3	22.3	16 7	14 4
Agricultural organization and training	5 2	4 6	2 4	7 2	11 8	3 3
Provisions for advisory bodies for agriculture	2 6	2 0	2 5	2 2	1 8	4 0
Control of vegetable and animal pests	2 5	1 2	1 8	3.3	1 8	3.6
Agricultural cooperation	0 9	0 8	1 1	0 9	—	1 1
Agricultural insurance	0 4	0 2	—	1 1	—	0 2
Agricultural credit	1 0	0.5	0 8	1 1	1 6	1 4
Methods of purchase and transfer of real estate	6.6	6.5	7.5	7 1	3 1	7 0
Land survey and land registration	2 9	3.6	1.4	1.5	8.2	2 9
Land settlement	6 4	8 4	4 1	6.1	5 7	6 5
Regulation of agricultural tenancy contracts, etc	2 0	0 5	2.7	1 7	1 0	3 7
Regulation of hiring agreements in agriculture, etc	0 3	0 1	0 4	0 3	0 4	0 4
Rural dwellings	0.02	0 1	—	—	—	—
Rural public health	0 4	0 2	0.3	0 5	—	0 5
Policing of country districts	0 5	0.7	1 5	0 1	0.2	0.1
Other topics	0.3	0 1	—	—	0.2	—
Total	100 0	100 0	100 0	100 0	100 0	100 0

The emphasis in the legislation of the last three years is believed to differ somewhat from that which prevailed during the earlier years of the decade under consideration. The later years appar-

ently show more emphasis upon legislation affecting the marketing of general food supplies, grain, vegetable oils, and oil-bearing fruits; on measures regulating rail, water, and truck transportation of plant products, livestock, dairy, and other animal products; on exchanges, markets and chambers of commerce; on real estate taxes, taxes on income and production and on the control of water courses; on land improvement; on the protection of animals, including hunting, fishing and the marketing of game and fish; on methods of purchase and transfer of farm real estate; on the regulation of agricultural tenancy contracts, rents, leases, and so forth; on the regulation of hiring agreements in agriculture and the protection of agricultural workers, and on matters affecting public health in rural districts.

The International Yearbook is, of course, unsatisfactory as a basis for judging the emphasis of the legislation passed during the earlier years of the decade. Many states were omitted from the Yearbook. This may have been only partially the result of efforts on the part of workers in the Institute to apply some basis of selection that may have been thought to bear a relation to the importance of the legislation.

In considering either the volume or the distribution of the subject matter of the legislation, it is necessary to note that many states considered themselves well equipped with agricultural legislation long before the decade now closing. The newer states have in some cases, perhaps, been recently going through legislative stages passed through long before in older states.

In order to obtain some idea as to which of the agricultural administrative and legislative measures enacted during the decade were regarded as important by farm organization leaders in the Grange, the Farm Bureau, and the Farmers' Union; by agricultural college leaders, and by state agricultural officials, the writer resorted to the use of a questionnaire. The pains taken and the courtesies shown by officials in providing the information needed for this paper are such as to call for the writer's appreciation. The object was to ascertain to what extent there might be agreement concerning the importance of the legislation. In formulating the check-list it was found possible to take considerable advantage of the categories developed by the International Institute of Agriculture and used in the index to the International Yearbooks. It is only fair to say that this basis of classification is one which deserves

more widespread attention among agricultural economists inasmuch as it is likely to prove helpful to anyone who wishes to follow in a systematic manner, the subject of state agricultural administration and legislation.

There was naturally a considerable difference of emphasis as between the three groups of replies, even when relating to the same state. The tendency for the educational leaders to refer to regulatory work, which in many cases has been intrusted to the state colleges and experiment stations, and to emphasize the trend toward research in marketing, disease control and so forth, as measures for the minimizing of losses, is one which would naturally have been expected. Farm leaders, on the other hand, placed much more emphasis upon pending legislation, as for example, state income taxes and other adjustments, for which they have doubtless been instrumental in preparing the ground during the past several years. State department officials placed considerable emphasis upon the changes in administrative practice, the impression being that much more thorough-going administration has been a feature of recent years.

All three groups tended to point out that many of the enactments of the last decade and particularly of the past few years, have simply been revisions of, or amendments to, more basic legislation which had been placed upon the statute books at an earlier date. In some respects one gains the impression that the past few years have been characterized by many helpful amendments and by a general tightening of administration.

In general, the replies from the three groups of officials show very clearly the need for a better understanding on the part of all three, as to the whole scope of state efforts in behalf of agriculture. It is not to be wondered at that a state college official should be most conversant with those state laws which have been personally causing him trouble, or at least requiring his repeated attention. It is believed that there is not a single institution in the country that has a chair of agricultural administration and legislation, either attached to its service in agricultural economics and farm management, or otherwise.

Probably the best way to call attention to the achievements in the various states will be to make a brief summary of outstanding measures illustrative of the kind of thing which states have undertaken in the interest of agriculture during the depression.

The New York laws which have attracted attention in other states include several that have a genuine importance such as:

1. The enactment of the two-cent gasoline tax, 20 per cent of the returns going to the counties for highway construction.
2. The provision whereby the state assumes the minimum salary for rural school teachers.
3. The amending of the public health law so far as it relates to the sanitary control and inspection of milk and cream, thereby helping to protect the market for New York State producers.
4. Doubling the amount of state money provided rural counties for the construction of dirt roads and side roads.
5. The appropriations for the establishment of additional forest nurseries and for the beginning of the purchase of land that is submarginal for agriculture, for the purpose of re-forestation.

In New Jersey a Farm Relief Commission was established in 1929 to investigate facilities for marketing within the state. Up to a few days ago no significant action had been taken by this commission.

Pennsylvania has given a great deal of attention to the improvement of the marketing of farm products. The Pennsylvania Bureau of Plant Industry has centered its attention on the control of the European corn borer and the Japanese beetle.

The last legislature in North Carolina increased the state school equalization fund in order to relieve rural taxation. The Governor of North Carolina has a small group known as the Agricultural Advisory Board which considers agricultural problems and makes recommendations to the legislature. This board is not essentially different from the Governor's Agricultural Commission and the Agricultural Advisory Commission of the Legislature of New York.

In Ohio, organized agriculture has recently obtained an order from the Ohio Public Utilities Commission which will provide for securing rural electrification upon a more favorable basis.

In Wisconsin, progressive steps have been taken toward relieving the cut-over lands of much of the tax burden. These lands have been rapidly passing out of the hands of private owners because of forfeiture for non-payment of taxes.

In Illinois, Iowa, and Washington, special attention is being given to revising the tax systems so as to make possible a larger use of state income taxes.

These measures are selected, more or less at random, from New York and some of the other important states which did not wait for the Federal Government to pass all the farm relief laws that might be needed.

SUMMARY BY SELECTED TOPICS

In taking an airplane view of the state agricultural administrative and legislative situation, there are eight points which may be emphasized.

1. States such as New York, Vermont and California, have safeguarded the strength of the rural interests in the state legislatures by assuring that at least one of the two chambers shall be strongly representative of the rural areas. One of the basic problems in state legislation in many states is that of obtaining representation in state legislatures in such a way that the chamber having smaller numbers may represent the less populous portion of the state since the larger house may be assumed to represent the more populous portions.

2. Agricultural advisory boards for service at the state capital, and elsewhere on call, are likely to be useful devices. Such a board should be such as to gain and hold the confidence of all farm organizations. In states in which such boards lack official status as well as in other states, it is frequently advisable for the state farm organizations to have their presentations of evidence and programs so unified as to avoid confusion on the part of legislators. California, Ohio, and Wisconsin are believed to be leading states in the development of unified representation by farm organizations. New York and North Carolina seem to have made effective use recently, of formally organized boards for advising executive and legislative officials. Possibly the Vermont Commission on Country Life serves somewhat the same purpose.

3. State agricultural census enumerations have reached an annual basis in Iowa, Indiana, and several other states. Florida has a five-year census plan by which the state census years fit about midway between the federal quinquennial dates. In many states the census work has been expanded and strengthened in recent years.

There is a widespread need for better agricultural statistics. Tax assessors in some cases can collect basic material correctly. In

Iowa 10 per cent of the salary is deducted if the statistical service is not performed.

4. In the field of land legislation there is not a single state of the Union which provides legislatively for compensation as between landlords and tenants for changes in the residual value of the real estate as a result of special contributions. Compensation for tenant-made improvements left on the termination of tenancy, was contemplated in a bill introduced into the Illinois legislature in 1919. Professor Hibbard testified and the movement promptly subsided.

Laws for facilitating the Torrens plan for land title legislation have found their way upon statute books in a number of states

Land settlement laws have been important in California and in the Lake States. Laws to restrain transactions in farm real estate have had little prominence in this country.

An interesting type of land utilization legislation was enacted in California a few years ago. It provided that when a sufficient number of owners of land suitable to the production of cotton, for example, had agreed upon the variety of cotton preferred by them, other varieties could be excluded from the area in which these growers held the necessary predominance.

5. Marketing legislation has been abundant and of many varieties. Where the public health of the population could be alleged to be at stake, sanitary regulations sometimes take a form that leads to the virtual exclusion of out-of-state products. The New York law does much to hold the market for whole milk and cream for New York producers. Connecticut apparently blazed a path for the edification of New York State farmers.

Standardization and grading, usually along lines promulgated by the United States Bureau of Agricultural Economics, has moved forward rapidly in nearly all of our states. In the horticultural field, maturity standards have been established, some of the most drastic being provided in the Florida citrus fruit legislation of 1929.

State marks and brands have been given much consideration, but in general little application.

Marketing departments and bureaus have been established or extended in nearly all of the states.

Laws facilitating the organization of cooperative marketing associations have been placed upon the statute books of practically all of the states.

6. This is not the place for extended analysis either of the administrative or legislative developments in the field of taxation. Professor Hibbard discussed yesterday the movement to displace general property taxes with income taxes. Only a third of the states have income taxes as yet.

State equalization funds for schools have gained increased headway recently. There is a question as to how far this movement can go in our larger states without endangering local control of schools, a matter of considerable importance in democracies.

Further reference is made to legislation for the construction and maintenance of roads and bridges only for the purpose of pointing out that much of the future trend in state agricultural and legislative policy may develop in relation to the revolution which such improvements are bringing about in our rural life.

In January, 1925, between 2 and 3 per cent of the farms of the United States were located on concrete or brick roads. The mileage of brick, block, sheet asphalt, bituminous, and portland cement concrete roads, has been increasing about one-third every three years. It is possible that about 4 per cent of all farms will be shown to have been located on concrete or brick roads at the time of the 1930 Census. In 1925, 5 per cent of the farms were located on macadam roads. By April, 1930, this percentage may have increased to 6 per cent. Not more than 10 per cent of the farms in the United States face concrete, brick, or macadam roads at the present time. When gravel and chert roads are included, the proportion is increased to about 30 per cent. It would not be surprising if the 1930 Census should show that one-third of the farms in the United States are on some one of these three types of roads. It is obvious that a change in rural transportation is taking place which may go far toward remaking the economic and social pattern of our rural life.

The first problem is that of getting service from custom operators of trucks and buses for farms and farm homes, that will afford economically sound transportation and fit our rural needs. In the case of bus service, the fact that much of it is interstate and therefore comes under the jurisdiction of the Interstate Commerce Commission has already led to a measure of public control and a systematic development of services and charges which may justify giving them little attention in this discussion.

The case of trucks, however, cannot be dismissed so easily. It

is certain that the truck already occupies an important position in bringing about a rapid and convenient movement of products directly from farms to points of ultimate consumption in the case of fruits, vegetables, milk, cream and other perishable farm products, and in bringing livestock to stockyard cities. The extent to which local shipping points are thus circumvented, and in some cases the chain of responsibility between producer and urban buyer weakened, is deserving of closer attention than it has generally received from students of rural-urban problems. When peaches, for example, are taken a hundred miles or more by truck operators who, for the time being, become transient traders, sometimes merchandising the product from house to house, it is clear that the householders may receive the product with inadequate warranty as to quality and condition. Again, when livestock is taken long distances to terminal markets by truck, the attitude of the driver toward cooperative and other commission agencies may too often determine the choice of such agencies, rather than the wishes of the farmer or farmers whose products are included in the load. The result in many cases has been to break down local cooperative shipping associations without a corresponding transfer of patronage to the terminal cooperative commission agencies.

In spite of some increase in stability, the rates charged by truck operators must still be characterized as irregular and at times are so highly competitive as to give indications that at least a part of the operators are not fully aware of their total costs.

Speaking figuratively, the trucks have brought into land transportation some of the features of marine transportation, so that while there may be some semblance of organization for "liner" service the more dominant characteristic is "tramp" service. It is possible that the liner characteristic will have to come into truck transportation in somewhat the same way that air and bus transportation is being developed by railways in some instances, that is to say, by coordination and integration. An approach in this direction is being made by some of the railroads of the United Kingdom. Isolated efforts of intra-state railways have been made in some of the states.

Among the possible features in the new pattern of rural community organization is the substitution of state district action for county action. A state like Illinois does not need a county for every 560 square miles, or at least does not need a full panoply

of county functions at every county seat. Western states with their larger counties did well to anticipate the coming of motorization and good roads. The pressure for lower taxes may find an outlet either in the merging of counties or in the transfer of functions such as jailing, to state district centers.

The codification of the whole body of agricultural legislation, state by state, seems to be in the interests of progress. Probably not more than four or five states have undertaken the molding of an agricultural code. It is difficult for one to review the annual deposit of new legislation, however, without feeling that an effort to systematize legislation within states, and, in the case of some problems, to develop more uniformity between the states, would not only benefit agriculture but would also improve the results to be had from the application of administrative and legislative energy, to the whole group of state problems.

Cooperation between the states is one of the problems likely to be more pressing in the near future. One instance of cooperative action among states is the effort made to acquaint the growers of potatoes in the southern end of Maryland, in conjunction with those of the states of Virginia, North Carolina, and South Carolina, with the possibility of reducing acreage so as not to cause an over-production. An interstate potato committee was formed in the fall of 1928. There was a definite movement to include all factors in the situation—growers, fertilizer companies, interested bankers, buyers, and so forth—with a view to placing economic facts before them and urging an intelligent handling of the crop so as to prevent the very severe losses that were suffered in 1928. This has proved very helpful, although it cannot be said that all of the reduction in acreage was obtained in 1930 that was desirable for the good of the industry.

The states, acting as 48 laboratories for the framing and trying out of various legislative patterns, gives this country some advantages and some disadvantages compared with some other countries where the central government is looked to more exclusively. State experience can often be profitably used in drafting federal laws, as in the adoption of quarantine and other regulations affecting the marketing of agricultural products, and the purchasing of such commodities as seed, feed, and fertilizers. In general, there is need for more uniform legislation in the control of such commodities as the above.

On the other hand, federal legislation might be much more effective in some fields if there were some readjustment of jurisdiction between the state and federal governments in the direction of the latter. This can be illustrated by a legislative proposal given consideration by the Mississippi State Senate early in 1930. It provided penalties for planting more than 60 per cent of any separately owned tract to cotton, but left it to the Government to determine whether or not other states, which produced ten million bales of cotton in the aggregate, had similar legislation, before making the penalties effective in Mississippi. A member of the Senate writes that the legislation was regarded as a gesture that would have an educational value. The thought was to indicate that the matter of acreage control might be taken up as a legislative and executive matter by some or possibly all of the important cotton producing states. Possibly this points in the direction of treaties between the states on the matter of the reduction of acreage of certain crops, just as treaties between the states have touched upon such problems as the Colorado River improvement, and the Boulder Dam project.

In rare instances, the power of the federal government to make treaties with other countries has provided a basis for preserving, if not exactly uniform state patterns, at least uniform minima in some essential points. In a period in which amendments to the Federal Constitution may be difficult to obtain, it would seem that there might be a special advantage in exercising the international treaty-making power on problems such as restraint of land settlement, abstinence from expansion along certain lines of production, and even reduction of acreage in the case of certain crops. Uniform state action within the United States would run parallel with uniform action within a whole group of countries whose adherence to any such plan is a prime requisite to preventing undue depression in prices of products that have world markets and are subject to excessive expansion.

It may be noted that any attempt on the part of our federal government to use coercive authority in directing the utilization of farm real estate in the various states would be beyond the pale of acceptable constitutional authority without either a special constitutional amendment or a treaty. Anyone who would expect the United States Senate to ratify an international treaty on acreage control, unless it included countries producing nearly all of

the remainder of the world's export surplus, would be an optimist indeed. To expect that body to support a constitutional amendment which would transfer to the federal government power to invade the jurisdiction of the several states, without some reservation that the federal government must confine its use of such jurisdiction to land uses affecting supplies of products made the object of a practically universal parallel control in other countries, is no less optimistic. A universal equalization fee or other arrangement for levying an administrative check-off or even penalizing a failure to keep crop plantings, or harvestings, or animal breedings, within agreed limits, may come eventually. The system of jurisprudence in the United States is proof against the coming into this country of coercive control of production until a treaty brings it, and for all practical purposes, that means a treaty binding not merely one other country, but enough other countries to make patent to a majority of the representatives of the states, as they sit in the United States Senate, that the project is as promising of beneficial results to our farmers, as a result of the restraints upon farmers in other countries, as restraints upon our farmers would be to producers elsewhere.

Efforts to reduce the volume of production of the United States are, of course, legal, if voluntary on the part of our individual farmers. There is no chance for them to become other than voluntary except as farmers of other countries likewise become subject to a coercive procedure. When the project for simultaneous universal treaty action is ready, however, our frame of government is of such shape as to permit this country to carry out its share in such negotiations. Until that time, and possibly even after that, the 48 American states stand secure in their sovereignty over the farm property within their borders.

In the meantime, the Conference of Governors, committees of the American Bar Association, and other agencies, must be depended upon to open the way to more uniform state legislation affecting agriculture. The pattern value of federal acts is not acknowledged in the states in any automatic way. There is both legal fact and psychological force in the independence of the states in real estate matters.

CONCLUSIONS

The disappearance of efforts on the part of the International Institute of Agriculture to follow the enactments of the various states of our Union might properly be followed by some special efforts on the part of our federal government to institute on a broad basis studies in comparative state agricultural administration and legislation. There might logically be established in Washington, possibly in connection with the Bureau of Agricultural Economics, a clearing-house where studies in this field would be fostered. The studies of state marketing laws, now under way in the Bureau of Agricultural Economics, might be regarded as an entering wedge in this development. The results should be made available to any and all persons needing them in this country or abroad.

It may be said that the states are not generally to be criticized for their failure to undertake individually to modify the supply of staple products entering the world's markets. They have been generally wise in concentrating their legislative efforts upon products having more localized markets, upon the improvement of quality, upon minimizing losses through the protection of plants and animals, and in general upon these lines lacking somewhat in the colorful characteristics that make the front page of the daily papers. Nevertheless, during the past decade, there has been a marked toning up, a new economic interest and impulse, actuating this activity.

Much is to be learned by interchange of experience. Significant beginnings have been made. A more systematic understanding of the problems is needed.

AGRICULTURAL AND SOCIAL LEGISLATION IN NEW ZEALAND

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FOR a small country—and partly, no doubt, because it is a small country—New Zealand is marked by an exceptionally wide range of governmental interference in economic and social affairs. Today we are less entitled than we were thirty odd years ago to be characterised as a laboratory for social experiment; and anyway as a practical and thoroughly English people we would scornfully repudiate any such rôle. Quite fitting is the title chosen by M. Albert Metin, "Le Socialisme sans Doctrines."

New Zealand's total area is 66 million acres, of which 44 million acres are occupied as farms. The population is 1,400,000 (forty-eight per cent rural). The number of farms is 85,000, with an average area of 508 acres; forty-seven per cent of the farms are of less than 101 acres. Dairy cows number 1,300,000; sheep, 29,000,000. The expanding volume of exports is summarized in table 1.

GOVERNMENT ECONOMIC ENTERPRISES

Railways were constructed and are operated by the State. They are probably generally regarded as the least successful public enterprise in the country, for, although current revenue exceeds expenditure, the balance is now inadequate to meet interest on capital costs. Weight must, however, be given to the fact that many lines were constructed to develop the country, with no expectation that they

Table 1. Annual Exports of Butter, Cheese, Frozen Meats, and Wool from New Zealand, 1908, 1918, and 1928

Year	Exports			
	Butter (hundredweight)	*Cheese (hundredweight)*	*Frozen meat (hundredweight)*	*Wool (millions of pounds)*
1908	230,000	280,000	2,120,000	162
1918	431,000	883,000	2,037,000	109
1928	1,449,000	1,567,000	3,794,000	227
Per cent exported to Great Britain. .	80	99	92	68

would pay in the strictly accounting sense. Moreover, railway rates were habitually scaled down until revenue merely balanced outgoings. By contrast, privately-operated lines, charging "what the traffic would bear", would have had a wider margin of profit to meet the hard times that have everywhere struck railways, and it is unfair now to reproach the State enterprise for failing to measure up to the standards of private profit-making industry. There is no reason to believe that private administration would serve the country better than the State monopoly. On the contrary, the duplication of lines by competing concerns would be a wasteful extravagance. Judging by much American experience, too, it seems in many ways easier for the government to undertake direct responsibility for public utilities than to struggle endlessly with the problem of regulating them.

Telegraph and telephones, as well as the post office, are also government monopolies.

Hydro-electricity is also being developed as a State monopoly, and with conspicuous success. Power is generated in government plants; unified control gives valuable economies, the plants being linked together so that surplus energy from one will be available to supplement the others. In urban areas, retail distribution is undertaken by the existing municipalities; in rural districts, *ad hoc* bodies are elected by the consumers. At no stage does any element of private profit enter into the provision of electric power.

Coal mines, as a State enterprise, arose from the government's need of fuel for its own railways. They also now supply the general public.

The Public Trust Office, caring for many of the functions commonly left to lawyers—notably the lucrative business of estate administration—is one of the most important and successful State enterprises in New Zealand. Established in 1872, it became self-supporting in 1874. In the past twenty years, estates under its administration have increased sevenfold to £50,000,000. The Public Trustee, a civil servant, is thus responsible for the conduct of such varied types of business as a brewery, many farms, and a jam-factory. The office pays land tax and income tax at normal rates, as for a commercial enterprise; furthermore, one-half of the net profit is now transferred to the ordinary revenue of the government.

In the field of insurance, the government offers life, fire, and

accident insurance. Proprietary and mutual concerns have found it by no means impossible to survive this State competition; but the value of the government's intervention in the insurance field is clearly evident.

Forestry is undertaken by the New Zealand government on a fairly substantial scale, but not in any manner that calls for special comment.

LAND SETTLEMENT

Since the early 1890's, land settlement has been fostered by the government through compulsory acquisition and subdivision, and through graduated taxation. The bulk of the land had already become private property, though substantial areas were still vested in the State. The policy of the Liberal-Labour government—in office from 1890 to 1912—was to retain public ownership, with long or "perpetual" leases to individuals. But this policy did not survive the desire of tenants to obtain the unqualified freehold, a demand due in part to the greater sense of security thereby conferred, but chiefly to the fact that it facilitated land speculation during a period of rising values. The transfer of land has been simplified (though not correspondingly cheapened) by the well-known Torrens system.

LOANS ON MORTGAGE TO SETTLERS AND WORKERS

Loans on mortgage are made directly by the government to the borrower without the intervention of credit-associations. In part, the scheme originated in the peculiar land-tenures mentioned above, which called for credit facilities to a type of borrower who stood beyond the scope of existing lending institutions. Loans to city workers on the security of houses now extend to 95 per cent of the construction cost; yet losses on realisation have been but one-twentieth of one per cent of the aggregate loans to date. Intermediate credit is likewise granted directly by the government to borrowers, and the machinery of the Public Trust office is used in its administration.

INDUSTRIAL ARBITRATION

Since 1894, industrial disputes in New Zealand have been settled by governmental conciliation and arbitration. For ten years the country was completely free from strikes. The ensuing period has seen a fair number of stoppages; but broadly speaking, the scheme

has succeeded in enabling necessary adjustments to be made with much less hardship than would otherwise have been probable. An attempt was lately made, though quite unsuccessfully, to make of industrial arbitration a scapegoat for farmers' post-war difficulties. Of necessity, the State's intervention in this sphere has obliged it, through the Arbitration Court, to prescribe in minute detail the conditions of employment.

COMPULSORY COOPERATION IN AGRICULTURAL EXPORTS

New Zealand farmers shared in the general post-war depression, and their satisfactory experience in war-time controls led them to demand some form of unified control in peacetime. Control boards have therefore been set up for all important exports except wool. Typically, these boards are elected by producers, with a minority added by the government and commercial interests. They are given extraordinary powers, even to the extent of prohibiting the export of New Zealand farm produce by any agency other than themselves. The Dairy Control Board alone exercised this full power, and with unhappy results. It encountered opposition on the part of London importers to which it was unequal; the market was weak owing to the general strike and the prolonged lock-out of British miners (1926); and the Board was torn by internal dissensions in a manner sufficient to wreck any chance it ever had of succeeding in its ambitious plan. The Board was forced to abandon absolute control. But the Dairy Board, like the other produce boards, has continued to function and has yielded good economies to producers, without any evidence of injury to consumers.

PENSIONS

Pensions have been granted aged persons since 1898 (to men at 65; women at 60). They are non-contributory, being financed wholly by general taxation. Pensions for widows with dependent children have been provided by the State since 1912. These measures, strenuously opposed at their commencement, have long ceased to be matters of controversy.

FAMILY ALLOWANCES

Family allowances have been paid from ordinary government funds since 1926. Where the family income falls short of £4

per week, the sum of 2 shillings a week is paid to the mother for her third and each later child.

UNEMPLOYMENT RELIEF

Hitherto, unemployment relief has taken the form of public constructional works, government labour exchanges, and where necessary, charitable relief by local authorities. A novel plan has been enacted this year (1930), with the creation of an Employment Board and an Unemployment and Sustenance Fund. All employed men are to contribute £1 10 shillings per annum, and additional money will be raised by taxation. Employers, as such, will not contribute. Relief to the workless will be at the rate of £1 1 shilling per week for adult men, with less for minors and more for family men. The Board is vested with powers designed to regulate employment.

EDUCATION

Education in New Zealand is financed in an unusual manner, with particularly valuable results so far as rural schools are concerned. The full cost of elementary schools is provided by the general government. There is a nation-wide scale of teachers' salaries and extra compensation is paid to teachers in remote districts. Hence, country children have educational opportunities more nearly approaching those of city children than one commonly observes abroad.

THE WELLINGTON MILK-DISTRIBUTION MONOPOLY

In the capital city of Wellington (population, 105,000) the legislature has granted the municipality a monopoly in the retail distribution of fresh milk. Private vendors may operate only in so far as licensed by the municipality. The margin between consumers' costs and producers' receipts has been narrowed; the quality of milk has been immeasurably improved; and the experiment in municipal socialism is an undisputed success.

CONCLUSION

Inevitably, the most conflicting deductions are drawn from New Zealand's wide experience in State socialism. People who are disposed to be friendly are entitled to emphasise that economic and

social conditions have improved, either because of, or in spite of, State interference. The per capita wealth of the Dominion is calculated to exceed that of all other countries except the United States, and for equitable distribution of wealth New Zealand is nowhere surpassed. The death-rate is the lowest in the world, and infantile mortality is just half as severe as among the white population of the United States.

Certainly our experience has shown in its own small way that an entry by the government into new fields leads almost inevitably to more and more interference with the "natural order". We have State railways, therefore coal mines; a new land tenure, therefore government loans on mortgage; the State sets out to reduce strikes and finds itself regulating in detail the conditions of industry. It is notorious, too, that these experiments, however vigorously condemned at their commencement, have been quickly accepted as normal, even by their political opponents. These politicians, indeed, when translated from the Opposition to the Treasury benches, have continued and often extended the range of government enterprise. Such an evolution is no doubt capable of more than one explanation: it may be held to prove that the new State functions have been vindicated by experience, and that governments, whatever their political philosophy, would court electoral disaster by sincerely applying the principle of "Less government in business"; or conversely, some may argue that New Zealand's new State functions have been of the nature of drugs; and that the people, their fibre weakened by excessive maternalism of the State, cannot now stand on their own feet. Personally, I prefer the former view. I think that most criticism concerning the inevitable incompetence of the government to regulate social and economic affairs is based upon notions that were valid enough a century ago; but since then the technique of public administration has improved out of recognition. Certainly it has improved relative to the efficiency of private competitive industry.

It is probably true (this in answer to a question) that industrial development has in a sense been retarded by the State regulation outlined above. No doubt a full-blooded American industrialist would find his way annoyingly harassed by "socialistic nonsense"; and "efficiency", in a very narrow sense, would thus be checked. Yet the same truth might perhaps be expressed, with a slightly different emphasis, by saying that through the liberal assertion of

public rights, New Zealand has happily been saved from some of those more ruthless manifestations of man's acquisitive instinct that one sees in, say, North Carolina.

Insofar as State socialism has succeeded in New Zealand, and I conclude it has, on a balance, very definitely succeeded, this has been largely due to honest and efficient administration. We are the fortunate inheritors of the British political system, uniting executive, administrative, and legislative functions in a manner conducive to effective action And, since 1912, the Civil Service has been so far removed from politics that neither technicians nor heads of departments surrender their office on a change of government. The Civil Service Commission plan of personnel control is one of the most valuable features of the public life of New Zealand. This is perhaps an administrative detail. But then the success or failure of government action cannot be judged by *a priori* theories; the problem resolves itself simply into a question of good or bad administration.

DOCTRINES RELATING TO AGRICULTURAL POLICY FOR THE UNITED STATES

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IT IS ONLY with some embarrassment that a citizen of the United States can talk to an audience with other countries represented in it, on the subject of the agricultural policy of his country, for it is only within the last eight or ten years that anything even approaching a definite, fairly consistent, agricultural policy has begun to shape itself. The nature of this policy which now seems to be evolving will constitute the final subject for discussion in this paper; but the topic which has been assigned me will not be adequately discussed unless presentation is also made of the various lines of thought that have preceded this evolving policy, and which even now are contending with it for control of the agricultural program. The general procedure in this paper will be to take up and discuss briefly in roughly historical order the more important of the different doctrines relating to agricultural policy, that have been held by our people.

DOCTRINE AS TO RATE OF DEVELOPMENT

The doctrine of oldest standing in our agricultural history is that our agricultural resources should be fully developed as soon as possible. A large number of vigorous positive measures that accord with this doctrine can easily be named—in the early days, the sale of land in tracts to land companies; later on, the homestead policy; grants of land to railroads; grants of land for schools; free immigration; the financing of irrigation projects; the Volstead drainage land act; numerous state provisions for setting up drainage or irrigation districts and selling improvement bonds; setting up state immigration departments, and so forth. And until a few years ago, it would have been hard indeed to have found in the statute books of the federal government or of any state, any measures designed to check or to restrict this vigorous program of getting the land of the nation into farms as rapidly as possible.

Early in the century, this theory was questioned seriously by the conservationists, who saw that in practice it resulted in the exploitation of the virgin soil resources of the newer areas and an accompanying abandonment of exhausted soils in the East. They argued

that systems of farming that maintain soil fertility should be developed in the older regions before new areas should be opened to farming. It is clear that our procedure in this matter has been parallel with our procedure in respect to forests and minerals. We have in general used the richest and most available of these as rapidly as any market has been found that would yield a net return above the cost of exploitation, letting future generations provide their own timber, fuel and metals. So also with soil fertility and agricultural products. It seems reasonable to believe that the time will come when failing supplies of all of these will raise costs and prices, and that our descendants will curse us for our selfishness and thoughtlessness. And yet we cannot be too sure about this. The professional conservationists are inclined to magnify the future too much at the expense of the present.

Recently the program of rapid development has been opposed by the United States Department of Agriculture and agricultural economists generally, on the ground that we have more land in farms now than can be profitably operated, and that we should call a halt till the population catches up with the food supply. The United States Department of Interior gives only half-hearted assent to the position of its sister department, taking the position that much land not in farms now is better farming land than some which is, and also that the present is a good time for getting more land ready for the day not far distant when food prices will rise again. It must be conceded that farm incomes are very far from being level in the various parts of the United States; and not until they are level will our agricultural resources be in properly balanced use. But one may question whether the way to level them is to bring more land into use at the present time. In general the procedure should be more in the direction of getting poor land out of crops.

Needless to state, the point of view of the local residents nearly always is that all local land resources should be developed; and their political representatives so vote in Congress and in the state legislatures.

DOCTRINE AS TO CONTROL OF DEVELOPMENT

Also from the beginning until very recently, the accepted doctrine has been that of almost unlimited individualistic exploitation of our agricultural resources. Our homestead policy was an em-

bodiment of this. Give a man 160 acres of land to do with as he would so long as he farmed it Likewise give land companies and real estate agencies a free hand. This program was approved partly as an inducement to settlement and partly because of belief in *laissez faire*. The excesses arising from permitting uncontrolled exploitation of mines and forests have already led to some restrictive legislation, to government ownership and leasing, and even to government operation of forests. They are not likely to do so with ordinary farm land; but control of grazing in the West seems to be highly necessary. Such control measures usually meet with vigorous opposition The American doctrine as to prosperity runs instead, along the lines recently indicated by Ambassador Gerard, who told a British audience that the way to solve their problems was to give a group of their leading men a free hand with the nation's resources and industries, and then later followed this with a list of fifty of our richest Americans and captains of industry, who, he said, really govern us, saying that if these fifty men could be given right-of-way with our resources for fifty years, we would be a far richer nation than at present. Most of us would add, I am sure, that another fifty years of control in the interests of the real public could not half undo all the damage that would be done in the first fifty years.

DOCTRINE AS TO LAND UTILIZATION

Again it has been an accepted theory until very recently, that "farms follow forests"—that land should be cleared of stumps and converted into agricultural use as fast as the timber is cut. It is not difficult to understand how such a theory developed in the long years when our pioneer farmers were wrestling with trees and stumps in the forested eastern half of the United States. Slowly within the past fifty years certain alternative ideas have developed such as that the nation must have a timber supply as well as a food supply, and that some of the land may return more in growing trees than in growing food. When the change first came, the accepted point of view was that certain land was too poor to grow farm crops, and therefore had to be used for such tree crops as could be grown on it. Today the point of view of the leading thinkers on this subject is rather that the application of the principles of comparative advantage should govern—some fairly good farm land may some day yield even more in tree crops; and some rather poor

forest land may be worth more for grazing, or even for producing certain types of food crops. The relative demands for the particular kinds of timber and food will determine which use will prove more advantageous.

But although the latter may be the accepted view of the leaders of thought, it is seldom that of the local residents in the recently logged-off areas who mostly oppose putting land into forest use, thinking that farming will support a larger population. In the eastern states, however, in sections where farming has been tried out and is being abandoned, the local residents will be found inclining much more to forest uses.

If time permitted, it would be interesting to go into detail with respect to forest policy itself, concerning which a wide range of theories exist, as to public *versus* private ownership, as to taxation of forest products, as to the degree of intensity which is economical, as to systems of forestry, and so forth.

DOCTRINES AS TO POPULATION AND LAND SUPPLY

For logical rather than chronological reasons, we should introduce at this point the body of theory relating to population increase and land supply. The United States Department of Agriculture has made much use of a certain doctrine on this subject in recent years, in support of its position that no further land development should be encouraged at present. Its general argument, as most often stated by Dr. O. E. Baker, runs about as follows: Our national population increase is slackening at such a rate that we shall have no further increase beyond 160,000,000 (the estimates range from 150,000,000 to 225,000,000); and this increase will be fed and clothed with very little more land in crops and pasture than we have in such uses at present. The opposing argument is to the effect that changes already under way in American agriculture in the direction of the use of more power and more fertilizer, more legumes, and more livestock per acre, are going to give us a greatly increased output per acre on much of our land, and a considerably increased output per man; that some of these changes will at the same time make it possible to farm profitably much land that cannot now be so farmed; and that in consequence of the above we shall have much more land in crops and pasture than at present as soon as the population of the earth provides consumption for the product; and as for the population itself, it will not come to a stand-

still as indicated, but will expand as during the industrial Revolution, although at a much slower rate, because scales of living have much more power over the birth-rate now than then. Probably the truth is between these extreme positions, but somewhat more nearly toward the latter. It will be apparent that the latter theory strengthens the position of the United States Department of Agriculture with respect to further land development at present.

DOCTRINE AS TO THE PLACE OF AGRICULTURE IN THE NATIONAL ECONOMY

While our national policy has long been to develop our land resources, it has been even more to develop our industries, as evidenced by the fact that tariff duties have been freely employed to subsidize industry at the expense of agriculture. While this was done more or less surreptitiously at the start, today the industrial group has obtained such control of our political parties and Congress that they do it boldly and brazenly. In the beginning, the argument was freely used that the nation was underdeveloped industrially. It can safely be stated that the real opinion of the industrial groups at present is that we still do not have industry enough. When Mr. Grundy in his testimony before the Committee on lobbying designated as "backward" those states which are still predominantly agricultural, he has no doubt expressed the view of his class. On the other hand, many of our agricultural leaders deplore the fact that farming has declined until it represents less than a fifth of the nation's activity, and would be willing to resort to measures as uneconomical as the tariff to restore it to a fourth or even a third of the nation's activity. The position which most economists take is that the nation should have only as much agriculture as can in the future stand on its own feet, in competition with industry, also standing on its own feet without tariff subsidies. On this basis, industry would still expand, especially in the South, Mid-west and West. The nation's industry is still poorly distributed territorially, even more so than its agriculture. But the relative rate of expansion of industry and agriculture would be noticeably different in the next fifty and in the next one hundred years if a general policy of no permanent subsidy for either of them could be substituted for the present policy. More than this, there is a body of opinion in this country in favor of the position that a considerable proportion of agriculture in a nation has values for

it of such importance that a small amount of agricultural subsidy is warranted on social grounds. Their arguments take on more significance as we discover that the country must now be depended upon to supply the cities with all of their future increase in population.

If the country were largely agricultural, the foregoing arguments would mostly run the other way. But, the subject is a large one, with many significant implications to which not even reference can here be made. Foreign students will find them best discussed from our point of view in Sorokin and Zimmerman's "Rural-Urban Sociology."

DOCTRINE AS TO CONFLICT OF RURAL AND URBAN CLASSES

Many leaders of thought on the agricultural problem hold the opinion that the farming classes are more or less held in subjection to the urban classes. This point of view had vigorous expression about 1903 by J. A. Everett, founder of the "American Society of Equity," in his farm journal and finally in his book called "The Third Power." Organized capital and organized labor were the other two powers. These controlled the prices at which farmers must sell their products. Farmers must sell at prices named by the middlemen. The manufacturer names the price at which he sells; the farmer does not. This set of ideas was given a new life and a new setting in the Northwest by the Non-Partisan League, from 1917 on. With the spread of agricultural calamity to the Corn Belt and the South following the war, a closely related doctrine took form in a large part of the farming territory of the nation. The center of attack in Equity and Non-Partisan League days was the middleman. In the McNary-Haugen days, it was mostly the tariff. The manufacturing and commercial East opposed extending the tariff subsidy to agriculture through such devices as the McNary-Haugen and the export debenture proposals. Dr. H. C Taylor, who became a convert to this philosophy as a result of his experience as Chief of the Bureau of Agricultural Economics in the commercially and industrially controlled Coolidge Administration, has given it a fuller and broader statement in his recent discussions, such as the one before this Conference last year, placing more emphasis upon the growth of monopolistic control subversive to agriculture. A milder statement of this philosophy might be stated in terms of institutional developments, traditional reactions

and valuations, as a result of which, farm people customarily sell their services too cheaply.

This doctrine becomes especially interesting when connected with the devices proposed for remedying the situation. The Non-Partisan League program was state ownership and operation of middleman facilities The McNary-Haugen program was artificial price-raising by governmental action.

DOCTRINE OF AGRICULTURAL SELF-SUFFICIENCY

We now come to the set of doctrines upon which the Republican party has been basing the proposals for farm relief. The most conspicuous of these is that of national agricultural self-sufficiency, placing tariff duties on those products of which we have a deficit, until production is expanded somewhere nearly to the export point, and contracting production for export, until we no longer have an export surplus. This doctrine has long been held in some measure. One of the early secretaries of agriculture (then called commissioners) published a long list of agricultural products which we were then importing, which he said we might just as well be producing for ourselves. In the list were included tea, silk and rubber Large appropriations were made over a period of forty years to establish the tea industry in the United States. Even after 1900, Secretary of Agriculture Wilson was asking for funds to continue the tea-growing demonstrations. We are still nursing along our sugar industry with tariff duties representing over half the import price. Only within the last decade, however, has the doctrine been advanced in its stark nakedness. President Coolidge's agricultural conference held in the winter of 1924-25 adopted it as one of its two principal recommendations. Following this conference, Director R. W. Thatcher, then of this state of New York, one of the members of the conference, issued a press release from the Cornell Experiment Station, urging this doctrine of agricultural self-sufficiency upon the farmers of his state and of the nation. Candidate Hoover talked the doctrine in his campaign addresses. The Federal Farm Board has been attempting to put it into practice. But the reactions from the wheat growers have been such that the Republican administration has apparently become alarmed over the possible loss of votes. At any rate, the recent utterances of Board members have soft-pedaled the idea of eliminating the wheat export so as to make the tariff effective. The position which the

farmers have taken is that they have as much a right to produce wheat for sale in the world's markets as have the manufacturers to produce for export. The defenders of the McNary-Haugen and export debenture plans have repeatedly taken the same position They have charged the administration with wanting to curtail agriculture and expand manufacturing at its expense. It would appear that now that the doctrine of national agricultural self-sufficiency has been brought out into the open, it will be vigorously assaulted

DOCTRINE OF LARGE-SCALE MERCHANDIZING

The other doctrine that was advanced by President Coolidge's agricultural conference was to the effect that large nation-wide marketing organizations set up on a commodity basis, employing the methods developed in large-scale industry and commerce, and manned by high-powered executives, could solve the agricultural problem through orderly marketing, and production coordinated with the marketing. The first expression of this idea was in the Capper-Williams bill which Secretary of Commerce Hoover assisted in framing. Secretary of Agriculture Jardine preached along these lines throughout the second Coolidge Administration. Candidate Hoover offered it as his program of farm relief during his campaign. President Hoover had it incorporated in the Agricultural Marketing Act. The Federal Farm Board has been trying to put it into practice—with rather indifferent success so far. No doubt Mr. Aaron Sapiro must be given considerable credit for selling this idea to the parties above mentioned. It is of course an idea borrowed from big business in industry, particularly from combination in the field of big business. But a considerable factor in it is President Hoover's faith in the power of accomplishment of a super-administrator—a faith no doubt derived from his experience as an engineer, and in the Food Administration, as much as from big business. In a large engineering enterprise, the executive power is nearly supreme over materials and labor. There was even more excessive centralization of power in the Food Administration. But the units in a commodity marketing organization have no thought of surrendering all their rights to a central executive body. What is more important, the farmer members of the cooperative units are very much indisposed to surrender all their freedom of action to produce and sell as they see fit. The theory as to the power of accomplishment of super-administration

is therefore being severely jolted when tested out in the field of marketing and production of farm products, as it has also been when applied to such problems as unemployment and business depression. The President in consequence seems to have given himself the ridiculous character of a Don Quixote tilting at giant windmills with a cardboard lance.

DOCTRINE OF SELF-ADJUSTMENT

It would be a mistake to think that the two foregoing doctrines with respect to agricultural betterment, especially the second one, are acceptable to the rank and file of the industrialists and commercialists. As a matter of fact, except for a few of the more nationally-minded of them, the position is taken that the farmers will have to work out their own problems according to the inexorable laws of supply and demand. The urban press these days is full of utterances in which this moral is drawn from the experiences of the Federal Farm Board. In a milder form, this doctrine is adhered to by some of our agricultural economists. At least they go so far as to say that each farmer must figure out his own way of salvation for himself and that all any of us can do for him is to supply him with the established facts as to supply and demand. Needless to state, few economists ascribe to the law of demand and supply the high degree of inexorableness which is ascribed to it by middlemen particularly, but also by the industrialists. Instead they look upon supply and demand as things to be adjusted. As a matter of fact, so do these very middlemen and manufacturers when they come to considering their own problems.

DOCTRINE OF ASSISTED ADJUSTMENT

We have now come to the set of ideas about agricultural betterment which is furnishing the outlines for the national agricultural policy which now seems to be evolving. In my book on "Agricultural Reform in the United States," I have called this doctrine "Assisted Laissez Faire" (Ch. XIII). The essence of it is that the individual farm is too small a unit to be able to work out its own problems and make its own adjustments to changing economic conditions, without a great deal of assistance of various sorts from public agencies. Cooperatives should furnish this assistance in place of public agencies wherever this is possible; but it is apparent

that our existing cooperatives need assistance almost as much as do the individual farmers. The evolution which is taking place is with respect to the form this assistance shall take, the extent of it, and the machinery for supplying it.

It would be an error to present this doctrine as wholly new. As a matter of fact, the most essential feature of it was accepted when the state agricultural experiment stations and the United States Department of Agriculture were established. But the assistance in mind in those days was almost entirely along lines of disease and pest control, introduction of new varieties, and research in the field of natural sciences; whereas the new policy relates particularly to economic adjustments. Before 1900, there is little in the annual reports of the commissioners and secretaries of agriculture to indicate any interest in assisting farmers with their economic adjustments. Between 1900 and 1920, a little headway was made in this direction. In particular, the crop and livestock reporting service was developed considerably, the Office of Farm Management was set up in the United States Department of Agriculture, and later the Bureau of Markets, and the Federal Farm Loan Act was passed. In addition, a majority of the state experiment stations did some economic research. But in historical perspective, the efforts of these years now appear not to have grappled very closely with the problem. Farm management, for example, was busy collecting descriptive facts about farming, either by the survey or the route method, and trying, as do all new sciences, to establish some new principles of its own different from those of economics, instead of developing a technique for assisting agriculture in the large with its economic adjustments. To be sure certain suggestions as to size of business, the importance of yield per acre, and the like were commonly made, but these made little impression upon the rapidly changing times.

The date for the inception of a real policy of assistance to farmers in their economic adjustments was the creation of the Bureau of Agricultural Economics, with Dr. H. C. Taylor in charge, in the first year of the secretaryship of Henry C. Wallace, and more particularly the spring of 1922, when Dr. Taylor and Secretary Wallace got together and agreed upon the preparation of the first agricultural outlook report. Most of the evolution of policy since has centered around the growth and development of the outlook service in the United States Department of Agriculture and in the

several states Some of you will recall my discussion of the doctrine relating to this in a paper before the American Farm Economic Association in December, 1924, under the title "The Rôle of Public Agencies in the Internal Readjustments of the Farm."

In my few remaining pages, I propose to say a little as to what this policy means in the several fields of economics—production, consumption, marketing, land utilization, and so forth.

Clearly, many important changes are rapidly taking place in the organization of our agricultural production. Production programs have been particularly in turmoil since the World War. They are likely to be in turmoil during the next fifty years. A new phase of the agricultural revolution is now under way. The new policy calls for assembling all the facts possible as to current production and consumption of farm products in the United States and foreign countries, as to trends in the same, and as to past developments leading up to the present situation, then analyzing and preparing the best possible statement as to the conditions which our producers are likely to meet in the coming year, and in most cases, for some years in advance; and then making suggestions as to what production adjustments are likely to fit in best with these conditions. The United States Department of Agriculture can do this only in a general way. Each state needs to fit these suggestions into the special conditions prevailing in its various parts. The county agents need to interpret them in terms of conditions in various parts of their counties, and finally render all the help they can to individual farmers, or more often to groups of them operating under similar conditions.

There is, of course, much difference of opinion as to how specific the public agencies should be in their suggestions. Some, as above stated, believe in a very mild form of assistance, merely supplying general facts and letting the individual farmer figure out his own application of them. Others would go so far as to make definite recommendations, on the theory that most farmers are not yet able to make their own applications, and those who are, will be able to adapt the suggestions to their own farms. The actual outlook work steers between these extremes. It is obvious that different grades and types of farmers need different forms of assistance.

One of the most outstanding results of this new program is its effect upon the research program of the United States Department

of Agriculture. The efforts to prepare outlook reports have revealed the inadequacy of the old types of research to furnish a basis for making needed adjustments to agriculture in the large. The new program of research centers itself upon answering the specific questions that the farmers in each area want answered—such questions, in the Cotton Belt, for example, as whether the farmers in any particular section should continue producing cotton, or how much they should try to produce? What varieties and types of cotton should they produce? What other crops they should substitute? How intensively they should cultivate their cotton or corn? How much fertilizer they should use? What machinery can be used to advantage? How frequently should they poison for boll weevil? Should they increase their numbers of cattle and swine? What feed should they grow for them and what kind of feed should they buy? In general the method of analysis which the Bureau of Agricultural Economics is now using is that of considering the farm business as an integrated unit and estimating the probable effect on the net incomes of such units, of the most likely alternatives with respect to each of such questions as the foregoing. This method of analysis is commonly referred to in the Bureau as the budget method. The research in which the Bureau is cooperating in the various states is mostly directed at collecting the data needed to analyze such questions as the foregoing by the budget method. The projects chosen are those which relate to the most pressing issues in the areas most in turmoil as to their production program. It is obvious that a program thus directed will presently put the United States Department and the various states in a much better position to help the whole agriculture of the country with its economic ajustments.

It should be added that an important basis for such a program is a careful mapping of the agriculture of the United States according to systems of farming. Dr. Spillman has already done some preliminary work along these lines. It is now being greatly expanded in connection with the Census of 1930. Dr. F. F. Elliott, who has been developing the Bureau of Agricultural Economics' analysis along these lines, has been transferred to the Census Bureau for this purpose. It is expected that the various states will utilize these same data to the same ends.

It is obvious that an important part of the analysis basic to such a program relates to prices and markets. An effort must be made to anticipate price movements for the various products for several years in advance. This phase of it was touched upon, but only lightly, in the yesterday morning program. I should have liked to see a whole program devoted to it.

The foregoing program has sometimes been misrepresented as largely directed toward getting farmers to shift production programs back and forth from year to year. On the contrary, its major emphasis is centered on discovering trends and reshaping ten and twenty-year programs to them. But there are always some adjustments of a shorter nature, such as are involved in adapting feed rations to current feed prices, or those growing out of the hog cycle. The outlook service considers both of these types of adjustments.

The most important recent legislation designed to assist in this program is the agricultural foreign service bill, which will establish the machinery needed in competing countries to inform us of their trends in production.

In the closing days of the last session of Congress, Congressman Victor Christgau of Minnesota introduced a bill which is aimed specifically at strengthening the work of the federal department and the states along these lines. It will be of interest to know that Professor M. L. Wilson of Montana, a former president of the American Farm Economics Association, now manager of the Fairway Farms Corporation, assisted greatly in drafting this bill. He has made the setting up of experimental farms of the Fairway type one feature of the bill.

There are differences in the degree to which the various states are falling in with the foregoing developments. Unfortunately a few of the more individualistic type are inclined to ignore it largely and adhere to their old practices. But in the last few years, outlook conferences of some kind, following the general conference in Washington, have been held in over forty of the states.

This policy of assisted adjustments of the United States Department and the states has of course come into some conflict with that of the Federal Farm Board in its agricultural self-sufficiency pro-

gram, especially in the matter of wheat acreage. I think I am safe in saying that the conflict is practically over. The Federal Farm Board is rapidly swinging around to accepting and cooperating with the outlook program. In the future, I believe it will cooperate with the United States Department and the states in a program, not of general acreage reduction to the point where the tariff is effective, but of finding out in what areas wheat farmers should contract and in what areas they should expand.

The program of assisted adjustment has made only a little headway thus far in the field of land utilization. Within the last few years, however, the United States Department and some of the states have initiated surveys designed at replanning the land utilization of specific areas. In my judgment, a special body, a national land planning commission, will be needed before work will be effective along these lines.

In marketing, the economic assistance being rendered at present is principally along the following lines: Analysis of prospective prices as a guide as to when to sell; collaboration with cooperative organizations in studying their problems in business practice, membership relations and the like; market news, price quoting, inspection and certification, and grading. The setting up of the special Division of Cooperative Marketing was the important step in developments in this field. Obviously there is conflict between such a program and that of the Federal Farm Board of setting up nationwide, large-scale, big-business, marketing units under government supervision, supplemented by quasi-governmental stabilization. But this issue is also resolving itself. The stabilization corporation idea has already had a severe setback, and is not being pushed. Mr. McKay's statement before this conference the other day, as you will recall, was largely along the lines of assistance of the foregoing types, and kept very largely under cover the big-business idea. Students of cooperation in this country look forward to a time when there will be considerable centralized cooperative control of the marketing of the various commodities; but they believe that the organization for this must be a steady, healthy growth over a period of years, perhaps as few as three or five in some cases; but in many cases as many as fifteen to twenty-five years. The

Federal Farm Board can help greatly in hastening this growth if it applies itself wisely to this task in place of trying to build up national marketing structures in a few months or a year or two.

An important part of the marketing problem relates to assisting consumers in their buying of farm products. Mr. Olsen touched on only one phase of this the other day. Public agencies have an important rôle to perform in this field. The United States Bureau of Standards fails to function as it should in protecting consumers. State agencies have made little headway with this problem as yet.

I am also of the opinion that a vigorous public policy directed at improving the quality and raising the level of farm family living would assist greatly in agricultural betterment. Our small squad of home demonstration agents are preparing the way for a much larger program needed along these lines which must include attention to health and sanitation as an important feature. Dr. H. C. Taylor has long urged upon our people the importance of this phase of agricultural betterment The Division of Farm Population and Farm Life has furnished stimulating leadership To be sure, some of the research work in this field has not been of the sort which assists much in programs of betterment of farm living, not being directed sufficiently at answering the questions most needing to be answered Some of the early workers in the field got lost in the job of collecting figures on the cost of living. But the trends now are all in the right direction. All that is needed is a more vigorous prosecution of the program.

In conclusion, let me say that I hope none of our foreign visitors will leave this country without coming to realize fully the nature and extent of the work developing along the foregoing lines I have this criticism of the program of this conference, that sufficient place has not been provided for discussion of the outlook service, particularly of the United States Department of Agriculture, and particularly in the field of farm management. I fear that our visitors will get the mistaken impression that we are still spending most of our time making conventional farm business surveys and estimating cost of production. I ask you instead to center your attention on the type of study of the wheat problem which Professor Grimes outlined in his paper yesterday. Indeed we are making surveys, and indeed we are making cost analyses; but we are more

and more pointing all such research at answering the important specific questions that farm operators need answers for, and which must be answered by the outlook service.

I may summarize by saying that I fully expect the outlook service to grow until some day we shall simply look at it and say: This is the national agricultural policy of the United States.

In the few months which I spent in Europe last summer I noted important differences between countries in the extent to which the work in agricultural economics is directed at developing national agricultural programs. In some, I found strong development in this direction, from which we can learn much. In others, I found nothing but small groups of workers here and there working upon largely local problems, sometimes with all their attention centered upon a few farms—nothing much actually going forward anywhere that looked at the agriculture of the nation as a whole and the building of a program for it. These latter can learn much from the outlook program of our Department of Agriculture.

POLICIES IN THE UNITED STATES AFFECTING AGRICULTURE

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THE VARIOUS units of government in the United States—the townships, the municipalities, the counties, the states, and the federal government—have developed laws and services to regulate or to aid the farmers. They provide fence laws and weed laws to adjust the relations of farmers with each other; they establish sanitary and food laws to protect the consumer; they make war on plant and animal diseases; they establish grades and standards, render inspection service, and provide information service as a protection and as a basis of intelligent action on the part of producers, dealers and consumers.

Viewed historically these government activities have had as a background a land and transportation policy intended to hasten the expansion of the agriculture of the United States, and a research and educational policy intended to increase the production of farm products per acre. In general, the national and state policies have looked to the increased production of cheap food and raw materials. Prior to the administration of Theodore Roosevelt, in the first decade of the present century, little regard was given to the welfare of the farmer. The Roosevelt Country Life Commission was at least a gesture in the direction of giving thought to the farmers' economic and social well-being. Since that time, agricultural economics and rural sociology have developed. The incomes and the living conditions of farmers have been studied by agencies of the states and of the federal government. The agricultural depression has focused research, education, and legislation upon the unfavorable economic condition of farmers. The result has been the promulgation of a policy by the federal government which definitely commits it to economic equality for farmers. In some measure this points toward a reversal of the old policy of expansion of production to insure cheap food and raw material. It points toward limiting production in the interest of higher prices as a basis of improving the welfare of the farmer.

While the government is committed in principle to giving thought to the economic well-being of the farmer, it has not yet

developed effective methods of accomplishing this purpose. At present, the government is depending upon the voluntary actions of farmers as individuals and as cooperative groups for the attainment of economic equality for agriculture as an occupation. Can cooperation solve the problem of securing equality for agriculture?

In approaching this question we need first to keep in mind the nature of the farmers' economic ills. It is a well established fact that farmers' ills are not due to inefficiency in production nor to inefficient methods of marketing farm products, but to the ratio of exchange of the things farmers sell and the things which farmers buy. This ratio has been unfavorable to the farmer for ten consecutive years. At the present time, the farmers have to deliver five carloads of produce in exchange for what they secured in exchange for four carloads, during the five years prior to the World War.

This situation is due to the fact that farmers have remained on a highly competitive basis while most other industries have entered upon a régime of limitation of competition through association and through legislation. The central question regarding the Federal Government's proposal of cooperation as a remedy relates, therefore, to its usefulness in limiting the competition of farmer with farmer. In the past, the great gains through cooperation have come through providing additional competition for the independent dealer at the local grain market, at the local creamery, in the local potato market, and so forth, or the organization of the farmers interested in one market or in one product produced largely in one area. Here an important service has been rendered for years. In the current Harpers, Mark von Doren gives the typical outsider's advice when he says "Cooperation for control of supply and price is of course the thing he (the farmer) needs to learn."

The question is: Can farmers, through cooperation, limit production and thereby restore and maintain favorable prices for the major staples of American agriculture? This is a vast new task of a kind which cooperatives have not performed in the past. It has been proposed by the Federal Farm Board that the wheat crop be reduced 25 per cent. How can the cooperatives help in a job of this kind? Is this to be done by asking each farmer to produce three-fourths of a crop? If so, what will he do with the other fourth of his wheat land, and the other fourth of the use of his equipment and his labor? It is obvious that his cost per bushel of wheat would greatly increase if he runs only three-fourths capacity.

The alternative is to get those who produce about 200,000,000 bushels of wheat, or a fourth of an average crop, to go out of wheat production. What would they produce instead? Not other farm products, of course, for that would run head on into the reduction program in some other phase of agriculture. Obviously, these surplus farmers will have to be moved off the land, and the land abandoned. Is this a task which can be handled through agricultural cooperation?

Suppose we were successful in limiting wheat production to the demands of the domestic market. Who would benefit? The taking of 200,000,000 bushels out of the world market would undoubtedly lift the world price level and would benefit wheat producers throughout the world. Outside of the United States, this benefit would come as a free gift to the farmers. In the United States, it would come at a very high cost which might be compensated for only through an effective tariff. It would seem, therefore, that even if, through some new kind of cooperation we know not of as yet, the United States wheat production could be cut 25 per cent, there is no guarantee that the farmers of the United States would benefit, and certainly the nation as a whole would lose heavily by such a readjustment in our economic life as would be involved.

The proposal to reduce the wheat crop 25 per cent is a drastic remedy for an ill that has been created by an excessive use of the protective tariff and an unprecedented amount of limitation of competition among manufacturers and trades-people. Price competition has in a large measure ceased. Competition for the business continues but does not help the farmer as a consumer. Is there not a much simpler way out of the difficulty? Can we not make a direct attack upon the conditions which have caused the unfavorable price ratios?

In 1925, when the McNary-Haugen relief measure was in its earlier stages of promotion and while I was still in the government service, I made the statement at the Institute of Politics at Williamstown that "If I might blue pencil certain Federal laws which give special privileges to other groups to the detriment of agriculture and enforce certain other laws now lying more or less dormant, I would ask for no new legislation especially for agriculture."

Five years have passed and I have had no occasion to change

my views on this subject, but I have seen the struggle in Washington which shows how difficult it is to secure a square deal for agriculture either by repealing laws which damage, by enforcing laws now on the statute books which would help, or by securing new laws which would tend to place agriculture on an economic equality with other occupations.

The chief basis of complaint on the part of farmers today grows out of the fact that the government has changed its policy with respect to industry and commerce, in a manner such as to increase the prices farmers pay for what they buy without a corresponding change in the prices of the things they have to sell. Since the slogan "More Business in Government and Less Government in Business" was promulgated and put into effect, the basic fabric of our national economic life, as it functioned in the days of Theodore Roosevelt, has given way in many places. This slogan has come more and more to mean: "Let business run the Government in the interest of business profits, for if business prospers, all will prosper."

For many years business prospered inordinately under this régime, but agriculture has suffered as never before. This bad situation for the farmer is the result of the application of the new theory of limited competition, controlled production and prices by manufacturers, and controlled rates for middlemen's services determined by business men in their own interest. Unfortunately for farmers this new régime of limited competition which has come into existence without Congressional action or sanction is not applicable to the producers of the great staples of agriculture because of their numbers and their geography. Hence the farmer sells for competitive prices and pays controlled prices for what he buys.

The farmer's problem could be measurably solved either by reverting to the old régime of competition, by the government control of monopoly prices, and tariff revision downward, or, by developing new agencies which will do for farmers what the new régime of limited competition is doing for business. The latter can not be accomplished for the major agricultural staples by cooperation as we have known it. Government action would be required. Would this be a new sphere of government activity?

All governments attempt to protect life and property and to enforce contracts. In recent times, recognizing the conditions under which many contracts are made, limits have been set in the enforcement of contracts. Under the institutions of private property and

contracts, the "law" of supply and demand operating under conditions of free competition has been the accepted basis of the distribution of incomes. In order to maintain fair play and justice under that régime, the government at one time prohibited the maintenance of high prices through the limitation of competition in the industries classed as competitive, and established agencies to guard against the limitation of competition.

The recognized monopoly has been an exception. In certain specified fields of economic activity, where effective operation required monopolistic control, agencies have been established for the purpose of guaranteeing fair prices for products or fair charges for services. Means have, in some instances, been provided for establishing fair wage rates for the employees of monopolies. Furthermore, the government has endeavored to promote education, research, and the free and equal dissemination of economic information as the basis of more intelligent free competition. What more need be done?

If these laws which relate to competition and price were administered in an effective manner, and certain special privilege legislation repealed, little more could be asked by American farmers. But these basic conditions of our economic life have not been administered effectively in the interest of the general welfare, in recent years. The administration has abandoned the old policies without legislative provision for so doing. It would appear that we have today no well thought out plan for ordering the economic life of the people of the nation as a whole, but rather an extra-legal plan which provides for limitation of competion, presumably in the interest of efficiency of production, but more often it is in the interest of efficiency in acquisition.

We hear often of the "law of supply and demand" in terms which indicate its inevitableness, but we hear little about free competition without which this so-called law becomes intolerable as a basis of determining prices and incomes. Instead, we hear much of the theory that order and justice in our economic life can be established by encouraging those in all industries to limit their production in such a manner as will bring about an equilibrium between demand and supply at a point which will yield a price that will satisfy the producer.

Before accepting this new economic doctrine, certain questions should be asked and answered.

1. When all industries adjust supply to demand under conditions of limited competition and on the basis of prices satisfactory to the producers, what disposition will be made of the excess of people who will not be needed in any of the occupations.

2. Will not a national economy which limits the production of each and every industry limit the productivity of the nation as a whole and thereby limit the total quantity of economic goods available for the people of the nation?

3. Can the policy of limitation of competition by private interests be carried out to an equal degree in all occupations?

4. When free competitive prices disappear, what basis will remain for adjusting monopoly prices? Will not the distribution of incomes be entirely without a principle of control?

It is believed that an economist who keeps the national welfare in mind will answer these questions essentially as follows:

1. The artificial restriction of the industries of the nation as a whole must not be such as will in the long run exclude able-bodied citizens from finding employment as a means of subsistence.

2. A few industries can profit by exchanging their limited supplies of products for goods produced under conditions of free competition. But if those in all occupations limit production equally, then the exchange of products between those of different occupations would be at the same ratio as if these industries were all operating on the basis of free and intelligent competition. No one would benefit. The total product, and hence the economic well-being of all the people would, however, be reduced.

3. The ease with which some industries can limit competition and thereby enhance prices and the practical impossibility of limiting competition and similarly enhancing prices in other industries, makes this policy a freedom to limit competition and adjust production to demand on the basis of maximum profit to the industry, ruinous to industries such as agriculture where free competition prevails among those engaged in the occupation and where advice to limit production can at best be applied only to certain minor lines of production. The best that can be hoped for in the staple lines of agricultural production is a more intelligent free competition. Justice in the occupational distribution of the national income demands, therefore, that, insofar as free competition ceases as a price regulator, public authority step in to guarantee fair price.

The only alternative would appear to be the establishment of government agencies capable of providing for adequate limitation of competition in the more highly competitive occupations.

4. Obviously, with the passing of competition as a price regulator, we will be under the necessity of finding new standards for the evaluation of the contributions which the several economic groups of society make to the consumers as a whole. Standards for the purpose of establishing justice in the distribution of incomes have not been promulgated by those who are promoting the new principles of production based upon privately controlled limitation of competition, which limitation destroys the old and accepted basis of justice in the distribution of the national income.

As I contemplate the present trend of affairs, it appears to me that a new order of economic society may be creeping upon us unawares. It is not likely that this new order, whether it be one of exploitation due to lack of public control, or one of economic justice due to adequate social control, will come without conflict. You may recall that John Stuart Mill said, "The Distribution of Wealth depends upon the laws and customs of society. The rules by which it is determined, are what the opinions and feelings of the ruling portion of the community make them, and are very different in different ages and countries; and might be still more different, if mankind so choose." The question we now raise is, "What is the 'ruling portion' of the United States?" The fact that it appears to be a "portion" representing one group interest and not the whole is ominous. An editor recently said to me, "What group is better fitted to control the government than the business group?" The answer is, "We need a group of statesmen who will look to the interest of all the people rather than the profits of their own group." More than thirty years ago, Spahr, in his book entitled "The Present Distribution of Wealth in the United States," made reference to the Civil War and indicated that the next great conflict in this country would be over the distribution of the national income.

While much of danger and conflict seems to be involved in the present trends, nothing radical is involved in what need be done for agriculture by the government. In fact, one might be justified in becoming a reactionary in the presence of the extremely dangerous trends which place the economic life of the nation at the mercy of a series of highly organized groups operating in their own pri-

vate interest. What then should the government do for agriculture? I would answer this question briefly as follows:

(a) Restore competitive prices in the so-called competitive industries, by making the Sherman Anti-Trust Law effective, by redirecting the Federal Trade Commission and by suspending that part of the work of the Department of Commerce which promotes the organization of manufacturing and trade groups for the more effective limitation of competition.

(b) Fix reasonable prices in fields where monopolistic control is inevitable, by making the public utility commissions effective in establishing fair rates and fair prices on a basis equally fair to stockholders and to the consuming public, keeping in mind the principles of relativity which are essential if justice is to be meted out to all. In recent years, the profits of the public utilities have been considered without adequate regard to the profits of the industries which pay the bills.

(c) Our government should reduce to its proper sphere, special-privilege legislation, particularly the protective tariff which, at times useful within proper limits, has been used so excessively as a means of elevating prices in the interest of inordinate profits for certain industries at the expense of other occupations and of the consuming public. It was at a time when there was no hope of securing equality for agriculture under the tariff by downward revision of the rates on certain classes of products that the equalization fee, the debenture plan, and the domestic allotment system were brought forward as alternative means of securing some degree of justice for farmers under the firmly established "protective" tariff. A wise and just revision of the tariff would make these devices unnecessary. Of this there is at this time, however, little hope.

(d) As a basis of intelligent free competition in the production and distribution of agricultural products the agencies for collecting and disseminating information and the preparation of outlook reports should be further developed on a world basis. It is quite as important to the farmers of the United States that the wheat growers of Canada and the Argentine have this information as that our farmers have it for themselves. The cooperation of all producing and consuming countries is needed in this undertaking.

(e) As a means of maintaining a proper proportion of the human factor in the various occupations, an information service rela-

tive to the present and prospective opportunities in the various lines of economic activity should be collected and disseminated and agencies should be developed for facilitating the movement of population from one occupation to another. This implies also the removal of barriers which are set up to keep people out of a given occupation in order to maintain extraordinary wages.

(f) The government should seek to reduce the fluctuations in the purchasing power of the media of exchange securing the co-operation of other nations to that end insofar as this may be necessary.

These are the basic things the government needs to do to place agriculture on a basis of economic equality with other occupations.

Much is here asked that the business interests who are profiting by the new régime will resist. But the new régime of limited competition has not only come into existence without Congressional provision or sanction but unknown to the rank and file of the people. If we cannot go back to the lawfully established order of free competition, may we not hope to have some lawful foundation for the new order, and may we not ask that a basis of fair play for farmers and other similar groups be provided in the new régime?

The questions will be asked, "Can not the Federal Farm Board, as recently established, take care of the needs of agriculture? Is it not doing for agriculture what other industries have done in limiting the effect of competition on the prices of products?" The answer is "No." The major things which need to be done in restoring order, as outlined above, are the duties of old established agencies of government which in the present régime are in a large measure ineffective. If the competitive order is to be left behind, and a new régime of limited competition is to take its place, something more than the Agricultural Marketing Act, under which the Federal Farm Board is now operating, will be required to enable this Board to put agriculture on a basis of economic equality with other occupations.

Since writing the foregoing pages, I have submitted them to a considerable number of business men and economists who have taken the trouble to read and comment upon the views which are here presented. All agree that a new régime of limitation of competition has prevailed in recent years and they almost uniformly look upon this limitation of competition as essential in modern in-

dustrial life. The arguments one time voiced against the wastes of the competitive system by the advocates of socialism are now voiced by business men and economists who have no thought of embracing socialism. These men who wrote me that we must not turn back to the Rooseveltian régime, failed, however, with one exception, to suggest any method of securing justice in the distribution of incomes under the régime of "competition limited."

If we accept the new régime in production, is it not inevitable that a new régime in the distribution of incomes must follow? Who will outline a new régime which will provide justice in the distribution of the annual income of the nation under conditions of privately controlled limitation of competition? Is there any system of controlled distribution which the business interests would ever approve? No. In a government run by business men, there is no hope. Statesmen are needed who look to the welfare of all, not simply to the profits of the few. In a government by statesmen, a new régime of production and marketing which substitutes group control for competition would not be accepted until means have been provided for the maintenance of reasonable prices and a just distribution of the national income. If freedom to limit competition is granted first, the control of distribution which will be essential if the limitation of competion is to be tolerated by the people of the nation, will be secured only after a fight which may be more wasteful than competition in production. It would appear, therefore, that farmers as a class should insist on maintaining the competitive régime outside of the field of natural monopolies at least until a new régime has been lawfully founded which will take care of the problem of providing equitable incomes as well as the promotion of efficiency in production.

THE VALUATION OF FARM REAL PROPERTY FOR TAXATION

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THE problem of the valuation of farm real property for taxation purposes in our states operating under the general property tax system, is one of approximating the intent of the law that all property shall be uniformly assessed on the basis of its true cash value. The law does not presume to go back of the cash value, or to prescribe the elements that must be taken into consideration in arriving at such a value. This stand is consistent with the basic economic theory that price is the resultant of the interplay of the forces of supply and demand under a system of *laissez faire* economy. The theoretical justification of the whole general property tax system seems to imply this idea.

The practical difficulties involved in the valuation of farm real properties for taxation purposes are of old standing. But the ever-increasing rural tax burdens, especially during the last fifteen or twenty years, accompanied by a general depression in agriculture during the decade just past, has thrown them into new relief

During periods of light tax levies, even gross inequalities go unnoticed. Heavy burdens, on the other hand, give even the minor discrepancies a practical significance.

Investigations in the field of agricultural taxation carried on during recent years in a number of our states, indicate that general property taxes frequently take from one-third to two-thirds of the economic rent from farm land, and that in some instances, as high as ninety per cent and above, of the net returns from the land have been thus absorbed. A study made by the Division of Agricultural Finance of the Bureau of Agricultural Economics in the year 1921-1922, indicates that taxes per acre of farm land in the United States had increased about 125 per cent during the preceding eight years. A further increase, although one of less significance, has taken place during the succeeding eight years.

In the state of Oregon, a typical western state, total rural general property taxes increased from slightly over six million dollars in 1910 to more than eighteen millions in 1921, an increase of over 200 per cent, followed also by a further slight increase during the following six years. The rise in levies on actual values

over the same period—1910 to 1928—represented an increase of slightly more than 100 per cent. It is these heavy exactions that have created an absorbing interest in farm taxation.

The problems of land valuation for taxation purposes divide themselves into two major groups: (1) the valuation or assessment of farm property as compared with the valuation of urban property, and (2), the valuation or assessment of one parcel of farm real property as compared with the valuation of other parcels of farm real property. The former problem is generally significant only to the degree that general levies for state, county, and township purposes are uniformly imposed upon both rural and urban assessments, whereas the latter problem involves not only the allocation of the general state and county taxes, but the distribution of the local levies as well.

Various conditions and practices make for a lack of uniformity in assessments and hence for a lack of equality in the distribution of the tax burdens between rural and urban property holders. In the rural areas, real property constitutes the major portion of all taxable wealth and land constitutes the major portion of all real property. In urban communities, on the other hand, a large percentage of the taxable wealth is in the form of personal property, tangible, and intangible. Improvements on lands and lots in urban areas also represent a much larger percentage of all real property values than is true in the case of rural areas.

Personal property, particularly the intangible, which, according to the most reliable information available, equals, or exceeds in value that of urban real property, very largely escapes the assessors' rolls. The above is a generally accepted condition and needs no verification. It is also generally known that improvements on lands and lots are assessed at a considerably lower percentage of their actual value than are the lands and lots on which those same improvements are located. This practice, although contary to the law, is an established practice and is openly admitted by most assessors.

The implications of the foregoing conditions and practices are apparent. Rural property is real and tangible and hence lies exposed to the assessor; much urban wealth, on the other hand, is intangible and therefore very largely escapes assessment and consequently taxation.

Improvements constituting a much larger percentage of the total real property values in cities than in rural communities, renders

the practice of over-assessing lands and lots as compared with the assessments of the improvements located thereon, advantageous to the cities in the payment of the general levies.

Another institution or practice, and one of constantly growing importance, inuring to the advantage of the urban taxpayers, is the total exemption by law of certain classes of property. We daily enjoy in our cities many direct utilities provided us through the use and operation of such totally tax exempt wealth. Cases in point are lodge properties, community hospitals, libraries, and playgrounds for both children and adults. Again, such properties as fire stations and equipment, water systems, and other municipally owned utilities such as power and light systems, transportation and communication systems, and so forth, are generally totally tax exempt. No one would deny these the full protection of the law, yet they contribute nothing directly to the support of the public treasury.

To the degree that the general levies, state and county, are replaced by income from other sources, the above problems will disappear. But with an increase in these levies for the centralized support of education, roadbuilding and other public utilities, they will take on new interest.

An outstanding difficulty in maintaining equality of assessment, and hence taxation, between rural and urban property, grows out of the fact that changes in rural real property values frequently do not synchronize with changes in values of urban property. This condition has been particularly significant in many areas during the last ten years.

Lack of uniformity in the assessment of the different farm properties themselves, constitutes the problem of major importance in farm taxation. As indicated above, variability in valuations or assessments between rural and urban properties merely affects the allocation of the general state and county levies—usually but a small part of the total tax levy—whereas variability in the ratios of assessed to actual values of the rural properties themselves, affects equally the distribution of the general levy and the distribution of the local levy.

The prevalence of such inequalities in valuations has been amply verified by extensive studies carried on in several states. These variations generally manifest themselves in two forms: first, a pronounced tendency to over-assess properties in the low value

classes or groups, with a gradual scaling down of the assessment ratios as the higher value groups are approached; second, a variability in the ratios of assessed to actual values of the individual farm properties, independent of group variations.

The former is a group phenomenon and the least serious of the two. Measures of variability would indicate that the percentage of total taxes misplaced due to variations in group assessments probably does not exceed four per cent in most states. But as this extra burden falls upon the owners of small properties, those generally least able to bear it, the ill results therefrom are unquestionably out of all proportion to the taxes so misplaced.

Inequalities in assessments among individual farm properties, next to the heavy tax burden itself, presents the most serious problem in farm taxation.

The findings of the investigations carried on in a number of states indicate that from ten to thirty percent of the farm real property taxes in the various areas surveyed have been misplaced through such inequalities in assessments. In some states, real farm property representing less than one-half of the total real farm wealth, bears two-thirds of the real property taxes, whereas the other one-half of the real farm wealth bears not to exceed the remaining one-third of the tax burden.

The ill results of such inequalities in tax burdens are difficult to over-estimate. The market values of the over-assessed properties are adversely affected through the capitalization of the unjust tax burden. It necessarily creates dissatisfaction and discontent on the part of those unfairly taxed, and the just complaint of the over-taxed property owners may give the state the unmerited reputation of being burdened with an excessive tax. Furthermore, all the evil effects of inequality and unfairness in other phases of our economic life follow. Equality of economic opportunity is destroyed, standards of living are affected, and the law is brought into disrepute.

The causes of the variations in size or value-group assessments cannot be stated with certainty. The idea that the tax is a personal tax, and that every one should contribute something to the support of his government, may consciously or unconsciously influence the assessor to evaluate the small parcels of real property the more highly. This idea is closely akin to the "benefit theory" that taxes should be paid according to benefit received at the hands

of the state, rather than in proportion to the ability of the taxpayers to meet the levy.

Recognized arbitrary over-assessment of lots and small acreage plays its part in many districts. It is also easier to examine and evaluate small properties than large ones. The intentional placing of higher assessments upon lots and lands than upon the improvements on the same, would offer an explanation for the variations in group assessments in cities where low valued transfers usually represent vacant lots. But this practice cannot be offered as a valid explanation of the variability in group assessments in rural properties where the value of improvements usually constitutes too small a percentage of the total value of the farm unit to account for any appreciable discrepancy.

A leading cause of over-assessment of small properties may be found in the less frequent complaint of the small taxpayer. Personal favoritism, and the frequently alleged influence of wealthy and politically influential taxpayers as causes of under-assessment of the more valuable properties, have no foundation in statistics.

The causes of the variability in the over-assessment of individual properties can be stated with somewhat greater definiteness.

One of the principal causes is no doubt the low ratios of assessed values to actual values generally. An analysis of assessment and sales data in one state clearly indicates that with a decrease in the general ratios of assessed values to actual values, there is a strong tendency for the variability or inequalities in the assessment of the individual properties to increase. Low assessed values necessarily imply high tax levies, with a resulting increased pressure for a still greater reduction in assessments. This condition would argue in defense of the law requiring the assessment of all property at full cash value.

Another prominent cause of the inequalities in the assessments of real properties, is a direct outgrowth of an inherent defect in the general property tax. It is found in the prevalent idea that real property is unjustly bearing the greater tax burden. Hence any escape from real property taxes through under-assessment is looked upon, not as an evasion of a just obligation, but rather the escape from an unfair burden.

An immediate cause of the lack of uniformity in assessment of farm properties, is the dearth of accurate and detailed information on the properties within the assessor's jurisdiction. This is more

particularly true in the sparsely populated areas of the country, and in those areas where there is great diversity of resources, but such dearth of information is not restricted to these states. In response to the question, "What is your most difficult problem in the assessment of rural property?", a number of assessors in Oregon have personally said to the author, "I don't know what I've got in my county." Some have volunteered the further statement, "When my taxpayers claim that they are over-assessed, I am not in a position to successfully refute them. They have more information than I have." This same condition prevails quite generally throughout the western states.

What is needed most in these areas, is a thorough-going survey or re-survey of the land and its resources. Carefully made plats minutely describing the contour, soil conditions, and tillable and non-tillable areas, are highly essential. The assessor should be in possession of accurate and detailed information on every acre of land within his jurisdiction, whether timber, brush, cleared and tillable, or grazing land. Huge grazing areas, for example, in our western states, widely differing in value, are frequently subjected to flat rate assessments of from $2.00 to $3.00 per acre, with the result that changes in land tenure are seriously retarded. The poorer grazing lands are frequently leased for less than the taxes.

In a few counties in the states of California and Oregon, for example, where careful surveys and descriptive plats have been made, few complaints on assessments are registered with the assessors, and practically none are carried beyond the assessors' office to the equalization board. The differences can generally be smoothed out to the complete satisfaction of both the assessor and the property owner.

Once a thorough survey has been made, constant changes in assessed values of properties coincident with changes in the shifting values of those same properties will be necessary. Adequate funds to provide a trained staff for this work is dependent upon the public's interest in, and appreciation of, the problems involved.

PROPOSALS FOR RELIEVING FARMERS OF UNDUE TAX BURDENS

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STUDIES have been made in at least a third of the states showing the farm situation with respect to tax payments. They are all alike in the one essential particular—they all show that the farmer, in proportion to his ability to pay, is taxed more heavily than any other important occupational group. Moreover, the burden is getting, or rather has been for nearly a decade, well-nigh unbearable. Farmers have been going bankrupt by the tens of thousands. For some years almost a quarter of all farm sales have been more or less forced transactions. That taxation has been a factor in this unhappy condition is obvious when it is noted in the many studies made, representing every section of the country, that taxes take from 15 to 40 per cent of the net income of the whole class of farmers, averaging not far from 30 per cent. It must be kept in mind that these big percentages indicate a much heavier burden on farmers, with a net income of not far from a thousand dollars a year, than similar percentages on incomes much larger. That high taxes are responsible in no small measure for the unfortunate financial situation of our farmers, is beyond question. At the same time these constitute but one of several major considerations

The Secretary of Agriculture in his last report estimates the farm tax payment at $1.42 per $100 in farm value. This is a distinctly high tax, but the burden is even greater than here appears in view of the fact that quite uniformly farm land value is now overestimated in proportion to its earning power. Were it valued as it should be, the tax payments now made would clearly be much above the $1.42 estimate—probably $2.00 per $100 in value.

Whatever may be the exact, or proper, valuation of farm land, and no matter how dexterously the intangible contributions of the farm to the living of the farm family be handled with a view to making them appear as great as possible, it remains incontrovertible that the taxes are not only heavy beyond ability to bear, but they are also outrageously heavy in comparison with the tax burdens of other classes of people. The cause of the unfair and unbearable inequality is nothing other than the reliance upon the archaic general property tax system. We have outgrown the economic setting

of the early and commendable general property tax, but we are held in the vise-like grip of its political tentacles.

Along with the general property tax inheritance, came an allocation of community responsibility which has been only less persistent than the tax system itself. Each little country community was charged with the responsibility of caring for itself. School houses were two miles apart each way throughout a large part of the Middle West, with almost no regard for the productive possibilities in terms of either crops or children. Roads were built by, and mainly for, each little group, never larger than a township in size. Both roads and schools were local and poor, though in each case some were poorer than others.

The first important effort to get away from mere local responsibility in the matter of schools was to require by state authority that schools be kept running a prescribed minimum number of months, such as six or eight months each year This resulted in a compulsory increase in the tax levies in many poor districs amounting to five or ten mills on the dollar of assessed property.

The next important exercise of public authority modifying the tax situation pertained to roads. In this case the authority carried with it national, state, and county aid. It would seem that the local district was to escape some of the burden. For the most part this has not come to pass. The demand for better roads has been so general and so intense that relief concerning the thoroughfares has required expense on the byways, and the road taxes of most country districts are higher now than ever before, in fact several times as high as in 1900 or even in 1910. We have automobiles and we must have roads whether or not we have dining room tables or bath-tubs.

All told, the tax burden on the farmer has increased about 160 per cent since before the war, while his income has increased a tenth or an eighth as much.

While the tax burden has been increasing, even to the breaking point, in the country, it has also reached as high a level as is consistent with common sense on tangible property in cities and villages. In other words, we have clung to the general property tax doctrine and practice until we can no longer blink the fact that it is in a state of rigor mortis, or in the language of Jack London, belongs to the unburied dead. During the past half century the business world has undergone profound changes; within that time

wealth and income have concentrated in the cities. Especially has that happened within the past decade. Income is no longer made primarily out of the ownership and use of tangible property. It comes rather out of transactions with a less visible base. Taxing the modern business or professional man by the old method, with any hope of overtaking his ability to pay, is a case of the hare and the tortoise in which the dinner and sound nap are taken with more discretion. Yet some supposed tax experts, at least members of tax commissions, have recently insisted that the general property tax should not be put into the discard until it has been given a real and genuine trial—for example, not until an adequate effort has been made to bring personal property out of its hiding.

While these naïve views are being promulgated for the thousandth time, the farmer with nothing but visible property and most of it real estate, is paying, not according to ability, but at least double that, while a large part of the tax paying ability of other classes is carrying a light load indeed.

PLENTY OF TAX-PAYING ABILITY

We have plenty of tax paying ability. It is abundantly able to take care of all reasonable demands—educational, ethical, physical. Yet we are hungry, surrounded by a plethora of viands.

PROPOSED TAX REMEDIES

1. Minor suggestions. Over and over it is proposed that we revise the system of assessment. Every student of the subject will agree that it should be done. We should eliminate the local town assessor. He is never chosen on the basis of competence, and is seldom kept in office long enough to become acquainted with his duties. He is subject to political influence. Undoubtedly we need county assessors (or assessors for groups of counties), and these should be chosen by boards from a civil service list. Assessment is a technical undertaking and cannot be properly done by the uninformed. Assessors should be supervised by state tax authorities such as tax commissions. But this reform hardly touches the main subject.

We should find all the property contemplated in the acts covering the tax provisions. This applies to any and all systems.

We should insist on economy in the use of taxes. Again, this principle is of general application.

2. Major suggestions. First, we should move as far and as fast as circumstances will permit in the direction of a greater reliance on income taxes. True enough, there are many details to be faced and knotty problems to be solved after the income tax principle is adopted, but no cogent argument has yet been made in favor of the general property tax in comparison with the income tax as the main basis of raising revenues.

A perfect case can be made on paper in favor of taxing farmers, at least in part, as for example to the extent of fifty per cent of the revenues raised in rural districts, on an income basis. This would avail little, applied to the present rural school or road district. Just so, small school and road districts are anachronisms and should be put promptly into the discard, and county and state organizations provided in their stead. But farmers should not pay out of proportion to their ability, and income is the best means of measuring ability.

Practically, there are many objections to a real resort to the income tax. With the states, the trouble is a matter of competition for citizens and business. One must offer as good inducements as others offer. Again, the federal government is collecting an income tax from private citizens. Some ingenious person has proposed that the federal government do as is now being done in connection with the inheritance tax, namely allow a deduction from federal taxes equal to the amounts paid to the states. This would compel the federal government to devise some other means of raising a considerable revenue. It could be done.

A second major consideration, though by no means equal in importance to the income tax in possibility or so unmistakable in desirability, is a tax on a selected, restricted class of sales. While the drawing of the line is not easy, it should in general be drawn between the necessary goods and services and those at least not so essential. A few examples must suffice, although the list can be enlarged greatly.

First, the gasoline tax. This is now universal over the United States, ranging from two to six cents a gallon. Gasoline may be a necessity or a non-essential—there is a disagreement of the juries—but in any case, another canon of taxation is involved. Here we pretty generally agree that ability to pay is subordinate to the benefit doctrine. We cannot sell packages of protection to life and property at the police station, but we can sell the privi-

lege of using the roads, and get back a considerable fraction of the cost by a tax on motor fuel. Just how high this tax should be has not been agreed upon, but there is excellent logic in the contention that it should be as high as possible without breaking down the administration of its provisions. And, moreover, it should be used for roads, distributed over the various districts of the state according to the best information and judgment. Taxes on gasoline, together with motor registration fees, can be used to relieve greatly the tax on farm real estate for road purposes.

Another sales' tax which has met with approval in some of our states and in other countries, is the tax on cigarettes. It is capable of raising millions of dollars per state. It does not conform to ability to pay, at least not unmistakably. Neither does it square with the benefit theory. It is to be justified on the somewhat flimsy basis of a luxury tax. More genuinely it is a means of collecting a few dollars a year from people who have a fair amount of spending money and who, in proportion to numbers, do not pay much in the form of property or income taxes. As a means of reaching the Schwabs, DuPonts, or Morgans it is not to be recommended. In this same category may be mentioned taxes on cosmetics, amusements, radios, and so forth. To all of these there are objections, but the objections are minor in comparison with the present practice of taxing farmers out of house and home. These are makeshift means of raising some millions of dollars per state, and to this same extent lessening the burden on farm property.

Another type of tax, unpopular true enough, but which can be made to yield an appreciable amount of revenue, is a tax on transactions—on notes, deeds, bonds, and the like.

There are possibilities of raising goodly sums of money through a business tax. This is, of course, a crude type of income tax, at least it may be, based on the amount of business done. But, again, remember that this, or at least a wide use of it, is a stop-gap proposal to be operated while we are getting ready for something more worth while.

We need a tariff revision unlike the one just enacted. This was designed as a national pacifier, a new brand of Mrs. Winslow's soothing syrup, or more accurately, changing the figure, a newly polished gold brick with just enough of the precious metal in it so that in the hands of an assayer perfectly acquainted with its contents and arrangement, a good report can be made as to its

analysis, but let no skeptic handle the assayer's boring tool lest the true contents be discovered.

Severance taxes, where applicable, are to be commended and developed.

Should these latter types of taxes prove unpopular enough, the very discontent would compel a study of the situation and create sentiment out of which we might hope for a real tax reform. Nothing short of a radical revision of our taxing system will suffice to bring about justice and wide-spread prosperity.

The above may sound like a big order. However, it may be noted that several states have made at least some progress along the lines suggested. Some fourteen or sixteen states have an income tax. When, and if, they all pass income taxes of the present proportions, the more progressive will again move out in front with a new and higher rate. Several states have cigarette taxes, with no notion of repealing them. All states are raising real sums from gasoline taxes and motor registration fees. Several states have school equalization acts in force and doing good service. The equalization idea is splendid. The method of raising the money for it is not so good. Several states have severance taxes; others have but little in the nature of natural resources to be severed.

It must be admitted that many of the above suggestions under major proposals are not in themselves majors, yet taken as parts of a whole they may belong to a major group as distinguished from a minor group.

Whatever is or is not done to relieve the farmer of undue tax burdens, it must always be kept in mind that the trouble is both chronic and organic. The general property tax is the main difficulty and is past all hope of adaption or reform so far as the main reliance is concerned. It must be reduced to its proper sphere, a sphere vastly below and smaller than the one it now plays with such ill effect.

OBJECTIVES AND METHODS IN THE LOCAL DEFINITION OF THE EXTENSIVE MARGIN IN AGRICULTURE

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THE answer to the question as to what lands are suitable for agricultural occupancy has been left hitherto largely to private initiative, not only in the United States, but in most other countries of the world. In the older European countries where agricultural expansion is negligible and land utilization has been worked out on the basis of centuries of experience, the question is not especially vital. Again, the importance of attempting to define the agricultural margin is perhaps more apparent in the United States than in younger countries, such as Canada, Australia, and Argentina, where need for expansion and growth appears to justify giving more or less free play to the individualistic impulses that motivate expansion. Even in such countries, however, a definition of the agricultural margin would aid in avoiding the heavy penalties which we in the United States have incurred by reason of our *laissez faire* attitude toward land utilization.

In this country, there has been some indirect public influence on the course of land utilization through reservations of public land, and a relatively small amount of acquisition of lands, mainly for public forests and parks. A certain amount of necessary land classification has occurred under such legislation as the Desert Homestead Act, the Timber and Stone Act, the Forest Homestead Act, and particularly the Grazing Homestead Act, which specifically excludes from occupancy, lands suitable for cropping, and lands incapable of maintaining a family on 640 acres from the proceeds of grazing only. These policies, however, have applied to public lands.

The definition of the margin discussed in this paper is of significance mainly in regard to lands in private ownership, which in this country now include practically all that are suitable for farming, interspersed with large areas economically unsuited for that purpose. While a few states have attempted to influence the course of settlement by supplying prospective settlers with helpful information, passing "blue-sky" laws, or regulating real estate practices, on the whole there has been but little public activity that

has notably affected in practice the location of the agricultural margin on lands in private ownership.

What are the considerations of public interest that appear to justify so extreme a departure from established policies and points of view as would be involved in an attempt to define and determine the location of the agricultural margin and to influence the course of utilization accordingly, as distinguished from leaving it to the free play of individual initiative?

The first consideration is that private initiative in the selection of land, especially in a relatively new country, results in a very large aggregate of uneconomical land utilization. Even for the expert, equipped with a special knowledge of soils, climate, and other physical conditions, the physical and economic requirements of crops and livestock, facilities of transport and markets, and the long-time outlook for prices and costs, the problem of determining what lands are economically adapted to utilization for farming is one of great difficulty. For the new settler the problem is frequently complicated, not only by a large degree of ignorance on such points, but also by the psychological pressure exerted by land-selling agencies. The continued occupancy of land submarginal for agriculture is frequently prolonged by reason of the persistence of non-commercial standards of living, especially in mountain regions; by low racial standards, as among southern negro tenants; or by economic and psychological inertia.

The occupancy and utilization of land for agriculture resulting from these mistakes are matters of public concern for many reasons. They represent a low efficiency in the employment of human resources and capital, leading in many cases to unwholesome conditions of living, the frustration and disappointment of numerous families, and an aggravation of agrarian discontent. They involve an uneconomic use of natural resources that might be more effectively employed for other purposes. The utilization of lands submarginal for agriculture contributes to the agricultural surplus and magnifies the difficulty of estimating prospective increases in production through new expansion. The vagueness of public opinion with reference to what lands are best adapted to private or to public reforestation tends to delay adequate provision for meeting our future needs for timber or providing for the recreational, scenic, and other advantages that are incident to the utilization of land for forests. The sparse and sometimes transitory

occupancy of land economically unsuited to farming imposes on the public unnecessary burdens for maintaining local utilities, such as schools, roads, telephone and electric power lines. Vagueness as to the future use of land complicates the development of long-time programs for the development of such utilities.

The reasons that might be regarded as justifying public agencies in undertaking to define the agricultural margin have been given vastly greater emphasis as a result of the abnormal conditions affecting American agriculture during the past decade. These abnormal conditions have disturbed to an extreme degree, the established modes of land utilization and have caused large areas to fall below the margin of profitable cultivation. A special monograph would be neccessary to present adequately these far-reaching dislocations. I can only touch upon them briefly.

First, here as in other countries of the world, agriculture in the older regions has been profoundly affected by the expansion into semi-arid regions, made possible by new technical developments, which has continued persistently in spite of a decade of depression.

In the United States the effect of this new competition has been seconded by a steady progress in technique, resulting not only in great economies in the use of human labor but also in a larger product per unit of crop land due to increased efficiency in cropping and greater economies in utilizing feed and forage in livestock production. On the other hand, there have been certain changes in consumption that have tended to economize in per capita land requirements—notably the saving in feed of horses through substituting tractors, increased per capita consumption of sugar at the expense of the cereals, a decrease in the per capita consumption of mutton and lamb over the past decade, and recently of beef, offset in part by an increased per capita consumption of milk and pork. Until the decline in beef consumption began two or three years ago, the net result of the above changes since the years just preceding the World War did not alter materially the per capita land requirements, but they did involve the necessity for material changes in the scope and character of agriculture in particular regions.

The expansion in semi-arid regions together with the slowness of contraction in areas where agriculture has become unprofitable, and the changes in efficiency in the use of land already mentioned, have caused agriculture not only to become unprofitable over wide

areas but to yield less in the areas where it is expanding than the special advantages of the new areas appear to justify.

Another circumstance that is profoundly affecting American agriculture is the spread of pecuniary standards of consumption and urban standards of wages into areas long accustomed to frontier methods of existence, notably in mountain and other backwoods regions. Many of our older agricultural regions find themselves handicapped in meeting the new conditions of competition on account of impaired soil fertility or the disappearance of timber resources which formerly supplemented the other sources of farm income.

While extensive areas have fallen below the margin of profitable agriculture or have become newly conscious of their submarginality, the nation is confronted with a serious prospective shortage of timber a few decades hence.

OBJECTIVES IN ACTION BASED ON DEFINITION AND DETERMINATION OF THE AGRICULTURAL MARGIN

Recognizing, then, a public interest in the definition of the agricultural margin, what advantageous lines of public action would be made possible as a result of the definition of the margin in particular localities?

The most positive form of action would consist in the public acquisition of lands considered submarginal for agriculture, whether now operated or not operated. Such a proposal is sometimes urged on the basis of the need for increasing the national supply of growing timber. It should be clear, however, that this aim alone is not sufficient justification. Enormous areas of submarginal land are incapable of growing trees. In wooded regions the acquisition of occupied farms is an expensive method of acquiring land for reforestation, and scarcely justified when extensive areas of cut-over land can be purchased in large tracts at far less cost than would be involved in purchasing an equivalent area consisting of small farms, even though essentially submarginal.

Except as a means of consolidating and rounding out a forest area by eliminating a few interspersed farms, the public acquisition of submarginal farms by purchase would have to be justified, if at all, largely as an agricultural, rather than as a forestry, policy. The public acquisition of submarginal farms has been proposed as a method of dealing with the so-called "surplus" problem; but

in view of the international scope of the market for important farm crops, it would probably prove a futile, as well as an extremely costly attempt at a solution. In wooded regions, particularly, where the amount of crop land is frequently a small proportion of the entire farm area, it would be necessary to acquire a large acreage to eliminate a relatively small acreage of crop land. Thus, in two West Virginia counties the land we have classified as submarginal for farming and which is likely during the next twenty years to be allowed to grow up to timber, will increase the existing forest area of the two counties by less than 5 per cent.

It appears probable, then, that public acquisition of submarginal farms by purchase must be justified only incidentally as a means of reducing the surplus and of adding in some regions to the area available for reforestation, but rather must it be justified to a large extent on specific local benefits, such as reducing public expenditures for roads, schools, mail delivery, and telephones. Another social benefit arises through eliminating poverty areas and areas where the community life lacks compactness and coherence, and preventing the prolongation of these conditions by the re-sale of submarginal farms to unwary purchasers. Incidentally, in some submarginal regions, large areas are coming back to the states by reason of tax delinquency, and the purchase of a certain amount of land would be economical merely to consolidate public holdings. An important need is to modify the established policy of redistributing tax delinquent lands, by creating a definite recognition that they are frequently submarginal for agriculture and should not be again disposed of to prospective farmers.

A second line of action following the definition of the agricultural margin, would be the development of an energetic extension program to acquaint the public with the facts. The adequate presentation of the fact of submarginality, frequently not consciously recognized by the occupants, may be found a potent method of stimulating abandonment, preventing the tragic mistakes made by new settlers in selecting land, and elevating the level of real estate practice.

A third form of action would consist in promoting agricultural reorganization of those areas which are submarginal under present systems of organization, but which might be economical under an extensive scheme of reorganization.

Fourth, as already suggested, there should ensue the reformulation of plans for local utilities, in line with the revised outlook for land utilization.

THEORETICAL CRITERIA IN THE DEFINITION OF THE AGRICULTURAL MARGIN CONSIDERED FROM THE STANDPOINT OF PUBLIC POLICY

What criteria determine the extensive agricultural margin? The classical definition, namely, the land where returns tend to equal expenses, is an explanation of what the self-interest of the individual should lead him to do in occupying land for agricultural use. From being an explanation of what the individual should do it is often employed to indicate what he will do.

But even if it were a reasonably correct interpretation of what occurs in practice (and it is not) it does not follow that such a margin would coincide with the line which, in the interest of public policy, should be drawn between lands to be used for agriculture and lands to be used for other purposes. A margin to serve as an explanation of individual conduct may be quite different from a line which subserves the interests of public policy. I have already referred to the difficulties encountered by the individual in determining what land it will pay to use, the numerous mistakes that result, and the tendency for these mistakes to be multiplied through the influence of high-pressure real estate salesmanship. In practice, wage levels and costs of capital are widely different for long periods as between various regions. In mountain and other regions, as Richard Jones brought out just a century ago in his discussion of peasant rents, a rural economy largely non-commercial frequently prevails, giving rise to the utilization of lands that would be considered below the margin in a system of commercial agriculture. As Marshall and others have pointed out, the speculative interest frequently causes the occupation and utilization of lands below the margin. Moreover, after occupancy has been established, even by commercial farmers, both economic and psychological inertia delay removal; for, until improvements wear out, until other alternatives are found, and until hardship creates a willingness to break established social connections, people cling to land even though it is submarginal. Furthermore, many people are carrying on a certain amount of farming on poor land in connection with other occupations, such as mining, lumbering,

or urban employments, making a reasonably good living out of the combination. Finally, there are submarginal people who, by reason of age or infirmities, may be able to exist, frequently by the aid of pensions or contributions from relatives, more cheaply and securely on poor but cheap land than they could live in commercial areas of high priced land.

In the formulation of a public policy of land utilization for a given area, many of these special conditions must be taken into account. Such a policy should not adhere rigidly to a single formula as a basis for designating lands as non-agricultural.

It is probably well, however, to apply a formula as a starting point, and the formula should be one which assumes the point of view of a commercial agriculture. Stated briefly and abstractly, it would be well to determine whether the particular classes of land under consideration can be expected to yield a return equivalent to what the requisite labor and capital can command in alternative employments and leave enough for the land to equal at least what it would earn in the next most advantageous use, say grazing or timber growing.

I need not elaborate at this time the difficulties in applying such a formula which will occur to all of you. One must first face the problem of determining what the land can earn in the most advantageous agricultural uses. This implies not merely ascertaining the probable returns under existing uses, which may not involve the methods or systems of organization that would be most advantageous, but also implies attempting to determine what methods of agricultural organization and practice would be best adapted to the conditions of the area. In such an undertaking, one must take the risks of unpredictable changes in technical methods, prices, and costs. One must decide also, how far he will go in including income from outside employments which may be justifiable, at least in the case of activities which are economically complementary and supplementary to the labors of the farm. There is another set of difficulties in determining what net return the land would earn under alternative uses, such as forestry or grazing, and still another group of problems in deciding what alternative returns for the labor and capital employed should be used as criteria in measuring the adequacy of the returns from the agricultural use of the land. In the case of wages, for instance, what occupations should we select and in what localities? Shall we adopt the interest

rate on first mortgages prevailing in the region as a criterion of the cost of capital or the more favorable rates of other areas?

These difficulties and others that might be enumerated are formidable, but many of them need be encountered only in the case of types of land falling within the twilight zone of uncertainty. For large areas the utilization possibilities are likely to be obvious. A large porportion will be clearly non-agricultural, and the problem will be merely one of determining whether it should be employed for extensive grazing or for forests, and in the latter case, whether by private or by public enterprise. Much other land will be readily recognized as clearly agricultural. In the initial stages of his inquiry the investigator will accomplish much by determining and mapping these fairly obvious distinctions.

As already indicated, the application of the above formula in defining the margin of agricultural utilization will comprise merely a point of departure in the development of public policy. In some cases, for instance, it will be well to eliminate from farming certain classes of land which are clearly supermarginal. I have in mind a type of soil in the counties included in our West Virginia studies. It is capable of a good return per acre, but it is scattered in small tracts in the midst of extensive areas of submarginal land. It is difficult to find enough in one tract to make up a farm of adequate size, and it is clearly uneconomical to maintain schools and roads for such widely scattered farm units. It will frequently be found wise to encourage the continued occupancy of land otherwise submarginal, so long as existing improvements are capable of use. Again, it might be an unwise policy to encourage the evacuation of a submarginal area occupied by a population that is reasonably contented. The interpenetration of modern standards of living and of wages is likely soon enough to disturb the existing stability. One would hesitate to displace an old or infirm occupant who can exist better where he is than elsewhere, unless perchance his removal may appear essential to the larger aims of public policy. In general, a program of encouraging farm abandonment should be justified only by fairly definite prospects that the people can make a better living in a more wholesome environment elsewhere, either as farmers in other localities, or in other occupations.

TYPES OF RESEARCH INVOLVED IN DEFINING THE MARGIN

The interest in attaining a better understanding as to the present and prospective location of the agricultural margin gives rise to a number of different kinds of projects varying greatly in the scope of their respective objectives.

1. For certain purposes it is desirable to know merely whether expansion or contraction is likely to be justified for the nation as a whole, and approximately how much, without attempting to determine in what regions or on what classes of land it is likely to occur. Such a generalized statistical outlook throws light on such questions as the desirability of further land reclamation, and other policies, private or public, involving expansion or contraction in the farming area. In the Division of Land Economics we have made some attempts at this kind of long-time forecasting, considering such items as population trends, modifications in consumption, improvements in production, and trends in imports and exports as they appear to affect the land requirements of the nation. There are many obscure elements in such an undertaking. For instance, we are woefully ignorant as to the probable magnitude of the expansion likely to occur in the next decade in countries having large undeveloped areas of semi-arid land.

2. Related to the above, but somewhat more specific, is the attempt to determine the prospective expansion over a period of years for particular crops and kinds of livestock.

3. A third type of project of a general character is to take note of the geographic tendencies in expansion—for agriculture as a whole, and for particular enterprises. It is fruitful to note current changes, but it would be far more fruitful if we could undertake to determine, for instance, the probable magnitude of the prospective expansion of wheat or cotton in the western Great Plains; is it likely to be 2,000,000 acres or 20,000,000 acres? Even rough estimates, though not involving detailed land classification, would be of great assistance to those responsible for the formulation of agricultural policies.

4. A somewhat similar class of project is involved in estimating statistically the area of potential agricultural, forest, and grazing land in the United States and various subdivisions thereof, basing the estimates largely on a study of the relationship of census tabulations by townships to available maps and descriptive data with reference to geology, topography, soils, and rainfall.

5. All of these more extensive types of studies provide a helpful background for the intensive definition and localization of the agricultural margin.

METHODS IN THE LOCALIZATION OF THE MARGIN

Time will permit only a rough itemization of a number of the steps in such a project, some of which will be synchronous and others successive.

1. An inventory of the physical conditions is a prerequisite, including a study of the various conditions in their interrelationships.

2. A study of significant facts, made available by scientific research or local experience, as to the characteristics of specific soil types, their adaptability to various uses, and their peculiarities affecting use under existing conditions of rainfall, temperature, and topography.

3. A mapping of roads, railway lines, centers of population, and other elements of the culture.

4. A mapping of present uses of land as related to physical conditions and culture of the area. This will include a mapping of forest cover and, in the case of extensive range areas, of types of forage.

5. A division of the area into significant land-character units for purposes of further study, such units representing complexes of associated physical and cultural conditions which appear to give rise to important distinctions in methods of utilization.

6. A historical study of the changes in utilization in such land-character units. Since such units do not usually correspond with customary units of census tabulation, it will be necessary to reconstruct the recent history of the respective land-character units in various ways, including a regrouping and retabulation of census schedules, studies of assessors' reports and tax lists, inquiry as to the recent history of individual farms and forest tracts. Such a historical analysis is likely to reveal a number of significant, though possibly not conclusive, indices as to the prospective utilization of particular land-character units, as, for instance, tendencies with respect to tax delinquency and gradual or sudden abandonment of the land, consolidations or subdivisions of farms, activity in the making of improvements or the lack of it, and so forth.

7. A further step will be an analysis of current or recent economic experience in the utilization of the different land-character

units. Obviously, the methods of analysis will depend on whether the predominant use is for farms, forest, or range grazing.

In the case of farming, much of the data included in the ordinary farm management survey will be found serviceable, including quantities produced, gross receipts classified by source, family consumption of farm products, the usual inventories and lists of expenses. Particular consideration must be given to determine how representative the figures for the particular year are of normal experience. This will involve attention to yields and expenses over a period of years. Data should be obtained on amounts and sources of outside income. The economic history of the occupant of the farm, and particularly his financial progress or lack of progress on his farm, will furnish significant indications.

In the analysis of these data, it will be helpful to undertake a series of residual imputations of income to each of the three factors, land, labor, and capital, based on assumptions as to the opportunity cost of each of the other factors. While such approximations are subject to all the limitations of the assumptions themselves, they are of assistance in appraising the economic results of the existing method of utilizing each land-character unit.

It is also important not to form judgments based too largely on averages. It is possible that a half dozen persons out of fifty in a given land-character unit may have effected an adjustment which permits a reasonable measure of prosperity, although the other forty-four exhibit indications of economic deterioration. Exceptional cases may indicate successful methods of organization and practice capable of being followed by the ordinary run of farmers or on the contrary, merely the inexplicable combination of individual ability, special advantages, and good fortune, which the ordinary man can scarcely hope to duplicate.

8. The above procedure is predicated on the assumption that each land-character unit contains one or more farms. This is the case in some regions, as, for instance, in the areas studied in West Virginia. On the other hand, it sometimes happens that the individual farm contains a number of land-character units in various combinations and proportions. In such a case total gross and net income alone become less significant indices. It may be found desirable to analyze each farm into its land-character units to determine the inputs and outputs, and finally, to correlate the net returns by land-character units with net income from the farm

as a whole, in order to determine what combinations of land-character units, if any, promise to be effectual in yielding a supermarginal income.

9. I have already indicated the importance of adopting a criterion of marginality in income under conditions of commercial farming. Thus far we have not gone farther in this direction than to average the net incomes earned by tenant farmers in various parts of the United States believed to be capable of maintaining a permanent agriculture.

10. Before reaching conclusions, the investigator will take into account the general long-time outlook for the important crops of the region of study, new technical developments and any other predictable developments that may affect his conclusions.

Since this discussion is devoted to the definition of the agricultural margin, I shall not undertake to outline the methods of analyzing the probable economic results of utilization for forests or for range grazing, which are frequently essential elements in a land utilization project. Lack of time forces me also to ignore the discussion of the information necessary to the consideration of readjustments of public policy in relation to tendencies in land utilization. Such information will comprise data on the institutions and public facilities of the area and various significant sociological facts necessary to the formulation of well considered judgments concerning public policy.

The various processes outlined will be given different emphasis in some regions than in others. In some regions the available inventories of physical data are more adequate than in others. At best we must rely on indications rather than on absolute judgments, and our present problem is to determine what is a reasonably safe minimum in the accumulation of indices of the location of the agricultural margin.

THE PROBLEMS OF LAND UTILIZATION IN THE CUT-OVER REGIONS OF THE LAKE STATES

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WHILE this paper is confined to the problems of the cut-over areas of the Lake States of the United States, these problems are of more general application than the title suggests. Similar problems will tend to arise whenever there is a waiting period between one productive use for the land and another, or where lands are submarginal for private utilization. The so-called "Lake States" include Minnesota, Wisconsin, and Michigan. These states were at one time the source of much of the lumber supply of the country. In 1850 a little over 5 per cent of the nation's lumber supply came from these three states; this increased to over 33 per cent in the period, 1880 to 1890, and in 1900 over one-fourth of the supply came from this region. Today these states are importing wood products from the South and West.

Not all of these three states were originally forested. A large part of Minnesota was open prairie, and occasional prairies occurred in southern Wisconsin. Michigan was practically all a forest area. The early settlements in Wisconsin were made in the southern part on virgin forests and prairies. Here the trees were removed to create farms although there was some manufacturing of lumber and shingles. In the central part of the state commercial logging became more important and here settlement and logging by sawmills took place simultaneously, whereas in the upper 17 counties of the state the sawmill preceded the farmer and carried of its work in mass production style so fast that the plow could not follow the ax.[1] It was in this way that the vast areas of cut-over land were created. The National Lumber Manufacturers Association estimates that there are over 14,000,000 acres of such land in Minnesota, 13,000,000 in Wisconsin, and almost 12,000,000 acres in Michigan. The importance of these vast areas will be appreciated if put in terms of percentages. Twenty-six per cent of Minnesota's land area, 37 per cent of Wisconsin's land area and 31 per cent of the land area of Michigan, is occupied by cut-over lands.[2]

[1] F. G. Wilson, "The Farm Timberlot," Wis. Agr Exp. Sta. Bulletin No. 407, pp. 7-9.

[2] Hearings before a Select Committee on Reforestation, U. S Senate, S. Res. 398, Part I, pp. 36-37.

This area is increasing at the present time; land is still being cut faster than it is being cleared.

The point I wish to make is that the original resource has practically disappeared as a basis for productive use or for taxation. It is true that the land is restocking itself with second growth wherever fire is kept out, but in general the species coming in are inferior to the original stands of white pine, Norway pine and hardwoods. The expected utilization for agriculture has failed to materialize. At present less than one-fourth of the area of the 17 northern counties of Wisconsin is in farms and only 6 per cent is in harvested crops. Not one-tenth is today in saw timber, whereas over 65 per cent is so-called cut-over land.[3] This cut-over land is really land awaiting a use; it is like the merchandise on the shelves of a store waiting for some purchaser who will put it to some productive use. Taxes have been paid on it for years because the owner fully expected to find a purchaser for it.

A few years ago it was believed that the North would become a great dairy empire. This dream failed to materialize for several reasons. In the first place, much of the land is submarginal for agriculture. In 1897, Filibert Roth gave as his opinion that not more than 20 per cent of the 27 northern counties of Wisconsin was good farm land, 40 per cent fair, and that the remaining 40 per cent should "by all means be left in forests." A detailed soil survey of Bayfield County revealed 40 per cent as the limit of agricultural utilization under present conditions.[4] However, as the timber was removed in the North, the land fell into the hands of land selling agencies who proceeded to sell it, good and bad alike. The result was that settlers were placed on submarginal land, or on land so difficult to clear of stumps, brush, and stones that it has become a common saying that it takes three generations of settlers to subdue the land. Some German settler poet has said—

Der Erste Tod
Der Zweite Not
Der Dritte Brot

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[3] B. H. Hibbard et al, "Tax Delinquency in Northern Wisconsin," Wis Agr Exp. Sta. Bulletin 399, p. 6.

[4] Filibert Roth, "Forestry Conditions of Northern Wisconsin," Wis. Geological and Natural History Survey Bulletin No 1 (1898), p. 8.
"Land Economic Inventory of Northern Wisconsin—Bayfield Co." Wis. Dept of Agriculture and Markets, Bulletin No. 100, p. 37.

Part of the failure of settlement is due to the fact that the settlers were marginal farmers. Too often they were city people lured by the prospects of farm life or they were drifters such as are found on all frontiers.

The second reason for the more recent failure of the settlement of the North is the farm depression. If it seriously affected the farmer on good land, it was disastrous to the man on the frontier, who, in the majority of cases, is a man with limited capital, most of which is sunk in land and fixed equipment. Such a man is in a poor position to weather the storm.

As a result of these two factors, there has been an exodus from the farms on the frontier. In Bayfield County over 4 per cent of the area of the county is in abandoned farms while in Lincoln County 5½ per cent of the land area is in abondoned farms. In another county about one-fifth of the farms are abandoned, and so the story goes. In some cases the farms have reverted to the land company or they have reluctantly been taken over by the mortgage holder. These involuntary owners are trying to rent or sell these "partly improved farms," but the market is naturally slow in a region where 65 per cent of all the land is for sale. Tax delinquency is high on abandoned farms. From the standpoint of county finances this has meant a shrinking tax base (1) in the number and value of the farms, and (2), in the value of the remaining active farms.[5]

One other land use has developed in the North, and that is recreation. There are thousands of beautiful lakes and streams whose shores are sought for resorts, hotels and for summer homes. Such land is very valuable, being sold by lake frontage rather than by acres. From the standpoint of area it is not of great importance, being about 2½ per cent in Bayfield County, 8 per cent in Oneida County, and somewhat more in Vilas County. But from the standpoint of value, and as a tax base, it is very important. In Oneida County it forms one-third of the entire tax base outside of the one city, and therefore one-third of the taxes are paid by resorts, summer homes, or by owners of land not yet developed for these purposes. There is very little delinquency on recreational land.

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[5] George S. Wehrwein, Land Ownership, Utilization and Taxation in Bayfield County, Wisconsin, Journal of Land and Public Utility Economics, May, 1930, pp. 161-162.

The land that is causing the most trouble in utilization and taxation is the land for sale. Since the hope of selling this land in large quantities has vanished, more and more of it is becoming delinquent; from 25 to 35 per cent was delinquent in Bayfield County in 1926, the year in which the study was made. Less and less of it is being redeemed by the owners or bought by private tax certificate buyers, since 1920. The owners of these lands are in a curious predicament. For years they have paid taxes which built the roads and schools and made local government possible; now they are "dropping the land for taxes" and the lands are becoming public property.[6]

However, the burden of carrying land until it should be wanted for farming would have existed even if all the land had been suited for agriculture and if settlement had gone forward instead of backward. At the best rate of development ever experienced in Bayfield County it would have taken 100 years to settle the whole county, or 40 years to settle only that portion considered suitable for farming. At the prevailing rate of settlement, 800 years would have passed before the upper peninsula of Michigan would have been in farms, and 100 years would have been required to bring even the best of the cut-over lands of Minnesota under the plow. Therefore, some of the lands would have had to wait 100 or more years before they were needed, and with the present trends, most of it will never be needed for farming.[7]

The first problem in the cut-over regions is, therefore, the shrinking tax base resulting from (1) the removal of timber and the loss of wood working industries which often means the loss of entire towns, (2) the shrinkage of the agricultural area through abandoned farms, (3) the shrinkage of farm values in general, and (4), the shrinkage of the tax paying area through tax delinquency with the consequent shifting of the burden on those land uses which can and do pay taxes, namely, the remaining timber lands, farms, and recreational land.

Although the tax base has become smaller, there is no marked tendency for governmental expenses to grow less. More and more is asked from our counties—nurses, mothers' pensions, school aid,

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[6] *Ibid.*, pp. 166-169.

[7] W. B. Greeley et al, "Timber, Mine or Crop?" Yearbook U. S. Department of Agriculture, 1922, p. 87.

and so forth.[8] In the North, part of the trouble is that towns, counties, roads, and schools, were projected upon the expectation of more farms and more people. Part of the blame rests upon certain laws which were designed to help the struggling settler. For instance the town was obliged to build a road to a settler who located at a distance from an established community. Land companies took advantage of this fact and purposely located their first settlers as far away as possible. After the road was built it was easier to sell the rest of the holdings at better prices. Likewise the town must either provide a school or transport children at public expense to an established school. The purpose of these laws was excellent and if rapid settlement followed, no harm was done. However, in a period when settlers are moving away from, instead of upon the land, we have abandoned roads and schools as well as abandoned farms. Scattered farms remain which make heavy demands upon the public treasury for roads and schools. It is interesting to note public sentiment in certain localities at the present time. They do not want new settlers at all if they are to mean added public expense. The last legislature has rescinded the compulsory feature of road building. In brief, governmental expenditures are not easy to reduce even though the tax base itself has shrunken.

The increasing area of submarginal or unused land is a burden in itself. Submarginal or unused capital goods can be scrapped and they disappear. When the truck and tractor superseded the horse as a source of power, some 6,000,000 power animals quietly dropped out of existence. When the same revolution in power, together with other factors, made millions of acres submarginal, the land, nevertheless, persists. One of the outstanding characteristics of land is its permanency. Unused land becomes a public burden. Roads have to be built across it even though these roads serve farmers only every ten miles. Submarginal and idle land has to be

[8] A few items of county governmental costs will illustrate this The following figures are for Oneida County, Wisconsin, for the years 1922 and 1928:

	1922	*1928*
General county costs	$38,703	$ 43,794
Protection of persons and property	12,002	14,550
Health, conservation and sanitation	3,699	4,967
Highways	56,390	192,483
Education	19,438	19,833
Charities and corrections	31,227	46,475

policed, and scattered settlements on good land must be provided with schools and other facilities at a high cost per person.

Land submarginal for private use, whether for farm or forests, inevitably becomes public property. Land yielding no economic rent cannot pay taxes or the other costs of land ownership. If these costs are paid, it is because the owner has some other income out of which to pay them. In the cut-over regions the taxes have been paid in the past with the hope that the costs would be met out of the selling price of the land. Since that hope is rather dim, the lands are becoming tax-delinquent and finally revert to the state in Michigan or to the county in Wisconsin. As public lands, they are no longer a part of the tax base and tend to become a liability instead of an asset as far as the county is concerned. This explains the reluctance on the part of Wisconsin counties to take title to the land and the constant urge to "get it back on the tax roll."

Land submarginal for private use may conceivably be marginal or above the margin for public use, such as forestry or recreation, but if it is absolutely waste land it will become public land and stay there. The question is as to whether the county or even the state is a large enough unit, financially, to carry the burden of large tracts of submarginal land.

Having briefly sketched the situation as it exists in the Lake States, especially in Wisconsin where I am most familiar with conditions, let me sum up the policies and movements under way in this state aimed at meeting the situation. Our problem is like that of the eastern states—a shifting of land uses on the margins—but there is also the problem of directing the future utilization of these large areas of cut-over lands which up to the present have had no productive use. Since the problem has so many political aspects and is in part due to past legislation, the remedy lies to a large extent in public action. We have reason to believe that the next legislature will do something toward relieving the tax burden and making changes in our tax laws which will readjust the relations between county, town, and state. As matters now stand the county stands between the town and the state and seems to get the short end of so many things. This, however, I cannot discuss in this brief paper.

The school equalization law has tended to help the schools on the frontier and has given them an equal chance with the more favored regions of our state. But it has also placed an additional

burden on the better developed industrial and agricultural counties of the state. This means that the land question is one of statewide importance and not merely a local problem.

The last legislature has passed a law giving county boards the power to "regulate, restrict and determine the areas within which agriculture, forestry, and recreation may be conducted, the location of roads, schools. . . . ".[9] This law is in fact a zoning law and is aimed at preventing scattered settlements or even the settlement of lands not suitable for agriculture. Preliminary to such action a number of surveys have been made, several of them before this law was passed, largely for the purpose of getting the underlying facts.[10] One of them was made pursuant to a resolution of the county board and had in mind the use of the material for zoning purposes, although the word itself is not used. A study was made of the soil, location of forests, of tax-delinquent land, active and abandoned farms, schools, roads, and county finances. Although the exact dividing line between farms and forestry cannot be laid down with any degree of exactness, nevertheless certain areas stand out as regions where agriculture is not likely to succeed. Here county officials are trying to discourage settlement, even though they cannot prevent a settler from going there. In a few cases, isolated settlers have been moved to farms near established communities at county expense, but the cases are still few and conspicuous because of their fewness. This summer four such surveys are in progress as well as an intensive survey of recreation as a land use in three counties.

Counties are urged to take title as fast as possible in the areas of high tax delinquency and some counties take title to all the lands they can. This gives them full control over the utilization of this land. In a few cases the counties have sold small tracts to neighboring farmers; in other cases, they are holding river and lake frontage as public land. The bulk of such holdings, however, is being "blocked up" for county forests. As such, they can be entered under the forest crop law and the state will pay 10 cents an acre to the local treasury (the town). Thereby the town is sure

[9] Chapter 356, Laws of 1929. B. H. Hibbard, W. A. Hartman, W. N. Sparhawk, "Use and Taxation of Land in Lincoln County, Wisconsin."

[10] Wis. Agr. Exp. Station Bulletin 406; Special Circular May, 1929, "Making the Most of Marinette County Land," "Land Economic Inventory" *op. cit.* Michigan has had a Land Economic Inventory for many years and Minnesota is beginning a similar piece of work.

of a definite amount of income for a period of years while the state and the county will share the proceeds when the timber is cut. There is only one difficulty in this arrangement—the costs of supervising, planting, and so forth, fall upon the county and the county is the weakest unit, financially, at this critical time. Nevertheless, the county forest movement is a most gratifying one. Federal foresters are now in the State selecting the million acres which are to go into federal forests. Eventually we shall have federal, state, county, school and perhaps town forests.

Private reforestation is being encouraged by our forest crop law. Under this law a private owner may enter tracts of at least 40 acres, paying 10 cents an acre taxes to the local treasury, the state paying an additional 10 cents. At the time of cutting the owner pays a severance tax of 10 per cent of the value of the stumpage to the state. The Conservation Commission is administering the law. Up to the present time about 300,000 acres have been listed under the law. Private and public reforestation, the development of recreational facilities, and a slight "back to the land" movement in some places, are helping to solve the land utilization problems of the Lake States. I say "back to the land movement" because there is evidence that new settlers have come in during the past year even though in other places they have moved out. What effect a continued industrial depression will have on this movement remains to be seen. The North is now committed to a balanced development of agriculture, forestry and recreation.

SELECTED FEATURES OF THE LAND UTILIZATION PROBLEM ARISING IN THE OLDER SETTLED REGIONS OF THE NORTHEASTERN UNITED STATES

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A CONSIDERATION of land utilization in the northeastern United States should deal primarily with:

1. The problems of those extensive areas where the margin of agricultural utilization is receding or should recede, and where there does not exist, except incidentally, any alternative utilization of the land except forestry.

2. The problems of those areas, where a purely agricultural utilization may not be economically warranted, but where various types of mixed utilization, such as part-time farming, and various combinations of residential, agricultural, recreational and forest use of the same holding appear.

The first class of problems noted above appears primarily in the hill and mountainous regions of the northeastern United States, which are somewhat remote from cities, industrial towns, and villages. Extensive areas of this class appear in northern New England, central New York state and in the Appalachian Highlands of Pennsylvania and the Virginias. Many of these areas were occupied or settled in the colonial period of American history, and practically all of them before the end of the early decades of the nineteenth century. Frequently, mistakes were made in the selection of land, and in many communities abandonment began to appear soon after settlement. Under conditions of a hand-labor agriculture with its small fields and farms, organized along the lines of family, or at the most, of a high degree of community self-sufficiency, very many of the farms and communities possessed survival qualities, some of them to a marked degree.

The opening up of the agricultural lands of the West, a succession of new technologies in the fields of transportation, the development of farm machinery, and the attractions of the more complex and less isolated urban life, served, and are serving, to destroy the economic foundations of culture and society in those communities. It must not be thought that the conditions are uniform or that any dead level of rural decadence exists. Variations occur, ranging from almost complete abandonment of considerable areas, to situa-

tions where some farms are profitable and the effectiveness of rural social institutions is not greatly impaired.

The extent of the areas in which much or all of the farming is carried on under submarginal conditions, or where the question is a matter of doubt, is great. It includes the greater part of the hilly and mountainous land of the states touching the Atlantic seaboard from Virginia to Maine, and of West Virginia. It we add the areas of these regions where most of the farming is carried on under conditions of certain or doubtful submarginality to the areas of those regions where complete abandonment has occurred, or where the land was never cleared, the total will probably equal more than one-half of the area of the Northeastern States.

The character of the problem has already heen suggested. As better lands farther west have been occupied, as agricultural machinery and improved transportation have increased the supply of low cost farm products available on the market, and as the size of the economic unit adapted to profitable cultivation has increased, various parts of these regions have approached and passed below marginality. Originally many of them combined forest industries with agriculture, and in some localities the virgin forests, and oftentimes the second and third growth has been harvested, and the rate of this source of income has been greatly diminished. Substitutes for these sources of income have not been found. The substitution of modern commercial, industrial, and social organization for the self-sufficient families and communities of the earlier days has rendered that earlier organization obsolete. The more enterprising sons and daughters of these regions, and in some cases nearly all the youth, have been attracted away from the hard life, low net incomes, and isolation of these regions to the greater economic and social opportunities of the cities. Some families persist out of loyalty to the old order, or sentimental attachment to the family homestead. There is some backwash into these areas from the cities of persons who are wrongly led to believe that economic opportunity exists for them there. This is particularly true of recent immigrants from the farming sections of Europe who have no sound basis for judging agricultural opportunity in this country. A greater or less degree of farm abandonment is characteristic of the poorer regions.

The prevailing tendencies in net income and number and character of population not only tend to disrupt the traditional cultural

life of these communities, but reduce and narrow the bases of support of the economic and social institutions. The individuals available for the support of schools, roads, stores, churches, and so forth, are fewer, and possess less net income out of which to contribute their support. As the condition develops the problem grows more serious.

The taxation aspects of the problem are particularly serious. In many regions the fund necessary for the support of public functions constitutes a high percentage of, and very frequently exceeds, the net income from land, capital, and management even when the rates of wages are charged at a minimum figure and adequate credit given for rent, use of land, and food consumed directly by the farm family. In many cases local government has broken down or become ineffective.

Attention is being given this problem by the state colleges in Vermont, New York, Pennsylvania, Virginia, and West Virginia and by the United States Department of Agriculture. These studies are directed towards a description of the present situation and an attempt to define those areas that are definitely submarginal for agricultural use and which should be relegated to forests. Progress has been made in these directions, but a large part of the work is yet to be done. The statistical criteria of submarginality employed have largely been the family incomes or farm incomes of the inhabitants, tax rates and sometimes tax delinquency, and the amount of state aid or subsidy necessary to maintain the public agencies of the regions. Whether these criteria constitute sufficient bases for the determination of public land policy is open to question. Various informal qualitative comparisons have also been employed. Long-time forecasting of relative prices and technologies has not been attempted. Attempts at speeding up and facilitating the slow process of natural adjustment have thus far taken the form of programs for state purchase of the poorer lands for forestry and recreational purposes, and the enactment of special laws for the taxation of forests in some states.

The importance of the problem of land utilization needs to be made more vivid in the general public consciousness. Attention needs to be given not only to its delineation as a problem, and to the forecasting of sound adjustment programs, but careful thought must be focused on the problems of the technique of readjustment.

The second problem, that of mixed utilization, usually occurs either where the farms are submarginal for a purely agricultural use or where the mixed utilization of the land results in a better business organization than any form of specialized utilization. The former condition, that of part-time farming, is a very common one throughout southern New England, New Jersey, and other regions of the North Atlantic coastal region, where population is dense and industrial cities and manufacturing villages abound. Men pursuing all sorts of commercial, industrial, and professional occupations, and unskilled laborers and craftsmen of various kinds, are found living on farms and deriving a greater or less proportion of their income from their agricultural activities. Rozman, who is conducting a study of part-time farming in Massachusetts, estimates roughly that one-half of the 33,000 farms found in the 1925 census in that state were part-time farms, and that there were about 25,000 to 30,000 more which the agricultural census did not find. He estimates the annual value of the agricultural products of these farms as about $17,000,000 last year.

In one township of three hundred families in Connecticut, purely rural in its immediate environment, but within a few miles of several factory villages—a town in which the soil is poor and the topography rough—we found eighty per cent of the farms were on a part-time basis in 1927. Usually, but not always, the supramarginal farms have purely agricultural sources of income. There is a great variety in the character of these enterprises, varying from small holdings intensively operated in the vicinity of large cities, to large farms in the hills on poor or stony soils. It is safe to say that many thousands of these part-time farms were purchased for the purpose of operation as full-time commercial farm enterprises and only after disillusionment or as a result of new opportunities were outside sources of income sought.

Let us now use the phrase "economic pattern" as a general term inclusive of all such terms as type of farming, part-time farming, purely forest utilization, and so forth. The modal enterprise organizations and usual business set-ups of dairy farms, dairy and apple farms, certain kinds of part-time farms, or commercial forests, or any other type, would each constitute an economic pattern. The economic pattern then is descriptive of land utilization. It describes the use of the land in terms of the enterprise combinations of the production unit utilizing the land

and in terms of the approximate proportions in which these enterprises are combined.

The problem of determining the natural and economic conditions to which various economic patterns are adapted is an important problem of land utilization in the northeastern states. The study of the desirability of the various forms of part-time farming as modes of living and as modes of securing the means of family support needs careful pursuit. This pattern needs also to be studied from the standpoint of its relationship to social and economic institutions in rural and suburban communities.

In addition to the part-time operation of submarginal farms in the densely populated regions, mixed utilization is more often the rule than not, throughout the northern upland regions, and on many farms on the coast and in the valleys. Forest land, which from time to time yields substantial returns, furnishes an important part of the income of every farm. Numerous holdings in hills, mountains, and on the coast, yield an important income for recreational use, and very frequently the income from this use combines with income from farm and forest to constitute the operator's total income.

Some of these part-time patterns, as well as some of the types of farms, have been found to be characteristically associated with certain natural and economic conditions. It is desirable that determination should be made of the associations of these types of organization with different classifications of the natural environment throughout the East.

There is throughout the Northeast a considerable variety of soils and a diverse topography, and in extensive areas it characteristically happens that a number of soil series with their associated topographic characters are interspersed in the same area. Frequently, also, a markedly different set of enterprise combinations, a markedly different pattern, is indicated for each set of conditions. A forecast of a particular set of price and economic changes would involve a different adjustment for each type. When we can assume the existence of social and economic institutions adequate for the service of the population of the area, then the problem of land utilization is primarily a problem of determining the economic pattern that is best adapted, from the standpoint of net returns and satisfactory living, to each more important classification of the natural and economic environment. In making

forecasts of best future utilization, estimates of future prices, and estimates of future input to output relationships, plus a vast amount of informed common sense and good judgment are required.

When, on the other hand, the effectiveness or even the very existence of the social agencies and public functions performed in a community depends on the character of the utilization of the poorer lands, then an attempt to answer the question of land utilization in terms of the types of economic organization likely to yield adequate net personal incomes, becomes painfully inadequate to the needs of the situation. The problem becomes a complex one in rural planning, in the solution of which, the economist and sociologist must seek the cooperation of the other sciences.

Another important phase of the problem in the Northeast is the growing need and demand of states and municipalities and the public in general, for more adequate provision of watersheds and reservoirs for municipal water supply, for more state and municipal parks and forests, and for the development of a forest policy which will insure the American people some supply of forest products when our present reserves of virgin forest shall have been exhausted.

A review of the various features of the land utilization problem in the Northeast makes it clear that the problem is neither simple nor capable of division into unrelated units. It is not a problem which the economists can solve alone, but one to the solution of which resources must be drawn from many fields of science and practical affairs. It may be described as the field of "Rural Planning." The magnitude of the problem is such that the best resources of the agencies serving agriculture in the Northeast may profitably be marshalled and coordinated for its solution.

POPULATION TRENDS IN RELATION TO LAND UTILIZATION

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THE present agricultural situation, particularly the disparity between the prices of the things farmers sell and of the things they buy, which is as bad now as it was at the beginning of the period of depression nine years ago, indicates the need of studying the utilization of the land, particularly the relative advantages of use for crops, pastures and forests. In studying this utilization of the land, it is obviously desirable to take a long look ahead.

We will not undertake to discuss the utilization of land in the United States, for the subject is too large to summarize in a brief paper, but we will try to take the long look ahead, not covering the whole of the horizon, however, but only the segments relating to the progress of population, to changes in the per capita consumption of agricultural products, and to trends in agricultural production—and these subjects only from the standpoint of the probable future need for farm land.

THE PROGRESS OF POPULATION

The population of the United States ten, twenty, even fifty years hence, can be predicted with a greater degree of assurance than any other economic or social fact, provided the immigration laws are not changed. This is because man is a long-lived animal, with an expectation of life now subject to little extension in the United States. The births of the last few years determine the number of marriages twenty to thirty years hence, and the number of deaths fifty to seventy-five years hence. A curve representing the population of the United States during the past fifty years is almost a straight line, trending upward (figure 1). No other feature in our national life shows so few fluctuations and such steady progress.

STATIONARY POPULATION APPROACHING

But, it is certain that this curve will soon bend slightly, unless the immigration laws are changed, and slowly approach a horizontal position. Later the curve may trend downward. This is because the birth-rate during the past decade has been declining with

unprecedented rapidity. The number of children born each year in the United States is now fewer than in the year preceding. The

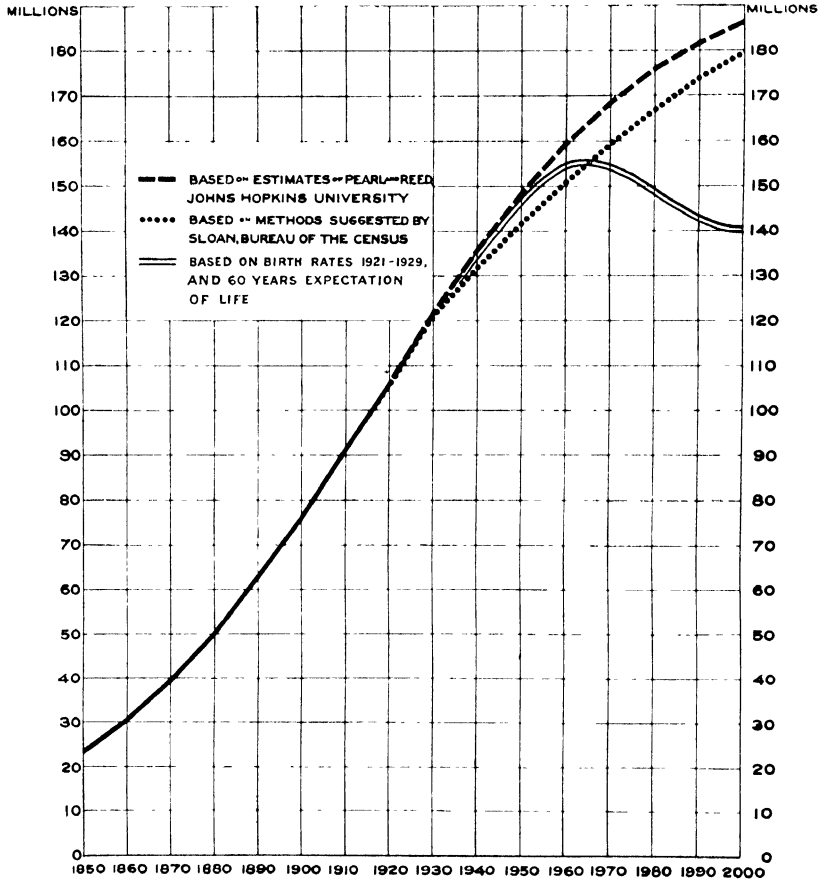

FIGURE 1. POPULATION OF THE UNITED STATES FROM 1850 TO 1920, AND ESTIMATES OF POPULATION FROM 1930 TO 2000 A.D.

Less than ten years ago Professors Pearl and Reed, of Johns Hopkins University, on the basis of the population trends, estimated the United States was slowly approaching a stationary population of nearly 200,000,000 about the year 2020. Dr. Sloan, of the Census Bureau, reached a similar conclusion. But the rapid decline in the birth rate since 1921, indicates a maximum population of less than 160,000,000 about the year 1960, unless the immigration laws are changed. Moreover, if the present decline in the birth rate continues a few years longer, and immigration remains as at present, a decline in the nation's population will set in soon after 1960.

enrollment in the first grade of the public schools has been declining very slowly, but surely, since 1918; in the second grade since 1922; and in the third grade since 1924. As the decline in

the birth-rate has been much more rapid since 1924 than in the years previous, it is clear that enrollment in the schools will decline more rapidly in the next decade than in the decade just past.

But, you may well ask, how can these things be in the face of the 1930 census returns, which show an increase of nearly 17,000,000 people in the past ten years, an increase which was greater than that between 1910 and 1920?[1]

The explanation lies in the fact that the contraction is in the number of little children, and that it will be twenty or thirty years before these grow to maturity and become a major portion of the population. As the larger number of young people—ten to twenty-five years old—grow into middle age, population will continue to increase. It is probable that the census of 1940 will show an increase of 13,000,000 or 14,000,000 over 1930, and that the census of 1950 will reveal an increase of 9,000,000 or 10,000,000 during the preceding decade. But the census of 1960 will show an increase of only a few million, and the census of 1970 will show no increase at all—unless the immigration laws are changed, or unless the ideals of the American people are altered and more men and women become willing to sacrifice for the sake of children.

However, in many cases the limitation on the size of the family is dictated primarily by a sense of responsibility for the education of the children. Three or four children—and it requires over three children per fertile family to maintain a stationary population—will reduce the standard of living, or increase the cost of living, of the average family by about fifty per cent, and fewer families, evidently, are willing to make the sacrifice or assume the responsibility.[2]

Other important factors affecting the birth-rate are the great reduction in immigration from Europe during and since the World War and the rapid urbanization of the American people. The immigrants from Europe prior to the war were mostly young people,

[1] It may be noted that the population returns of the 1930 census fall short by about 250,000 from the calculated population based on birth-rates, death-rates, and net immigration.

[2] The widening knowledge of methods of birth control, which permits the gratification of sexual instincts without involving the normal economic consequences, particularly in a civilization in which economic competition is intense and in which the desire to climb the social ladder is widespread, must be viewed with serious concern. A real conflict has arisen between the economic interests of the individual and his duty to the state and to the race.

recently married or of marriageable age. Moreover, these immigrants came mostly from peasant farms where the tradition of large families persisted. The reduction in immigration, therefore, reduced not only the increase of population, but also reduced the birth-rate in the United States. Similarly, the present migrants from the farms to the cities are mostly young people recently married or of marriageable age—middle aged and old people can-

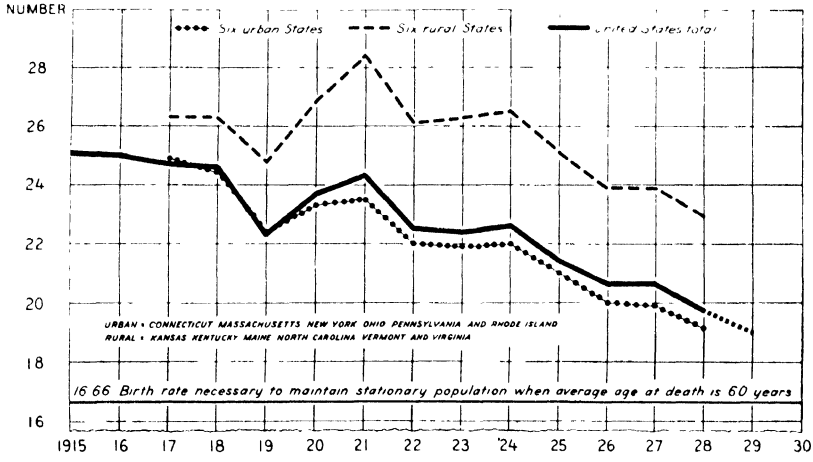

FIGURE 2. BIRTH RATE PER 1,000 POPULATION IN THE REGISTRATION AREA OF THE UNITED STATES, 1915 TO 1928, AND IN SIX URBAN AND SIX RURAL STATES, 1917 TO 1928

The birth rate began to decline slowly after the Civil War, and this gentle decline continued until the World War. Since 1921 the rate has been much more rapid. (The drop in 1919 was owing largely to the epidemic of influenza in 1918.) It will be noted that the birth rate in the six rural states was about two per thousand higher in 1917 and 1918 than in the six urban states, but that since1921 it has been about four per thousand higher. However, the rural birth rate is trending downward in much the same way as the urban birth rate. The fall in the birth rate has been so rapid recently that, despite the increasing population, the number of children born each year is less than in the year preceding. The enrollment in the lower grades of the public schools has already begun to decline.

not well learn a new occupation and make the many other adjustments necessary. Since farm people have a much higher birth-rate than city people, this migration of the young to the cities has reduced the birth-rate still further (figure 2). Only about twenty per cent of the nation's population now lives on farms, as compared with eighty per cent a century ago.

In 1921 the birth-rate in the registration area, which included most of the United States, was 24.3 per thousand population; in

1928 it was 19.7; and preliminary estimates for 1929 indicate that it was only about 18.8 last year (figure 2). A birth-rate of 17 is necessary to maintain a stationary population with our present expectation of life of 59 years, provided there is no immigration, and if the average age at death could be extended to 63 years, which is all that can be hoped for, it would require 16 births per thousand people to keep population stationary. Three or four years hence, therefore, if the present downward trend in the birth-rate continues, the number of children born will be only sufficient to maintain the present population, and any permanent increase will be dependent upon immigration. Moreover, it appears that after reaching a peak of about 160,000,000 near the year 1960 the population of the United States will begin to decline, unless the trend of the birth-rate is reversed or the immigration laws are altered.

AGRICULTURAL SIGNIFICANCE OF A STATIONARY AND OF A DECLINING POPULATION

A stationary population would involve difficult adjustments for American agriculture. During a century or more production has doubled about every 50 years, and our farmers have become accustomed to a demand for food and fibres increasing fully as fast as population. A declining population would be still more difficult to adjust production to; indeed, it would be a calamity to agriculture in many parts of the country, unless enlarged markets were found abroad. It would involve, unless exports increased, a rapid decline in the acreage of crop lands in the nation as a whole, and an even more rapid decline in the farm population. The declining farm population would tend to reduce the national birth-rate still farther, while the decline in crop acreage would affect the prosperity of many communities, urban as well as rural. The reversion of crop land to pasture or forest means generally, and doubtless will continue to mean, fewer farmers for the local merchant to sell goods to and for the local doctor and lawyer to derive a living from, so they also leave the community. There is less property value to tax for the support of schools and roads, and taxes, therefore, tend to rise. This makes more people give up their land, often allowing it to revert to the county or state for the taxes, which in turn raises the tax rate and forces still more land into a delinquent condition.

When the population becomes stationary, a farming community, or a nation, can still be fairly prosperous, because there are fewer children to support and the increase of capital and improvements in technique result, generally, in increasing income per person. But when the population of a community, or a nation, is declining, especially if the decline be rapid, it becomes more difficult for it to be prosperous, because, commonly, farm land lies idle, village houses, and many city houses also, stand empty and unproductive, business diminishes, land values decline, investments become insecure, and the young people and the more ambitious go elsewhere in search of work or better opportunities, leaving the aged or less efficient to farm the land, or to live in the declining cities. Above all, the spirit of enterprise is likely to be depressed. It is not without reason that the typical American community seeks to increase its population, organizes a Chamber of Commerce and employs a secretary to "boost" the locality and secure settlers and industries. It was not without reason that the nation, by means of the homestead laws, railroad land grants, and in many other ways sought to develop the resources of the country and encourage the increase of population.

But now the pioneer age is past, and the farm population is becoming urbanized so rapidly by the automobile and good roads, moving pictures, and popular magazines, that it is doubtful, even if agricultural production for export should be encouraged, whether there would be much clearing of land unless immigrants were admitted to do the manual labor, or unless the manual labor was rendered unnecessary by the use of machinery.

In any case, there will be little need for such land clearing unless immigration increases or unless a shift toward more meat in the diet takes place. Future immigration policy cannot be forecast, but the present national attitude is certainly opposed to reducing the restrictions very much. It is possible, however, to reach a conclusion with reference to changes in diet that may affect the need for farm land. Let us devote a few minutes to this subject.

TRENDS IN CONSUMPTION OF FARM PRODUCTS

The Word War caused changes in the diet of the American people as it did in many other things. Prohibition of the use of alcoholic liquors was also an important factor. The principal

change in diet was a notable decline in the use of bread, of corn meal, and other cereal foods and an increase in the consumption of milk, of sugar, of fresh vegetables, of fruit, and a slight increase in the consumption of meat (figure 3). Apparently the higher wages and salaries of city people after the war enabled them to eat more of the expensive foods. The average total consumption per person of wheat, corn, oats, rye, buckwheat and barley for

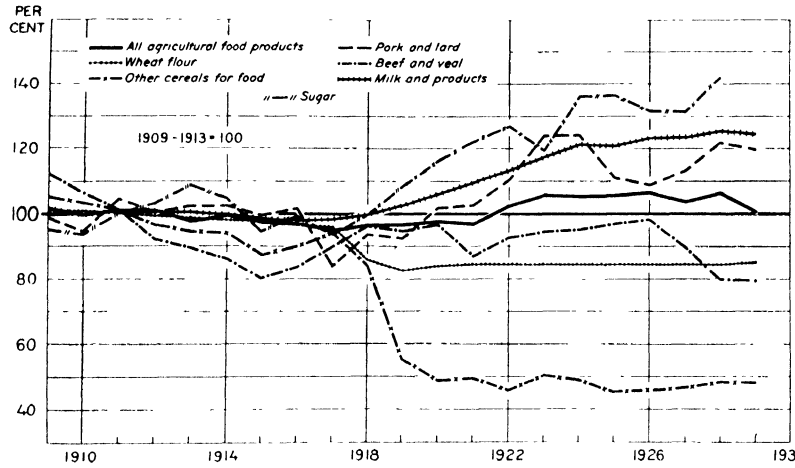

FIGURE 3. CHANGES IN THE TOTAL CONSUMPTION OF FOOD PRODUCTS PER PERSON IN THE UNITED STATES, AND CHANGES IN THE PER CAPITA CONSUMPTION OF SIX PRINCIPAL PRODUCTS, 1909-1929

The World War worked significant changes in the diet of the American people, as it did in many other things. Perhaps of even greater importance was the Prohibition Amendment to the Constitution, the prosperity of the urban people during and after the war, and the food education articles and advertisements in the popular magazines. The result has been a decline since the war years of about 100 pounds per person in the consumption of cereal foods, and an increase of about 27 pounds per person in the consumption of sugar, and almost as great an increase proportionately in the consumption of milk and its products. The per capita consumption of pork has also increased notably, while the per capita consumption of beef has declined. These changes have resulted in a slight increase in the per capita requirement for crop land.

human food averaged about 340 pounds a year during the prewar period 1909-1913, whereas during the last five years it has been only about 240 pounds. This is a decrease of 100 pounds, or nearly 30 per cent. On the other hand, the average American is now eating about 27 pounds more sugar, which is a third more than before the war, probably a fourth more milk and dairy products, possibly a fifth more vegetables, and a tenth more fruit, but only a little more meat.

THE EFFECT OF THE CHANGE IN DIET ON THE NEED FOR LAND

These changes in diet have had a marked effect upon the need for farm land. If man could live on sugar alone it would require only about one-third of an acre of sugar beets (or cane at average acre-yields in the United States) to provide the same amount of energy as that in the food which the average American consumes each year, but it would require three-fourths of an acre of corn or

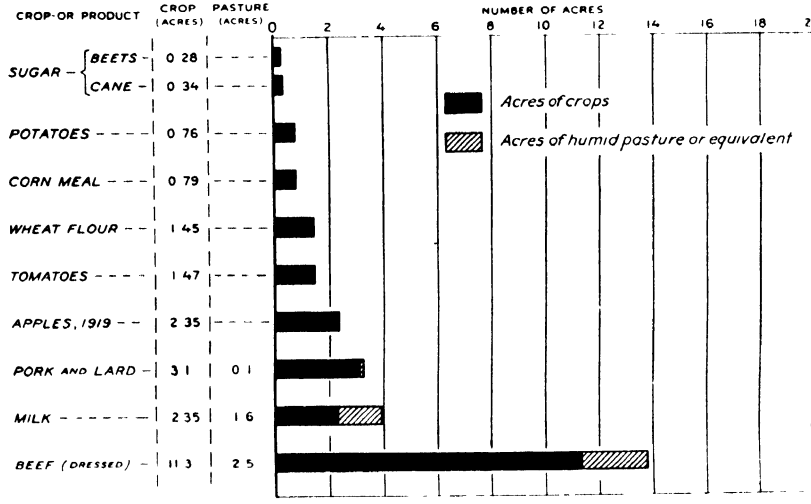

FIGURE 4. NUMBER OF ACRES REQUIRED IN THE UNITED STATES FROM 1922 TO 1924, TO PRODUCE 1,400,000 CALORIES OF CERTAIN FOODS

One-third of an acre in sugar crops produces about as many calories of food as three-fourths of an acre of potatoes or corn, or one and a half acres of wheat or tomatoes. But, lacking protein and fat, a person could not live on sugar alone, and the cereal diet would maintain health much longer. To maintain health permanently meat, milk, or other foods high in protein and fat should be added. These require three to four acres of crops and pasture to yield the same energy value in pork or milk, or 14 acres devoted to beef production.

potatoes, an acre and a half of wheat or tomatoes, about two and a third acres of crops and over an acre of pasture if he lived on milk, over three acres of crops if he ate only pork and lard, and 11 acres of crops, plus two acres of pasture equivalent, if he lived wholly on beef and veal (figure 4).

Of course, no man could live on sugar alone, for in a few weeks he would develop diabetes and other diseases; probably he could not live for a year on wheat alone; but he might be able to do so on milk, which is the most complete food. This comparison of the acreage required to produce an equal quantity of food, meas-

ured in calories, shows that much more land is required to produce a diet based largely on meat than a diet based on wheat, corn, or the other cereals. It now requires over two acres of crops to feed the average American, but only one acre to feed the average German, one-half acre to feed a Chinese, and one-fourth acre to feed a Japanese. This is owing largely to the differences in diet, except that the difference between China and Japan is owing to much higher crop yields in Japan.

The decrease in the United States since the pre-war years in consumption per person of cereal foods, principally wheat flour and cornmeal, has reduced the area of these crops needed to feed a person from about 0.34 of an acre to 0.26 of an acre, or by about one-twelfth of an acre, while the increase in consumption of milk, vegetables, fruits, and of meat has increased the area per person needed to produce these products by an eighth of an acre. Nearly all the increase in sugar consumption has been supplied by Cuba, Porto Rico, Hawaii and the Philippines, so it has not been included in the estimate. However, if this increased amount of sugar were produced within the continental United States it would require only 0.01 of an acre of beets per person, or about 1,250,000 acres for over 123,000,000 people. The net result, therefore, of the change in diet has been an increase in crop land needed to feed each person of about one-twenty-fourth of an acre. Meanwhile, the population of the United States has increased from 93 millions to 123 millions, which, after allowing for the change in diet, indicates that about 70 million acres more crop land would be needed to feed our people than just before the war, provided no changes occurred in production per acre. But the fact is that there are only about 30 million more acres of crops used to produce the nation's food than were used during this pre-war period. Indeed, after the war the acreage of crops actually declined until 1924, and is now only about as large as it was in 1919. This reduction of about 40 million acres in the crop land used to provide food for the American people is owing principally to the automobile and the tractor, which has reduced the number of horses and mules in the Unted States by over seven million and released for the production of food over 20 million acres of crop land, and secondly, to great improvement in the amount of meat and milk produced per unit of feed consumed.

It is evident that the increased use of meat and milk, made pos-

sible by the higher wages and salaries of city people after the war, helped to relieve the agricultural depression. But since 1926 there has been a rapid downward trend in the consumption of beef, the production of which requires so large an area of crops and pasture. If this should continue it would tend to aggravate the agricultural depression. On the other hand, an increase in consumption of beef would aid the farmers to obtain better prices for their products. As the upward trend in the cycle of beef production has now set in, accompanied by lower prices, it seems very likely that the consumption of beef will increase for four or five years, but then it will become, almost certainly, of decreasing importance in the American diet, unless the individual income increases as rapidly as the population. The consumption of pork seems likely to be fairly well maintained. However, the consumption of milk and dairy products declined in 1929—the first decline in 15 years—and prices of dairy products have fallen greatly. This decline in consumption, however, probably is not permanent.

The acreage of crops required to produce the per capita consumption of food in the United States during the last five years is somewhat less than at the beginning of the century, about the same as in the five years before the war, and considerably more than during the war years, but the trend now is downward.

Only one of the non-food products, cotton, requires mention, and it will suffice for our purpose to note that the per capita consumption in the United States of cotton lint, excluding linters, has remained remarkably uniform at between 25 and 30 pounds during most of the years since 1900, despite the rapid increase in the use of silk and rayon.

We come now to the question as to the probable acreage of crops required to feed a population 35 millions greater than at present at the peak, and having a per capita consumption, which, for safety's sake, we will assume to be the same as at present.

THE TRENDS IN AGRICULTURAL PRODUCTION

The changes in farming methods and the geographic shifts in the agricultural industry during the past quarter century have exerted extraordinary effects upon the need for farm land. The progress of population in the United States since the beginning of the century is compared with the changes in agricultural production, crop land, and farm labor, including that of the farmer, in

figure 5.[3] The graph presents the percentage increase over the base period, which includes the five years 1897-1901. This period, centered on the census year 1899, is about as far back as it is possible to secure sufficiently reliable data on the production of meat and milk. The base period, which marks the culmination of the agricultural occupation of the prairies, is one of abundant produc-

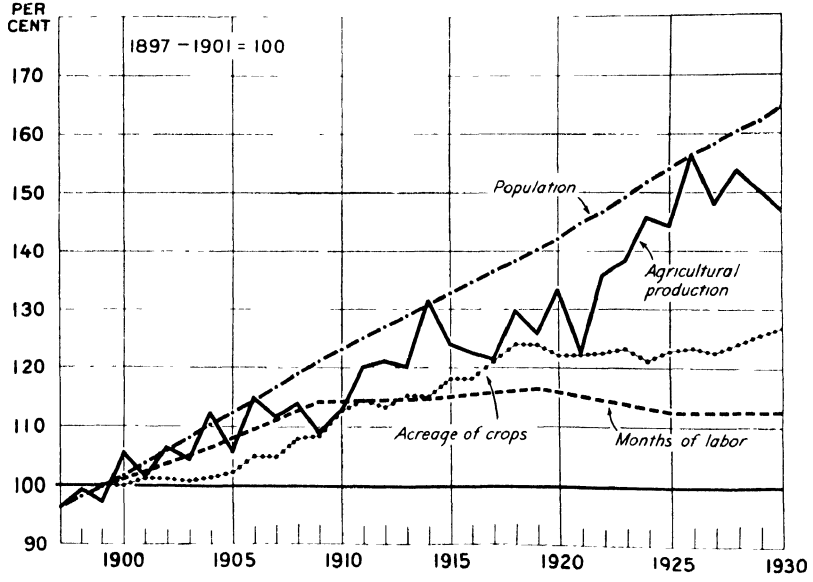

FIGURE 5. PERCENTAGE CHANGE IN AGRICULTURAL PRODUCTION, CROP LAND, FARM LABOR, AND POPULATION, 1897-1930

Although agricultural production is now over 50 per cent greater than at the beginning of the twentieth century, crop acreage is only 20 per cent greater, and the amount of labor employed in agriculture is only about 12 per cent greater. The increase in production per acre between 1919 and 1929, two fairly normal years, was about 16 per cent, practically none of which is owing to increase in acre-yields of the crops, while the increase in production per man was about 25 per cent. The data used in developing the index of production are preliminary and subject to correction after the returns from the 1930 census are available and after revised estimates of crop production prior to 1909 have been completed.

tion; indeed, the ratio of production to population may have been higher during this period than in any period before or after.

It will be noted that this high ratio of production to population persisted with but slight diminution until 1906, when a drop in

[3] The index of production consists of plant products for human food, plus animal products, plus so-called industrial crops, principally cotton, flax, and tobacco. (Crop products consumed by livestock are omitted since animal products are included.)

production the following year, with a further drop in 1909, lowered the ratio of production to population by about 10 per cent. This lower ratio, ranging from 5 to 15 per cent or more beneath the opulent ratio at the beginning of the century, has persisted since, except in the years 1914 and 1926.

THE FOUR PERIODS IN AGRICULTURAL PRODUCTION SINCE 1909

Let us note four periods in this curve of agricultural production since the decline in 1909. The pre-war period, 1910-1914, was one of rapid increase in production, each year being higher than the preceding, except 1913. During these five years production increased over 20 per cent, as compared with less than 10 per cent increase in population, but half of this increase in production occurred in the year 1914, which was characterized by extraordinarily large wheat and cotton crops. Then followed seven years of more or less stationary production, 1915-1921. During the first of these years war was raging in Europe, in which the United States soon joined; but after the disruptions caused by men leaving for the army camps had ceased, production rebounded in 1918 and again in 1920, when it exceeded slightly the high point in 1914. This was followed by an extraordinary drop in production of many crops in 1921, as well as in prices of farm products.

The period 1922 to 1926 was one of extraordinary increase in production. This period was in many ways the most remarkable in American agricultural history. For five years production was greater than in the year preceding and the increase by 1926 had become 25 per cent above the war-period level (1914-1920), whereas population had increased only about 10 per cent (since 1917, the center of the 1914-1920 period).

Not only was this increase in production extraordinary, but more extraordinary is the fact that it took place despite a stationary crop acreage and a decline in the amount of labor employed in agriculture (figure 5). Moreover, between the preceding 5 year period, 1917-1921, and this period, 1922-1926, there was a decrease of 17 per cent in number of horses, of 9 per cent in number of cattle and of 14 per cent in number of swine. The number of farms decreased 75,000 and farm population about 2,000,000, or over 6 per cent. Even more remarkable is the fact that this increase in production occurred despite an unprecedented decline in the level of prices of many farm products. The average purchasing power

of farm products declined 24 per cent between 1920 and 1921, and from 1922 to 1929 remained about stationary at 85 to 90 per cent of the pre-war (1909-1914) purchasing power prices.

What were the means by which this rapid increase in production was achieved on a stationary crop acreage, by a declining farm population, and in the face of a depressed level of prices?

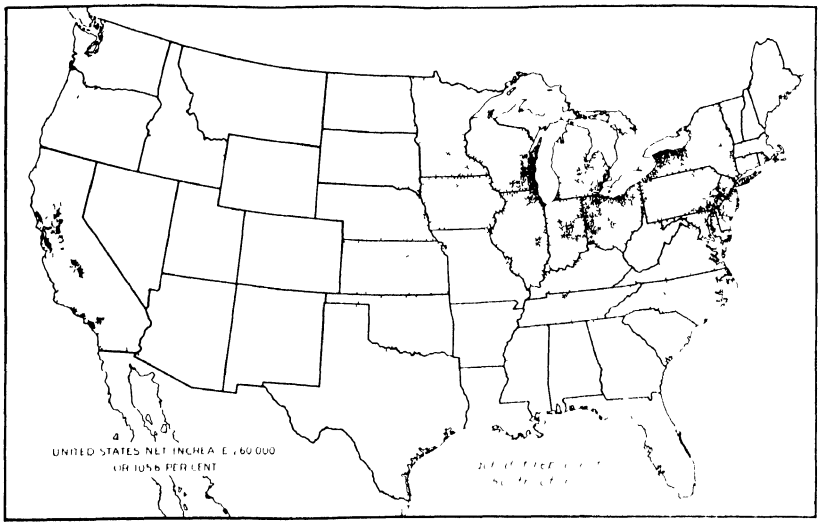

FIGURE 6. INCREASE IN THE NUMBER OF TRACTORS ON FARMS FROM JANUARY 1, 1920, TO JANUARY 1, 1925

The increase in tractors between 1920 and 1925 occurred mostly in the Corn Belt and in the more fertile portions of the Hay and Dairy Belt, in the Hard Winter Wheat Region, and in California. The increase was notable near the large industrial centers, where wages are high, and less notable on the large farms of the Central West, where, however, larger tractors are used than in the East. Few tractors are used in the South, except in central North Carolina and in Texas

FACTORS AFFECTING THE INCREASE OF PRODUCTION, 1922-1926

First, there was an increase of over 250,000 tractors on farms and probably over 500,000 automobiles, while horses and mules practically disappeared from city streets, (figure 6).[4] Between 1921 and 1926 the number of horses and mules on farms declined by 3,100,000 and in cities the decrease probably exceeded 300,000 (figure 7). This decrease of 3,400,000 horses and mules in 5

[4] The 250,000 figure for tractors is the increase between 1920 and 1925, according to the Census. In the spring of 1929 there were about 850,000 tractors on farms, according to estimates of the Bureau of Public Roads, United States Department of Agriculture.

years released probably 10,000,000 acres of crop land, which was practically all used to feed meat and milk animals or to grow cotton. During the last 15 years the crop land released has probably approached 25,000,000 acres.

Secondly, there was a notable increase in the amount of meat and milk produced per unit of feed consumed. The estimates of the United States Department of Agriculture indicate that about

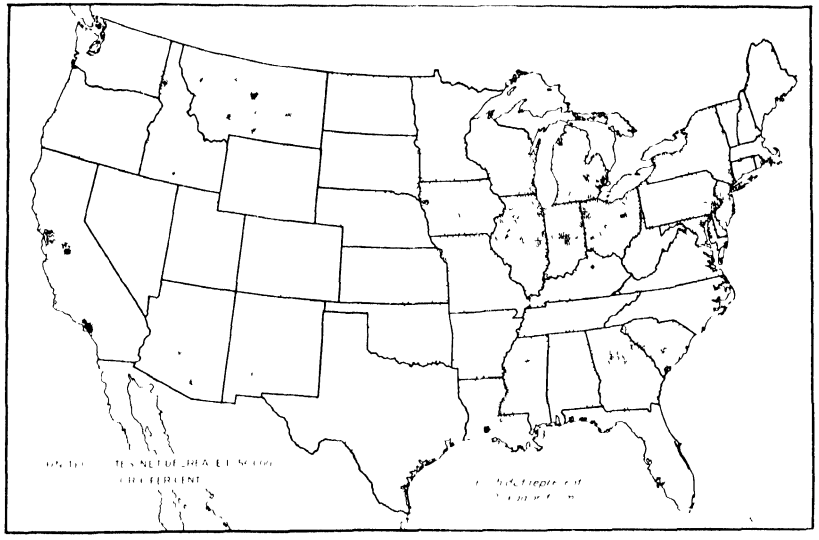

FIGURE 7 DECREASE IN THE NUMBER OF HORSES AND MULES, TWO YEARS OLD AND OVER, JANUARY 1, 1920, TO JANUARY 1, 1925

The greatest decrease in number of work horses and mules between 1920 and 1925 took place in the eastern and central Corn Belt, in the Hay and Dairy Belt and in California. In brief, where the increase in tractors was greatest. But a notable decrease occurred also in Georgia, South Carolina, and in other southern states, which was associated with the decrease in total crop land harvested and can be attributed only partly and indirectly to the tractor and automobile.

4 per cent more cows were kept for milk in the period of 1922-1926 than in the period 1917-1921, but that about 22 per cent more milk was produced; that about the same number of swine were kept in each period, but that probably 20 per cent more pork and lard was produced; that slightly more sheep were kept, but that about 19 per cent more mutton and lamb was produced; that there were about 8 per cent fewer cattle, but that nearly 9 per cent more beef and veal was produced (figures 8 and 9). However, after allowance is made for the decline in the number of cattle on farms,

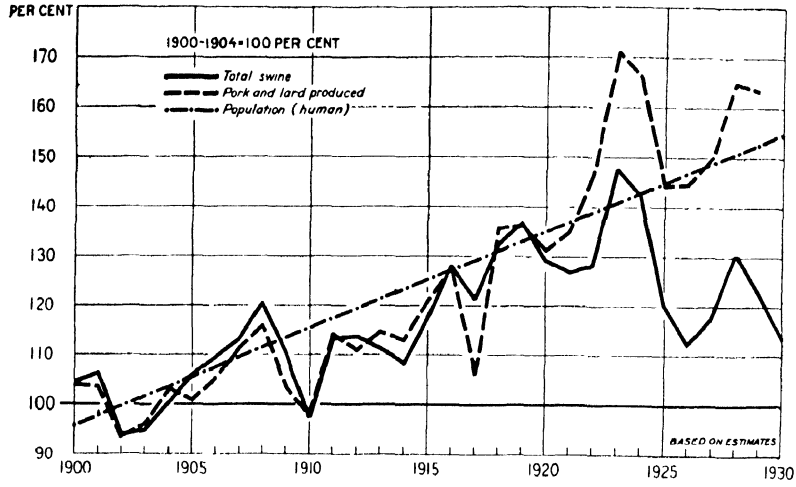

FIGURE 8. SWINE ON FARMS JANUARY 1, COMPARED WITH PORK AND LARD PRODUCED, AND POPULATION, 1900-1930

The production of pork and lard shows no deviation in trend from the number of hogs on farms from 1900 to 1920, that is, production per head on farms January 1, remained practically constant. Then the two lines began to diverge, and by 1923 production of pork and lard per hog on farms was about 18 per cent greater than in 1920, and by 1926 it was apparently 28 per cent greater. The production of pork and lard per person during the past decade averaged more than it did 25 years ago.

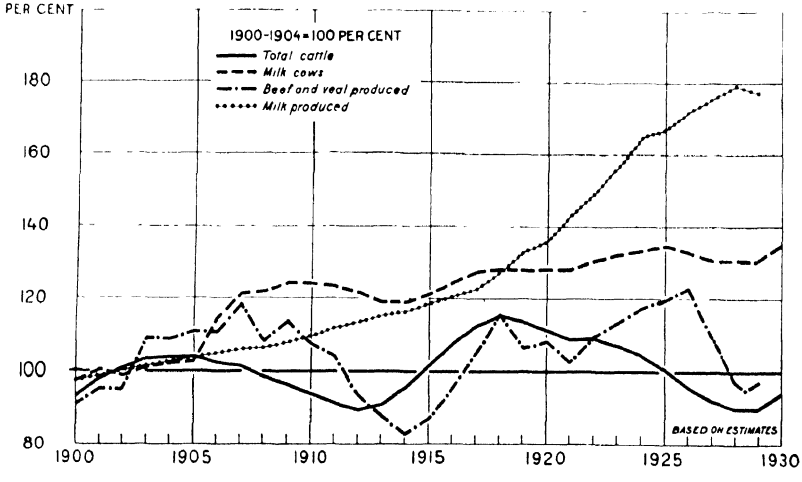

FIGURE 9. CATTLE AND MILK COWS ON FARMS JANUARY 1, COMPARED WITH THE PRODUCTION OF BEEF AND VEAL, AND OF MILK, 1900-1929

Two cycles in the number of cattle and in the production of beef are shown. The first cycle in number of animals began probably about 1896 and ended in 1914; the second cycle probably a year ago. In milk production, there is no cycle, but, instead, a constantly rising production, up to 1928. From 1918 to 1928 production increased much more rapidly than did the number of milk cows.

only a 9 per cent increase in the production of beef and veal per head on farms is indicated.

Increase in production per animal is, of course, greater than increase in production per unit of feed consumed; but, after including the feed released by the decline in horses and mules, it appears that the production of animal products in relation to feed consumed by the animals, increased in the neighborhood of 7 per cent between these two periods 5 years apart.

In the case of dairy cattle most of the increase appears to be assignable to improvement in the productiveness of the cows—principally to extensive slaughter of low-yielding cows; but for beef cattle and swine much of the increase was due to the decreasing number in the southern states, where the animals are less productive, and a stationary or, in the case of swine, increasing number in the Corn Belt and adjacent areas, where the animals are much more productive (figures 10 to 14). In the production of hogs there was also a great decrease in what may be called infant mortality, and improvement in feeding methods and sanitation. In the case of sheep much of the increase per unit of feed consumed was owing to the slaughter of lambs rather than of sheep, young animals making much more gain on the same amount of feed than old animals.

A third factor that affected the increase of production, but less important, was a shift from the less efficient classes of farm animals in the transformation of feed into food, toward the more efficient—principally from beef cattle and sheep toward dairy cattle and hogs. It requires only about three acres of crops fed to dairy cows or hogs to produce as much food as twelve acres fed to beef cattle.

Similarly there was a shift after the World War from the less productive crops per acre toward the more productive, notably from wheat toward corn in the Corn Belt, from corn toward cotton in the Cotton Belt, and from the cereal and hay crops toward fruits and vegetables in California and other fruit and vegetable producing areas.

Fifthly, there was a slight increase in the yield per acre of several crops, but this was the least important factor, accounting for less than 10 per cent of the increase of production. The land released by the decline in the number of horses and mules and the increasing efficiency of livestock in transforming feed into food,

account for fully two-thirds of the increase in agricultural production between the periods 1917-1921 and 1922-1926.

As already noted, expansion of crop acreage, which during the agricultural conquest of the continent was the major factor in increasing production, has ceased to be a factor since the war, the slight increase in acreage since 1924 just about balancing the decrease from 1919 to 1924.

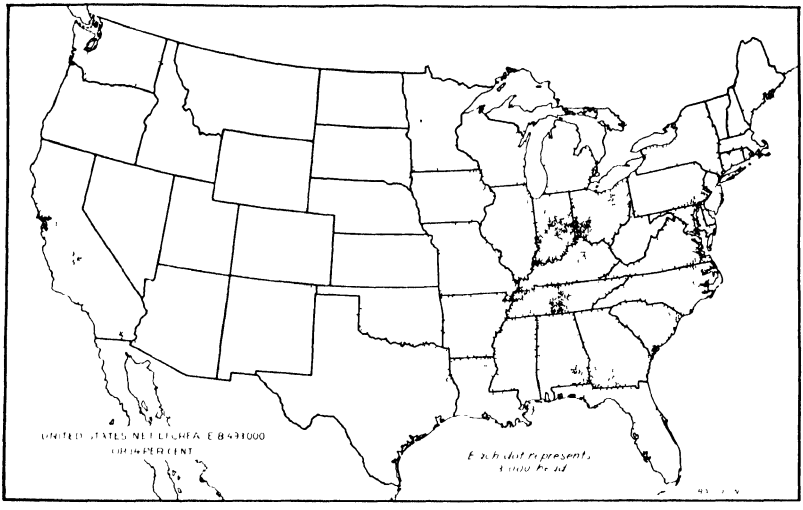

FIGURE 10. DECREASE IN NUMBER OF SWINE ON FARMS, JANUARY 1, 1920, TO JANUARY 1, 1925

The decrease in hogs between 1920 and 1925 was almost confined to the originally forested part of the United States, like that of corn, but extended a little farther to the north and west; a decrease also occurred in California. There are feed deficit areas except the eastern Corn Belt. Despite the 14 per cent decrease in the nation's hogs between 1920 and 1925, there was about 14 per cent more pork and lard produced in 1924 than in 1919, and 7 per cent more in 1925 than in 1920.

STATIONARY PRODUCTION 1927-1930

Let us now note the last period in the curve of agricultural production—1927 to date. For three years the trend of total production has been stationary, or, possibly, declining. The index number in 1926 was 157, in 1927 it was only 150 (the Mississippi flood diminishing production) in 1928 the index was 155, and in 1929, when adverse weather conditions were widespread, it was 151. During the present season of 1930 the drought has been severe in an area extending from Pennsylvania and Virginia to Texas and Missouri. It is too soon to tell whether this stationary condition

of production during the past four years is owing merely to the accidents of nature or in part to economic influences, but the fact that crop acreage has been increasing since 1924 suggests that it is almost wholly owing to adversities of the weather. Certainly it does not imply that American farmers are incapable of increasing production very greatly.

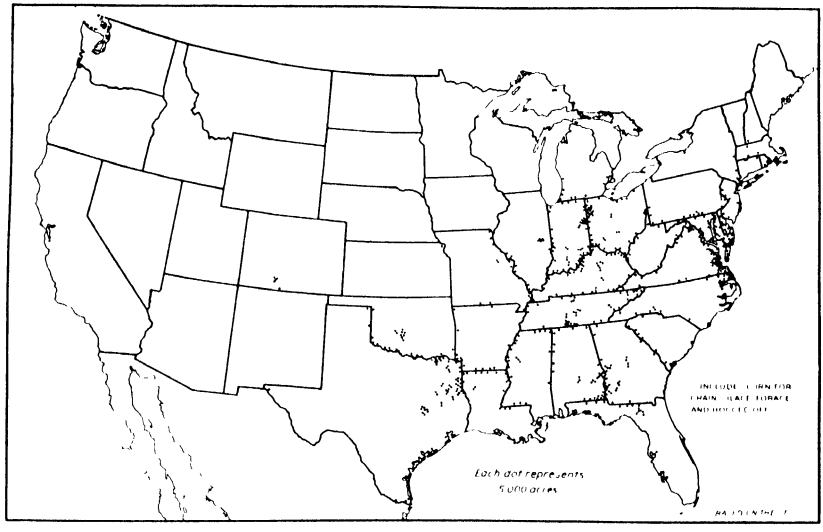

FIGURE 11. DECREASE IN TOTAL ACREAGE OF CORN, 1919-1924

The decrease in corn acreage between 1919 and 1924 was practically confined to the originally forested portion of the United States, where the soils are naturally poorer than in the prairie portion, and was greatest, proportionally, in the southern states. In the Indiana and Ohio portion of the Corn Belt, the decline in corn acreage was only a part of the shift from crops to pasture, resulting in part from the high wages obtainable in the nearby cities.

PRODUCTION PER ACRE AND PER MAN

Although agricultural production is now over 50 per cent greater than at the beginning of the twentieth century, crop acreage is only 20 per cent greater, and the amount of labor employed in agriculture is only about 12 per cent greater. Production per acre has, therefore, increased about 25 per cent, and production per man about 34 per cent. Most of the increase has occurred during the past decade, indeed, since 1921. The increase in production per acre between 1919 and 1929, two fairly normal years, was about 16 per cent, practically none of which is owing to increase in acre-

yields of the crop, while the increase in production per man was about 25 per cent.

THE PROSPECT FOR INCREASE IN PRODUCTION

It is unlikely that production per acre and per man will increase in the near future as rapidly as during the past decade, but it does seem likely that it will increase at as rapid a rate as during the past thirty years. The substitution of tractors for horses and mules

FIGURE 12. INCREASE IN NUMBER OF SWINE ON FARMS, JANUARY 1, 1920 TO JANUARY 1, 1925

The increase in hogs between 1920 and 1925 was notable in the western Corn Belt and in the Spring Wheat Region to the north, where the price of corn is the lowest in the United States. In these states there was a rapid shift from wheat toward corn and oats, while the number of horses decreased and the acreage of harvested crops increased. It will be noted upon comparing this map with figure 13 that the increase in hogs was not quite as widespread as the increase of corn.

is only about 25 per cent complete, and there appears to be no good reason why it may not become 50 per cent complete. Indeed, it must continue for several years since there are not half enough colts being raised to replace the horses and mules that die or become unfit for work annually. For fifteen years, perhaps longer, this release of farm land by the decline in horses and mules appears likely to continue, but by the time the nation's population becomes stationary this factor, probably, will have ceased to be important.

The increase resulting from the greater production of meat and milk per unit of food consumed by the animals will be limited, obviously, by diminishing returns, not only with reference to the feed but also with reference to labor and other costs. But the point of diminishing returns recedes with each advance in agricultural technique. Probably a century ago, when the average dairy cow gave perhaps 2,000 pounds of milk a year, the margin where returns diminished for the best cows was only 4,000 to

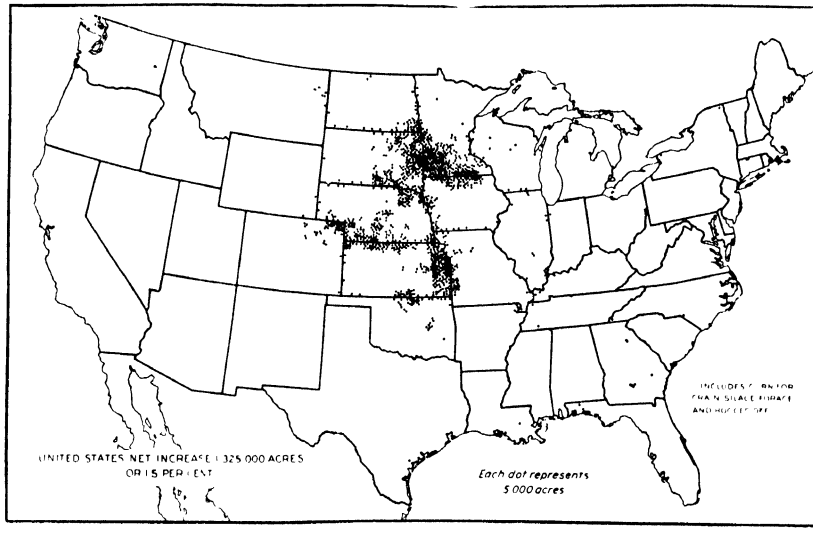

FIGURE 13 INCREASE IN TOTAL ACREAGE OF CORN, 1919-1924

In most of the region where the acreage of corn harvested increased between 1919 and 1924, the acreage of wheat decreased notably, and in the Dakotas there occurred also a considerable decrease in hay acreage. In southwestern Minnesota the increase in corn acreage was in part owing to a drought in 1919, and in part to drainage of land between 1919 and 1924. Partly as a consequence of the geographic shift in corn acreage, the production of pork and lard has been greater than ever before.

5,000 pounds; but now, when the average cow gives about 5,000 pounds of milk a year, the point of diminishing returns is around 14,000 pounds of milk for the best cows, according to the records of over 100,000 animals in cow-testing associations. During the past decade the yearly production of milk per cow has increased probably 1,000 pounds, or 25 per cent, whereas the consumption of feed has increased by only 15 or 20 per cent. Even if this recent extremely rapid rate of progress should continue, there is the possibility of increasing the efficiency of the milk cow in trans-

forming feed into food for many decades ahead. However, the increase in production of pork and lard per unit of feed consumed, which is owing mostly to better sanitation and reduction of the losses by death, probably will soon decline in importance. The same conclusion applies also to the increasing production of mutton and lamb per unit of feed consumed, which is assignable in large part to the increasing slaughter of lambs and the decreasing slaughter of sheep.

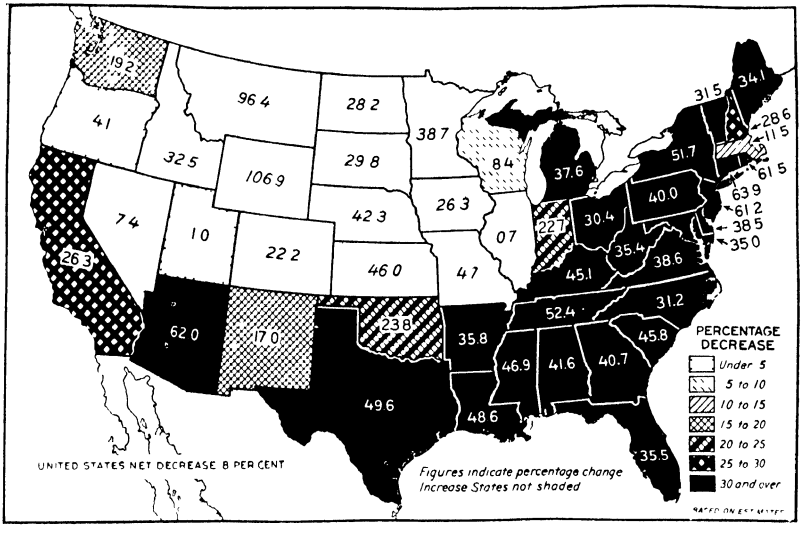

FIGURE 14. PERCENTAGE CHANGE IN NUMBER OF SWINE ON FARMS, JANUARY 1, 1920 TO JANUARY 1, 1929

The percentage change in the number of hogs on farms during the entire period 1920 to 1929 brings out profound geographic shifts in the industry. In the Cotton Belt the decrease in most states exceeds 40 per cent. The decrease is almost as great in Virginia, Maryland, and Pennsylvania, and is even greater in New Jersey and New York. On the other hand, from Missouri to Colorado and northward a notable increase has occurred, exceeding 40 per cent in Kansas and Nebraska, and mounting to about 100 per cent in Wyoming and Montana.

Both the mechanization of agriculture and the improvements in animal husbandry, which factors have been so influential during the past decade in increasing the agricultural surplus, are likely, therefore, to diminish in importance after a few years. Will other factors probably take their place and maintain the increase of agricultural production at much the present rate?

Of course, no one can answer this question with certainty; but in forecasting the future—and economic research must often fore-

cast the future if it is to be of practical value—it will be helpful to consider the factors which in the past have been the dominant factors in increasing agricultural production—the expansion of the crop acreage and higher crop yields per acre.

With reference to expansion of the crop area, there is about three-fourths as much land, now used for pasture or lying idle, which is suitable for crop production as that which is now used for crops—300,000,000 acres more or less.[5] This potentially arable land, of course, is mostly of lower productivity than that already in crops, but a rise in the prices of farm products such as occurred during the World War would bring millions of acres of this pasture and idle land under crop. The increase of the crop area between 1909 and 1919, most of which occurred during the war years, amounted to 45,000,000 acres; and an even greater expansion of the crop area probably would occur again if prices rose to a similar extent, for the tractor is admirably adapted to the task of expanding crop acreage rapidly.

With reference to increasing crop yields per acre, there are equally great possibilities. The use of mineral fertilizers is only in its infancy in the Mississippi Valley states, and even at present prices for farm products it would pay to use more fertilizer than is used. There are reserves of nitrogen in the air and of phosphate and potash in the earth sufficient to supply American farmers for hundreds of years.[6] The increasing importance of animal products in the nation's agriculture is a harbinger also of rising crop-yields. Several years ago it was estimated by a colleague in the Department of Agriculture that the average acre-yield of the ten most important crops, which occupy 90 per cent of the crop area of the nation, might be increased 50 per cent "when economic conditions shall justify the requisite cost of production," and there seems to be no reason to alter this estimate.[7]

Since nearly every invention, nearly every discovery, nearly every improvement in agricultural technique, nearly every advance in

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[5] Consists of 34,000,000 acres of idle and fallow plow land, 112,000,000 acres of plowable pasture in farms, probably 50,000,000 acres of sub-humid pasture land not in farms, and 114,000,000 acres of semi-arid dry-farming land. See figure 28 of "Land Utilization and the Farm Problem," Miscellaneous Bulletin No. 97, of the United States Department of Agriculture, 1930.

[6] Guy E. Mitchell, "America's Resources in Nitrogen, Potash and Phosphorus," in Economic Geography, October, 1928, pp. 366-380.

[7] L. C. Gray and others, "The Utilization of Our Lands for Crops, Pasture and Forests," U. S. Department of Agriculture Yearbook, 1923, p. 469.

economic organization tends to increase production, and recalling that the increase in production per acre in crops has been about 25 per cent in the last 30 years—not from higher crop yields alone, but principally from the transfer of the product of 25,000,000 acres of crops from horses and mules to meat and milk animals and from the increasing efficiency in the utilization of feed, attained by these animals—it seems quite possible that an increase of 30 per cent in agricultural production per acre in crops, corresponding to the increase in population, may occur during the next 30 or 40 years, provided a profitable market can be found for the products. It is more likely, however, that there will be some increase in the acreage of crops.

If half of the arable pasture and idle plow land should meanwhile be put into crops, the agricultural production of the nation might be increased by two-thirds without diminishing the present forest area. Population is unlikely to increase more than one-third. Instead of population pressing on the food supply, as was feared a few years ago, the food supply is pressing on population in our nation, and appears likely to continue to do so. Apparently we are not likely to need, for domestic consumption, much more crop land than there is in crops at present, and the problem of disposing of the export surplus seems likely to remain with us. Questions as to how agricultural exports may be increased, and as to what shall be done with the potential crop land, need especially to be studied. Most of the potential crop land—which exceeds in area the present acreage in crops—appears unlikely to be needed for crops for many years, if ever.

AGRICULTURAL ECONOMICS AS APPLIED ECONOMICS

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IN MY WORK in agricultural economics it has always seemed to me that the philosophy of economic science with which we are provided in the general studies of method in economics, and in general statements of the aims of economic science, is quite inadequate for our purposes. Agricultural economics is an "applied science," that is, it is a methodical pursuit of knowledge of economic processes and organisation in agriculture and of their results, for the purpose of stabilising, adapting or modifying them; and, if and when necessary, of changing their results. The application of knowledge to an industry does not necessarily mean changing the forms of organisation or structure of the industry or even making any change in its processes. The most complete and reliable information may confirm the usefulnesses, desirability, and value of the existing organisation and processes. But this is not often the case, and had there been expectations that this result would arise from the study of agricultural economics probably there would not have been any such study.

In all "applied" sciences there is an underlying assumption that the results of study will lead to desirable change, to development and progress. The study of agricultural economics grew out of a more or less clearly recognised need for knowledge of economic organisation and economic processes in the industry which could be used for intelligent modification of existing forms and conditions. Agricultural economics is not a "pure science," for the study is not pursued, nor is the organisation maintained to pursue it, maintained to produce "knowledge for knowledge's sake." There are necessarily times when agricultural economists must specially claim to be free to pursue knowledge in their sphere without restriction and without thought of its possible effects; and they will of course always claim "freedom of science" to explore their universe and "academic freedom" to proclaim results.

Scientists engaged in an "applied science" do not usually apply their knowledge: they usually apply their methods of study to what are apparently weak spots in the industry. They produce their results, and they sometimes indicate how these results affect the consideration of processes or forms of organisation. They may

even go further and indicate the modifications which seem, as the result of their investigations, to be necessary or desirable. Some studies are directed not, apparently, to weak spots in organisation or processes but to these in general. But no one will object to the statement that any weaknesses discovered in such investigations are given greater attention than evidences of strength or of stability. This condition may alter as the science develops and at some points knowledge may lead quite as clearly to preservation or conservation as to change, but this is not to be expected for some time to come.

If agricultural economics is not an applied science in this sense, then it can only be an industrial branch of "political economy" or "economic science." Studies will be pursued and organisations maintained to procure knowledge and to proclaim it. The result may be "pure knowledge," whatever that may be. But whenever the result is real knowledge we may rest assured that someone will use it either in whole or in part. And we have always to remember that "laws" or "principles" of the "purest" of pure economics have been used, particularly in politics but also in industrial administration. These uses perhaps have been more frequently of a negative or conservative than of a positive or constructive character, but negative uses of ideas, principles, and even knowledge in social life may sometimes be as important as constructive uses. The negative here as everywhere is merely the first step to a positive attitude.

Industry is a social activity. Economics is a social science. The pursuit of agriculture is a social activity, and agricultural economics is a part of a social science of economics, which is only one of the social sciences.

From these points of view I would examine the position of agricultural economics and in part that of the agricultural economist. If anyone accuses me of being an idealist, or of trying to make a philosophy, I can only say that my record as a fact-finder will show that I have done a fair share of work in that sphere. My dissatisfaction with mere fact-finding drives me to consider its basis.

The outstanding fact about any branch of applied economics, and about agricultural economics in particular, is that its results, its knowledge (sometimes more properly perhaps, its "information") will be used for purposes of manipulative or directive acts in the sphere of economics or politics. These acts may be those of individuals, of groups or their leaders, or of administrators or

statesmen. They may apply to one business, to group interests or collective businesses, or to economic organisation of the state or world-community.

There is a theory, or as I would prefer to call it, a suggestion (occasionally treated as a dogma), that agricultural economics is concerned only with natural forces in that part of the economic universe occupied by agriculture and agriculturists. Agricultural economics, it is said, is a naturalistic science, that is, it should pursue its studies with reference only to phenomena or facts; and it has nothing whatever to do with "values" or assessments of phenomena or "facts" by human or social standards. There is also a suggestion that agricultural economics as an industrial branch of pure economics is a study in pursuit of pure knowledge, which sometimes means that it is an essay or series of essays in logic. And it matters not that logic may be deductive or inductive: the results are logical and impersonal.

This, of course, is not true. Some processes in inductive logic in the social sciences are quite personal, and some in deductive logic are intensely so. Logic does not give mechanical results of mechanical processes. But neither of these represents the true position of agricultural economics as a branch of social science, and I shall not make any apologies for applying some of the principles of other social sciences to agricultural economics.

If we deal with economics by the methods of the naturalistic sciences we should arrive at something like natural law, but as a matter of fact we never do. Social life is not a "natural fact" "The form of social life at present under our eye is not the result of inevitable processes, but, in great part at least, the result of definite acts of choice made by particular men and groups of men." In so far as existing society—including the economic organisation of agriculture—is the result of past choice and past acts of will, so the social life of the future may be transformed by new acts of will. Practically speaking, we can apply the conceptions of natural science to the economic systems only when we use the conception of the "economic man." Then we regard the system as a ground arranged for a scramble in which men give as little and get as much as possible. But we do not now accept this principle of self-interest, at least in its crude form. We know that self-interest is and must be checked by law, by economic conventions, and by morals.

We do not accept the principle of self-interest in the science of politics and have not accepted it for about 80 years. "Political man" is not concerned with giving the least and getting the most "Political man" is concerned with the establishment and maintenance of order, the creation and extension of liberty, and the establishment and maintenance of good government. If we apply the political principle to economic organisation, then we view it not as a naturalistic world, but as a cooperative enterprise for maintaining and developing civilised life. (The specific objects sought by "economic man" may be discussed later.)

We may then, take as our fundamental principle in economics the division and specialisation of function because of its importance in production. Our fundamental problem is, then, the coordination of functions to secure the greatest order in the distribution of functions themselves and the greatest order in the distribution and the use of the goods and services produced. Or, accepting the principle that division and specialisation of function will lead to production at least cost or on the most economical lines, then our problem is that of combining the pursuit of least cost with that of the highest possible degree of order and security.

It is because no one believes in the naturalistic scheme of economic organisation that every one not merely accepts but gladly sees the political and social organisations interfering to qualify the results of the economic organisation. In the naturalistic system of economics the fact that the economic system does not need a man—although that man still needs food, clothing, and housing (and the health and well-being of society requires that he receive these and live in civilised decency)—means that this man is not a part of the economic system. The unemployed are irrelevant to the naturalistic economic system. Their wants are not relevant to that system because they are not backed by purchasing power. But the naturalistic economists never yet had courage to suggest that the unemployed be shot—as we shoot unnecessary horses—although some of their simpler and more truthful followers in the world of business have privately held views somewhat of this character.

I use this illustration because it is one of which the principles have long received recognition. But should we apply the naturalistic conceptions to agricultural economics we shall soon find ourselves faced with the same sort of dilemma. The farmer who

loses his economic position because of the advance of technical processes or economic organisation in the industry has just as much right to the support and assistance of society as the urban unemployed. He is a member of society, and society suffers when he suffers beyond a certain degree.

Just at the point at which the economic system breaks down the political and social systems take up the task of making civilised life possible. They are able to, and in fact are obliged to, because they are informed by better philosophies of the social life.

If our economic system is a natural system, it must be what it is, and what it is it will be. That is not to say it will not change, for if we believe in evolution in the natural world we believe in change in that world. But the seeds of all the change in future natural worlds are here in the present. This is true of the economic world also, but the seeds of change in the economic world are in the minds and hearts of men as well as in the economic phenomena themselves. Man does not change the stars, he only changes his thoughts and develops his knowledge of them. Man does select and breed plants and thus changes the plants that grow. But he cannot put into plants anything that is not already there. He uses directive thought and develops them. In economics, man can at least use as much directive thought as in applied botany, and he may put into the economic system some things which are not now there. When man begins to use directive thought in applied botany or in applied economics he asks not only "What is?" but "What ought to be?" or "What is required?"

We are then brought to the fact that in applied economics we are not only concerned with facts, but with values. *What ought to be* has to be considered equally with *what is* and with *what is coming.* Where we pass from the world of *what is* to ideas of *what ought to be,* we no longer deal with a world which is in any sense naturalistic, or with any world by the methods of naturalistic science.[1] The natural sciences deal with a universe that not only

[1] Throughout this paper the phrase "what ought to be" is used in the sense of what ought to be from the economic point of view, i.e. from the point of view of economic health in existing society. It has reference to what is now economically possible in existing society, or what may reasonably be achieved in the near future. There are points at which ethical and political considerations may join with economic considerations in the total social consideration of what ought to be, but the economist is primarily concerned with what ought to be from his own standpoint of the production, distribution, and use of goods and services provided by the economic system. The general tendency of economics is to lay emphasis on

is but will be. We deal with a world that is, but a world that will be as man makes it, and as we help him to make it.

What I have said contains no implication that there are no "natural facts" in the existing economic system; nor does it imply that I depreciate knowledge or the pursuit of knowledge of those facts. "Facts" in the economic world are mere existences; they are in no sense "inevitables." Laws in the economic world, if any, are mere existences and they are not inevitable. Economic laws are mere general tendencies in the existing scheme of things. Change the existing scheme and the law disappears. And most economic laws require modification from time to time.

Any fundamental laws of the economic universe can only arise from the nature of man now applied in that universe—his aptitudes, his capacities, his desires. If we admit that man has aptitudes and abilities which are not now used in economic organisation and desires which are not strongly expressed in it, and we begin to apply new aptitudes and abilities and to express new desires, then the economic system will change. There are many illustrations of such changes.

When we have described our facts, when we have discovered their several tendencies, it is not sufficient for us to say "Here is *what is*," or "That is how it came to be," and "This is what is coming or may be expected." It is for us to say (from the point of view of economics) what change is desirable what is the best method by which change may be secured, what degree of change will be possible in a given time by a given method, and possibly what consequential change will follow on any change that is made. Applied botany and applied genetics in animal breeding decide what change is desirable and the methods by which change may be brought about, and in some degree they hope in the future to estimate possible rates of change and to anticipate, at least, some consequential changes.[2]

In short, it is not for the economist, much less the agricultural

production and distribution with the greater emphasis on production. Agricultural economics, until quite recently, has dealt mainly with production. Any attempt at economic synthesis ought to go far beyond the system of preliminary production.

[2] The modern chemist, probably, is much more proud of his achievements in synthesis than of those in analysis. Synthetic chemistry has certainly done immense service to mankind and has brought high recognition to the whole science. It is no less scientific than the analytic chemistry upon which it is founded. And there is no *a priori* reason why a synthetic economics should be less scientific than the mere analytic.

economist, to regard as sacred a system of thought which he has created for his own convenience. It is certainly not for the economist to regard as sacred an economic organisation constructed during the last century by men less intelligent than himself. When the economists have finished their work on *what is;* when they have reached their forecasts of *what is coming;* then their task is to conceive an economic policy, that is, to conceive a deliberate control of production and consumption of wealth for the sake of a clearly conceived life of man in civilised society.

Before proceeding further with this discussion perhaps I ought to offer some ideas as to studies in agricultural economics.

Economic systems are made largely if not wholly by behaviour systems in men and groups of men, but not, mark, by any one behaviour system which is common to all men at all times. The predominant economic systems have been made by men who have been dominant in economic organisations. If we can change the behaviour systems of the men who dominate economic organisation, we can change the economic system itself. Incidentally, the first thing we attempt when we direct attention to farm management data or marketing data, and try to get knowledge applied, is to try to change the behaviour systems of men, so I presume that no one of the "practical" persons amongst us will say that behaviour systems cannot be changed. We can and do change behaviour systems of men in individual businesses, in groups or in nations.

Possibly the economic system has been regarded as a scramble because so many economic relations are the result of mere casual impact. Many of the relations into which farmers enter are really of the nature of accidental impacts. A man who wants to be a tenant "must get land," but it is often an accident which piece of land he gets. The impact between owner and tenant is not even inevitable for on some occasions tenants may not get land and on some occasions owners may not find tenants. A wheat producer must sell wheat, but it is largely a matter of accident to whom he sells it. If we could build up continued relationships, continuous cooperation, we leave behind the idea of scramble and put the idea of organised relationships in its place.

In dealing with complexities of social phenomena we have to be careful not to proceed too rapidly to lay out the apparent or the supposed uniformity. There are some cases, as in the so-called

theories of wages, in which we may have to be satisfied with the description of the complexities and where, if we are honest, we shall not try to make logical uniformity where none exists. H. G. Wells (in "The World of William Clissold") speaks of "the scholar's hate of irreducible complexity," and there is no doubt that those of us who have been brought up on logical systems like to see our way through a series of complex phenomena as quickly as possible, and feel baffled and ineffective when we cannot do so. Unless I am mistaken there are some aspects of existing marketing systems which show irreducible complexities and in regard to which logical reduction may not be possible.

It may seem a strange thought, but there are probably cases in which we shall never find order and uniformity until we have applied standards of what ought to be, and reorganised systems.

Everyone believes that the world in which we live possesses a certain kind and measure of regularity. Every action which we voluntarily perform, and every expectation which we entertain, carries the implication of such a belief. This is true of course of the economic world; but it does not follow that there is "uniformity of nature" in the economic world. Here phase follows phase in constant flow, but every phase is unique. Phases in social life are not often if ever repeated. The so-called "repetitions" in social life are never more than vague resemblances. But there is a view that the economic world is nevertheless made up of uniformities, of causal sequences repeated again and again, which collectively embody laws which are general over a given population in a given state of civilisation. If this exists there cannot be more. In economics there is no such thing as that unbroken experience in time and space which is supposed to establish the uniformity of nature and which, it is said, makes inference from experience possible. Yet we sometimes talk as if by processes of inductive logic, by the help of scientific methods, we can map out the whole of economic reality into a scheme of definite causes directly connected with well-defined effects, which together form sequences whose recurrence in different combinations makes the changing pattern of the economic universe.

Within a given space and a given time, or more properly within a society consisting of a group of people living in one area over one period, there are tendencies in certain directions which can be measured, there are experiences from which inferences can be

drawn, and there are uniformities which make possible some explanations and which give rise to expectations. Our universe is much more complicated than is usually suggested. Here it is very rare that anything happens through the operation of a single cause, or yet through the simple cooperation of many causes each adding its unqualified contribution to the total effect. Causes can never be completely isolated, and their operation is never unqualified. Sequences, so far as we know, are never exactly repeated. There is always the factor of human reactions in the course of economic relations. In economics "things" are never related to "things" except through man. And in the end we have to remember that all our calculations are mere approximations, and that we cannot rely on the repetition of the phenomena in the same relations and in the same quantities. In economics we are dealing with human history, and this has hitherto proved to be inherently incalculable.[3] No two human beings, it is said, exactly resemble each other. Certainly, for economic purposes, no two groups of human beings exactly resemble each other, and no two groups (whether separated by space or time or even by mere economic and social barriers) ever live in exactly the same circumstances. When we change the circumstances, we change the human beings, and when we change the human beings we begin to change the circumstances. Unless psychologists and economists can get together and obtain a common measure of these reactions there is no hope of certainty in economic calculations.

[3] The present position in economics seems to be that *minor* occurrences are becoming predictable, while *major* occurrences come entirely unexpectedly. Could we, for instance, foresee in 1920 the coming popularity and cheapness of artificial silk, and the consequent effect on cotton and wool? Could we forsee about that date, the spread of the combine-harvester and its probable effects on wheat production and on farm organization in some regions? Can we predict the future effects of the combine-harvester from the study of changes following the introduction of the self-binder? Are there any known scientific means by which we can predict changes in the location of production, or changes in consumption? Who predicted the substitution of the horse, and in part of the railway, by the automobile and its associates? All these questions are important even in agricultural economics.

Even the prediction of minor occurrences depends on the assumptions of a static world, or of steady and known trends. The use of correlation studies is particularly dependent on these assumptions. And it is probable that in these studies quite insufficient attention is paid to "residual factors," especially when these represent the beginnings of what may be described as catastrophic or at least as radical changes. Even where the results of quantitative analysis more or less coincide with the expectations from preliminary observation and deductive analysis, and a high degree of correlation between quantities of factors is obtained, we cannot be certain of the future repetition of relations and quantities, especially where the intelligence of man may introduce new factors.

While I regard this as true I still say that it is a wise and necessary procedure to press mechanical theories to their limits. It is necessary to search for what can be measured, and for methods of measurement and calculation. Mechanical research along the lines of mechanical theories is essential. The greater the obscurity, the less the certainty, the greater the necessity for methodical analysis and for the closest possible measurements. The analysis will deal with *what is, how it came to be,* and in some cases with *what is coming* and *what is becoming.* (I would distinguish between the last two. By "coming" is implied temporary changes such as trade or "financial" fluctuations, and so forth, which alter conditions but do not necessarily have great effects on existing forms of organisation. By "becoming" is implied tendency towards change in essential forms and in some cases in processes.)[4]

Essentially, we attempt to interpret human action and reaction in the processes and forms of economic organisation but within the whole environment of the social life. There is no "system of laws," no set of general principles, nor even of statements of facts, or explanations of facts, which can be complete or exhaustive for any considerable amount of time. Experience accumulates, new facts are observed, new forms display themselves, and all such formulae must be from time to time broken up and moulded afresh. But more than this, processes and forms must be moulded to social needs

As workers in applied economics we cannot accept the idea that economic development be left to chance or to the working out of such rough uniformities as may exist in the economic universe. Our very existence implies that economic occurrences may be planned for and directed, at least to some extent Either things are left to chance, or are directed. If they are left to chance there is no applied economics.

But so far we have not reached one of the most essential facts in the philosophical basis of applied economics—that it not only rests on the expectations of change and the possibility of directing change, but also on the essential validity of the ideal in social life. In all social science we are faced with the queer situation that we have to treat the ideal as reality. To the leader of men in individual businesses, in groups large and small, in economic or in poli-

[4] Becoming means to pass from one state to another to come or grow to be.

tical groups, the ideal is a magnet drawing on; and to the led amongst men the ideal is a direction-pointer; while to those whose interests would be injured by the establishment of the ideal, it is a bogey whose advance has to be obstructed by every possible means.

In passing we may note that one of the characteristic means of attempting to obstruct the establishment of the ideal is that of going out to meet it, and of establishing a new position in the direction of the ideal itself. One way of reforming economic institutions is that of preaching their replacement by an ideal institution which is entirely different, and thus making those most directly interested in the existing institution reform it in order to kill the bogey.

In any case, the men and women who have ideas and ideals, who begin to create new values, or to lay varying emphasis on existing values, represent the growth points in social life. The ideas and the activities of these persons are all-important to the work of the applied economist. It may be that when we have really begun to be masters in our science and in its methods we shall pay more attention to *what is coming* and particularly to *what is becoming* (as defined above) than to *what is general* or to *what has been.*

We are then brought back to the subject of values or *what ought to be,* to which we have hitherto given so little of methodical thought. The science of politics has conceptions of "the good" or the desirable, one might almost say of the "necessary," which are at least useful—the conceptions of liberty, of social order, of good government; but economics has no such terms and no such conceptions. Ethics, also, not only seeks to explain how systems of morals arose, but it seeks to show what systems of morals are necessary to a stable or a satisfactory social life. The obligation on applied economics to deal with what is necessary to the stable or satisfactory social life is no less than in the case of ethics. It is mere convention and bad tradition which leads us to ignore this obligation. But it is a sign of hope that the obligation is ignored far more in the theory than in the practice of applied economics, especially agricultural economics. Every one of us who goes out to advise a farmer, or a group of farmers, a cooperative society, a political administrator, has some sort of ideas as to "values" and as to *what ought to be.* The strange thing is that we are not willing to submit these ideas to the same sort of logical

analysis as we apply to facts which are more clearly of an external character. And yet we cannot have an applied science as a branch of social science without this analysis. In applied economics we need conceptions such as that of an adequate industrial security, adequate standard of living, adequate leisure, economical consumption and so forth. These, of course, like "economic laws," would not be absolute or universal, but would be relative to existing society and to its possibilities. And we may start to discover what is economically good or necessary by the same means as we try to discover what is true of existing things. There are, in fact, no other means than the human mind and the implements which it is trained to use. If we leave *what ought to be* merely to personal and unchecked prejudice or predilection, we can have no applied science but only the haphazard and often conflicting activities of a group of persons. Our standards of what is desirable, "what ought to be," must be made both rational and objective.

In so far as we can develop standards of what ought to be or of what is necessary, and in so far as we can get these adopted, just in so far shall we begin to bring true order into the economic system. If we desire truth in the sense of the true principles, the application of which will bring health into economic organs of the body politic, and of the social organism, we may seek it in the accurate description and analysis of existing things but we shall not find it there in its entirety.

In farm management economics we are using standards such as yield per acre, or per cow or per hen; standards of acres per man or acres per horse; standards of age-weight in meat animals; or of hours' work per acre on crops. These are "efficiency" standards, but this efficiency has reference to a purpose which can only be that of providing society with all the present means of decent living with the least possible expenditure of economic resources consistent with continuous provision of equal or increasing means at a constant or diminishing expenditure of resources. When we look for these standards we do not look for the average or even for the type at the point of greatest concentration. We do not look for the norm in the sense of a typical example, but for the norm in the sense of either a model or an authoritative rule. When we relate such efficiency standards to rates of profits we begin to create standards of profits. If a certain yield per cow in milk production, or a number of crop-acres per man in crop production,

is related to a certain standard of profits, and we make a standard of the yield, or of the crop-acres, we begin to make a standard of the profits also. This might be sound practice if all incomes arising from the production were determined by the profits, or even if all were determined by production. As we know that they are not, it is necessary to consider standards in distribution also. By using these norms in the stimulation of industrial efficiency we envisage, possibly create, constant struggle; and possibly constant rise in efficiency and total income. We must then envisage constant adjustment in distribution and unless we set up norms for this also we leave it to chance. It is indeed necessary to ask what is the nature, or the validity, of the standards of profits which are related to standards of efficiency. Do they relate only to comparative rates of profit within one branch of agriculture, to comparative profits in agriculture in general, to comparative profits or earnings in other industries, or to the average earnings of all occupied persons in the country? This question is important, for the farmer's reward is determined in the process of distribution as well as in the process of production of wealth, and the pursuit of efficiency standards may merely tend to enrich other people.

In the marketing branch of agricultural economics we have also need of some standards. Many investigations are concerned with what may be called the physical economy of marketing—cutting out superfluous handling or trading, improving methods of handling, grading, storing, and so forth, and in general, cutting down the material cost, or improving the service of marketing organisation. But the practical man does not forget that markets function not only in the distribution of goods (produce) but also in the distribution of wealth. There is an efficiency of marketing organisations as wealth distributors as well as their efficiency as distributors of goods The whole cooperative movement bears witness to the recognition of this duality. When a cooperative society limits interest on capital *per se* to 5 per cent or 6 per cent it sets one norm in the marketing system. But, on economic grounds, what should be the earnings of a wholesaler (or a retailer) with a known capital, a known turnover and a known (average or normal) rate of risk? No one knows; yet, by implication, we are all ready to suggest that we know what the minimum rate of profit or earnings of a farmer should be.

The general position is that agriculture, as a depressed or sup-

pressed industry, needs to make a start on the scientific establishment of norms other than those of industrial efficiency. Many of the modern and rising economic institutions have as their objects the establishment of norms in expectations and conduct which will lead to desirable norms in distribution, consumption, and conditions of life. This is the case with the trade union and the cooperative society, and in some degree with the trust, the cartel, and other forms of trade agreement. It is certainly true of the "trade unionism" involved in the method of collective agreement now being used in determining prices of farm products.

So I make a plea for the study of such standards as tend to be established in the distribution of wealth, and for the objective analysis of the economic possibilities of the establishment of other and more satisfactory norms. While we attempt to regulate and direct production towards efficiency we cannot leave distribution to the free play of haphazard forces. It is not improbable that the study of distribution of wealth from this point of view will favorably react on the work relating to production.

The ultimate purpose of all analytical studies is the provision of information for a new synthesis; and the synthesis cannot be left entirely to the untrained and unscientific mind.

THE ECONOMIST'S APPROACH TO THE AGRICULTURAL PROBLEM OF THE UNITED STATES

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AGRICULTURAL economics as a separate discipline had advanced hardly beyond its infancy in the United States prior to the World War. During the war an increasing amount of attention was devoted to the economics of our agricultural industry and, since the beginning of the agricultural depression in 1920, interest, funds, and activity in this field have been increased at a truly remarkable rate. One of my friends who is statistically inclined takes great delight in volunteering his services to work out a coefficient of correlation between the index of agricultural depression during the past decade and the number of agricultural economists. I have no doubt that he or others so inclined could show a very high coefficient but, like some other correlations, it might be used as the basis for incorrect conclusions. It would not necessarily prove that the growing number of agricultural economists have in fact been the cause of the agricultural depression On the other hand, considerable evidence is readily available to show that, faced with a condition of depression, those concerned in the welfare of agriculture have turned more and more to the economist specially versed in the subject matter of agriculture, finding him a source of help in the amelioration of the farmer's lot.

The American Farm Economics Association has been growing in numbers and influence during the past twelve years. We meet annually, compare notes, check on questions of methodology, and challenge each other's favorite lines of analysis. The present International Conference of Agricultural Economists, however, should have the salutary effect of causing us to search our hearts still more deeply to ascertain whether we have availed ourselves of the best possible tools to employ on the farmer's agricultural problem, or whether our workmanship with these tools has been such as to give us pride or to cause us shame. It is quite proper that our professional brethren in other lands should, on the occasion of their visit to this country, put to us quite bluntly the question, "What have you been doing to justify faith in the subject of agricultural economics on the part of the farmers, educational executives, or

legislators who authorize funds? What is your research work doing toward putting a solid foundation under your theorizing?"

THE FACTUAL BASIS

In a country as large as the United States, with so great a variety of soils, climate, and population, and with the complicated institutional machinery of modern economic life, it has been absolutely necessary that a large amount of purely factual material be gathered and be kept up-to-date if the inductive data are to be made available from which any trustworthy generalizing can be done. In fact, it was a weakness of early ventures of economists into the agricultural field that they attempted to make deductive application of principles drawn from other lands or other industries, or merely fabricated out of thin air. The inadequacy of such principles to stand the test of actual business experience in agriculture has brought a new note of realism into this branch of economics and caused our workers to abandon the older academic line of attack and to start patiently to build up an adequate factual foundation.

SPECIALIZATION

This mode of work has naturally resulted in a considerable degree of specialization so that we now have some dozen or fifteen subdivisions within the general field of agricultural economics. We have farm management specialists, marketing specialists, experts on cooperative organization, price analysts, and specialized workers on land utilization, rural credit, taxation, transportation, and other topics. This is but part and parcel of the general movement toward division of labor and the systematizing and intensifying of scientific work which is to be found in all directions. Along with its obvious advantages, it has certain hardly less evident disadvantages. At times we become impatient that these workers do not come forward with important economic truths of broad applicability. We chide them for not making a larger contribution to the "fundamentals" of our subject. It may well be replied in their behalf that they have been busy equipping themselves with so great a fund of practical knowledge of working conditions in the several parts of the agricultural industry that they can commend themselves and their science to farmers and to the business agencies with whom the farmer deals. On the basis of this confidence and intimate understanding they are able to perform a wide variety of constructive

services which, though not spectacular and certainly not revolutionary in character, are helping farmers and others to get a clearer understanding of their problem and to perform better their own functions within the system.

APPLIED SCIENCE

Working in close relation with the active participants in our rural economic institutions, the agricultural economists are advancing a general working knowledge of economic behavior in a dynamic world which contributes not a little to its sounder evolution. After all is said and done, the economic principles which would determine theoretically "right prices," the most efficient marketing system, the most economical organization of production, the best tax system, or the most perfect cooperative organization are relatively few in number and already tolerably well known. What is really the major task of the agricultural economist working in the field not of pure but of applied science is to help in effecting the adaptation and application of these general principles to a real world of human beings as he finds them. We are laying increasing emphasis in the United States upon the broad fundamental training of workers in these fields, but I believe and I hope that this will not be at the expense of intimate knowledge and recognition of the need that workers so trained shall continue to work in a practical and constructive manner with real situations rather than preaching generalizations which apply merely to hypothetical states ideally conceived.

If it be objected that our economists have failed to produce any outstanding remedies for economic ills or to present any brief and simple formula of salvation at a time when the finger of opprobrium was being pointed at the existing system, we may well reply that they may claim credit at least for a negative service of no small dimensions. Quacks in plenty have arisen with blue-sky projects for the reduction of costs or the enhancement of prices to which the farmer, untutored in economics, and equally naïve townsmen, have fallen easy prey. Broadly speaking, it may be said that the agricultural economists of the country have detected and exposed the fallacies of such proposals, although it can by no manner of means be said that their advice has been heeded by farmers and others sufficiently to prevent loss from embarking in these ventures.

The great industries which are responsible for the rapid rate of

our technological progress have experimental departments, skilled engineers, and experimental laboratories in which they are carrying forward the process of invention and discovery. I should have no hesitation in undertaking to equip a similar department for our agricultural industry and guaranteeing reforms of a revolutionary character within five years if only there were some way of carrying out the plans drawn, of building according to the blueprint furnished by the trained economic engineer. However, in a calling where institutions are firmly entrenched, and where the adoption of even proved betterments is left to the rank and file of small farmers—educated, half-educated, and uneducated—rather than in a business under the control of a centralized executive system, it is inevitable that the wisdom of the trained advisor will only very slowly and partially be translated into actual achievement.

MORE DARING NEEDED

To say all this in defense of our agricultural economists is by no means to express a feeling of easy complacency or to be content with things as they are. More vigor and daring might well be infused at many points. May I take the field of production economics as an illustration? We have had an enormous volume of work done in studying principles of efficiency in farm organization and operation. They have in general proceeded along the line of comparative analysis of existing farm operations with a view to discouraging the least profitable and encouraging the more profitable variations from general practice. In this field we have developed a corps of workers who have their feet solidly on the ground of actual farm experience and who have their heads enough above the routine of daily operation so that they can compare and generalize to the extent of putting fruitful suggestions within the reach of any farmer sufficiently intelligent to keep a fair record of his business and follow the steps of a comparatively simple analysis of this record.

If we are content to limit our efforts to the perfection of an existing technique, changing only by the slow process of gradual evolution, this type of effort toward raising the efficiency and lowering costs of farm production would be quite adequate. It appears, however, that there have come into our post-war agriculture some potentialities of technological and economic change which seem to open a wider field for analysis and guidance of

experimentation on the part of our agricultural economists. Power farming and larger economic units of organization are an accomplished fact in small areas of our country. To a majority of our farm organization and management specialists they have appeared to be non-typical phenomena of a sort to invite passive interest rather than any very active or aggressive attempt to analyze their possibilities either deductively in terms of the economic elements of the problem presented, or inductively out of the experience of the comparatively small number of such units which have established themselves on an apparently stable foundation.

Obviously the course which could with most benefit be followed by workers in this field will be somewhat a matter of temperament. I should say that in general a majority have decided that the beneficial results which have been flowing from their efforts at perfecting the old technique of management are so promising as to make them loathe to launch themselves upon the troublous sea of exploration of new and largely untried possibilities. A minority, particularly in regions to which the old technique is ill adapted, have thrown themselves more vigorously into the analytical and experimental study of the new types of farming. Obviously there is so much work still to be done in cultivating the field of farm management along lines which have been gradually perfecting themselves for some twenty-five years that no charge of failure to serve the industry wisely and well can be laid against those who continue to work along these lines. My own spirit, however, is sufficiently venturesome so that I long to see some workers in this field apply themselves unrestrainedly to the problem of seeing how far the new mechanical, scientific, and economic techniques may be developed toward production with lower unit costs than anything which we have had in the past. Only so can we justify the tradition of the Anglo-Saxon explorer and Yankee ingenuity.

THE PROBLEM OF READJUSTMENT

Doubtless one reason for shrinking from this line of attack on the part of many of our production economists has been their unwillingness to see low-cost areas of production stimulated at a time when higher-cost areas were already suffering so keenly from the process of readjustment which is slowly but relentlessly being forced upon them. There is in the United States today a lamentable but inescapable conflict of interest between sections and lines

of production which are favored by the new technique and destined to go forward under its impulse, and those which wage a losing battle under the type of competition thus introduced. The problem of readjusting our farming industry to a radically changed economic and technological situation may well be termed the master problem of agricultural economics today and in the years just ahead.

It is probably difficult for Europeans to realize how young and unfixed the agricultural economy of our country is. Likewise it is hard for all of us to realize how provisional this economy must be in the light of technological, commercial, and even social changes which are impinging on the industry. The World War brought all this into clear perspective, and post-war depression shows us an industry struggling with only moderate success to make quickly and surely the adjustments which are called for. Little wonder that results have not been more swift and satisfactory when we consider the cumulative weight of altered conditions of consumer demand, both domestic and foreign, of the increasing competition of other suppliers of the world market, and of the exacting demands made by rapid technological change. All these have borne hard upon the American farmer in the years since 1919. While certain leaders of agricultural organization have stubbornly insisted that some miraculous way must be found for saving the farmer and the agricultural industry as now constituted, the attitude of agricultural economists has been to accept these changes as part of the professional problem to which they must address their attention. They have thus been concerned more and more with the basic problem of how new agricultural enterprises can be fitted into the farm economy of this section or that, of how new types of farm organization can be developed in areas which are undergoing a transition in type of farming, of the most profitable organization for exploiting the expanding possibilities of sections such as our Great Plains area, and of conserving the farming possibilities of areas of declining agriculture such as the New England states or the South Atlantic Coastal Plain.

RESEARCH INSTITUTIONS

A state experiment station must in the nature of the case lack something of being an ideal unit for the study of such problems since every state has its vested interests, and likewise the nearness

of the research worker to those actively engaged in agriculture makes it hard to arrive at objective judgments or to express them with the most desirable freedom and force once they have been arrived at. In spite of this, it must be said that our state institutions have given a commendably free hand to their staffs and that these workers have in the main kept their work on a high professional plane.

In matters of this sort which constantly involve issues of national or even international agricultural policy, it is important that we have the Federal Bureau of Agricultural Economics, which can initiate regional studies and is somewhat less bound by local considerations than state organizations are likely to be. The work in land utilization and the type-of-farming studies of the Division of Farm Organization and Management offer good illustrations of fields in which the Federal bureau is exercising sound leadership on problems of agricultural readjustment.

Even a national Department of Agriculture, however, cannot be entirely oblivious of local considerations for there are senators from particular states and representatives from local districts who find it hard to accept the wisdom of a policy which would not specifically favor their constituents. I believe, therefore, that it is fortunate that a few organizations like the Food Research Institute, the Institute for Research in Land Economics, the Giannini Foundation, and the Institute of Economics furnish centers where persons interested in the economics of agriculture can consider questions of agricultural policy from the national or even the international viewpoint without the slightest necessity of restricting their investigations or limiting the statements of their conclusions because of their unpalatability to any group or section.

NATIONAL AGRICULTURAL POLICY

It has frequently been deplored that no individual or agency nor agricultural economists as a whole have succeeded in formulating a national agricultural policy which could command widespread support. This is partly due to the fact that most of our workers have, as I stated earlier, developed along lines of specialized proficiency rather than general concern in agriculture as a national or world industry. It is due also to the fact that many of us have felt that it was of more real importance to assist in practical adjustments at various points in a system which was undergoing a

rapid evolutionary process than to attempt ideal statements of comprehensive national policy. Finally, however, there is a basic division in point of view between those who believe that agriculture should be considered strictly according to its commercial competitive position along with other economic interests and those who believe that such a policy should be modified through consideration of social policy, racial hygiene, military security, or other collateral issues.

On the question of agricultural policy, according to the first of these viewpoints, the agricultural economist is qualified to speak. He should be able to tell us just what the competitive position of the several branches of the farming industry is and what it may be made under the most intelligent direction. This knowledge is an indispensable prerequisite to the drafting of any well-reasoned national policy with reference to agriculture. But it does not itself yield a policy. The latter cannot properly or adequately be formulated by any individual or interest group. Its working out calls for the joint labors of highly qualified and essentially detached persons, widely representative of all the interests which are involved.

The agricultural economist must not allow himself to become a special pleader, urging extraordinary advantages or aid for his clients at the expense of other members of the body politic. He should be simply a person of economic training and specialized familiarity with the organization and processes of the agricultural industry who seeks to assist these groups in organizing their economic life most profitably within the business of farming or even, upon occasion, by abandoning that business. No sound agricultural policy is likely to come forth without taking advantage of his special wisdom and counsel, but he should be merely one consultant in a group which embraces the historian, the political scientist, the psychologist, and the sociologist, as well as the non-agricultural economists qualified to speak for manufacturing, transportation, banking, labor, and other groups. Only by such collaboration can the highest type of social statesmanship prevail.

AGRICULTURAL ECONOMICS AND THE EMPIRE MARKETING BOARD

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AS THE result of a recommendation of the British Imperial Conference held in 1923, the Imperial Economic Committee, an advisory body composed of members appointed by the various governments of the Empire, was established in the same year. The functions of the Committee are to consider and report on the marketing of over-sea Empire produce in the United Kingdom, and a large number of reports have been issued during the past seven years on such commodities as fruit, fish, dairy produce, agricultural machinery, timber, tobacco, and so forth.

Following the appointment of the Imperial Economic Committee, an executive commission, the Empire Marketing Board, was established in May, 1926. The Empire Marketing Board is a body appointed by the Secretary of State for Dominion Affairs to advise him in the administration of the annual vote of one million pounds sterling granted by the British Parliament. It is composed of certain ministers of State, ex-officio, and of representatives of the various countries of the Empire. The Board is charged with the duty of furthering the sale of Empire produce in the United Kingdom and its main work falls under the three headings of publicity, scientific research, and economic research.

Wherever possible the Board works through existing institutions and is to be regarded mainly as a grant-administering body, but in some cases, particularly in the economic field, it has had to directly undertake certain functions.

For the purpose of this paper, the general position as regards agriculture may be stated very briefly. Great Britain may be said to export the products of her manufacturing industry in exchange for the foodstuffs she cannot economically produce herself. It is only in the case of a few commodities—the most important of which are fresh milk and potatoes—that the British Isles are in any sense self-supporting. About 43 per cent of the beef and veal consumed in the United Kingdom in 1924 was home produced.[1] During the same year, about 40 per cent of the consump-

[1] The last Census of Production was in 1924.

tion of mutton and lamb, and about 30 per cent of the consumption of pig meat was home produced. In the case of dairy produce, the percentage of the total supply produced domestically was even lower, being about 23 per cent in the case of cheese and 11 per cent in the case of butter. In regard to wheat, about 20 per cent of the total requirements were grown in the United Kingdom.

As has been aptly said, England is a nation of week-enders, producing only sufficient to feed her population from Friday night till Monday morning. The greater part of the national energy is devoted to the production of non-agricultural commodities, the ratio of agricultural to industrial production being approximately one to eight (1924 Census of Production).

The total exports of the United Kingdom in 1924 were valued at about £800 million. Of this total, about 42 per cent went to the over-sea Empire. As regards imports of agricultural produce into the United Kingdom, about 50 per cent of the total imports of wheat, 70 per cent of the imports of frozen beef and lamb, 42 per cent of the imports of butter, 86 per cent of the imports of cheese, and 82 per cent of the imports of wool in 1928, came from the over-sea Empire.

In the agricultural economics sphere, the Board has the advice of a technical committee. Under the auspices of this committee, two reports have been issued: the one, "Agricultural Economics in the Empire," and the other, "The Survey Method in Agricultural Economic Research."

The activities of the Empire Marketing Board in the field of agricultural economics may be divided roughly into two sections:

1. The furnishing of the data on which producers or their representatives may formulate selling policies; this resolves itself mainly into a study of the United Kingdom market.

2. The furnishing of the data on which producers may base their farming policies; this is concerned with problems of world production and of the comparative advantages of different countries as regards production and marketing costs.

MARKETING

The Empire Marketing Board has made a series of grants to the Ministry of Agriculture for England, the Department of Agriculture for Scotland, and the Ministry of Agriculture for Northern Ireland for investigation into the marketing of home produce.

This represents a development of the ordinary work of these three departments.

In the field of market intelligence, the Empire Marketing Board has itself undertaken an official service in two groups of produce, namely, fruit and vegetables, and dairy produce.

The scope of the "Fruit Intelligence Notes" embraces reports of imports, week by week, of each fruit in the 25 chief ports in Great Britain; arrivals and prospective arrivals from all of the principal producing countries; and reports on fruit crop prospects in every country in the world in which this information is likely to be of interest, as affecting supplies to the United Kingdom markets.

The "Dairy Produce Notes" include reports of weekly imports into the chief ports in Great Britain; gradings and stocks in the dairying Dominions; and reports on conditions in British and foreign producing countries. Current prices are quoted week by week. With the cooperation of the provision trade and of the proprietors of cold stores throughout the country, the Board has recently started the collection and publication of statistics of butter held in cold store in Great Britain. The figures are furnished voluntarily at fortnightly intervals by cold storage companies, and the returns are estimated to represent fully 90 per cent of the stocks of butter held in cold storage in the whole country.

Information of a somewhat similar nature is collected in regard to the dried fruit trade, and arrangements are being made to extend these services as the need arises.

Market intelligence reports are of course primarily of current interest to selling agents who are enabled thereby to build up a well-informed selling policy. There is, however, a cumulative value in weekly statements of prices and supplies, since such a service provides material for economic research into seasonal influences and trends, a type of study which may prove of great value in the determination of policies of production and marketing.

The object of the Empire Marketing Board is to increase the demand for Empire produce in the United Kingdom. The economic investigations undertaken by the Board have therefore been designed to extend the knowledge of the marketing mechanism and of market conditions, at the same time as they deal with specific problems which have been raised by representatives of Empire producers.

Owing mainly to the difficulties of standardization and to the highly perishable nature of the product, the fruit trade presents a particularly complex field for economic study. The use of artificial cold has made possible the transport of fruit over long distances and also the gradual extension of the marketing period, but it has resulted in the appearance of hitherto unknown diseases which are frequently responsible for serious loss. Problems of wastage have been studied intensively under laboratory conditions, but the application of this knowledge under conditions of ordinary commercial practice presents considerable difficulty owing to the large number of variable factors involved. During the past three years, the Empire Marketing Board has attempted to supplement the laboratory study by a systematic survey of the extent and nature of deterioration of fruit in transit and also in the subsequent period of distribution to the retail shops, with the object of identifying the more serious types of wastage and assessing their relative economic importance.

The investigations have made available for the first time exact information on the main types of wastage and the extent to which they occur in the various varieties of fruit. Problems for further laboratory study have been thrown up and attention has been directed to the relative merits of different methods of control. In addition, however, the survey has served to provide the groundwork of technical knowledge of the trade which is an essential preliminary to any economic study of the problems of distribution and marketing.

The preliminary investigations which have been undertaken in the fruit and dairy produce trades have shown that the greatest practical value from the Board's point of view, is to be achieved by approaching these studies from the consumption end Accordingly emphasis is being laid on retail practice and on problems of consumer buying habits.

The importance of close study of wholesale distribution has been fully realized by producers and their selling agencies. On the other hand, the important part which retail selling plays in the disposal of farm produce appears to some extent to have been comparatively neglected. Producers' organizations, having disposed of their produce in the wholesale market, have presumably felt only a minor interest in its later movements. But the demand for particular classes of goods starts with the housewives and is

expressed in the retail shops in the first instance. The retail salesman can to a large extent influence the trend of demand by the class of goods he stocks and by the enthusiasm which he displays in exciting the interest of his customers in certain brands of produce. He is by no means a passive agent in passing on the orders of his customers to the wholesale market. The consumer has more or less decisive limits set by income, season, taste, and custom or prejudice, but within these limits the retailer can and does to some extent influence choice.

There is a constant interaction between the expressed and half expressed wishes of customers and the policy of retail selling. This is of the greatest financial importance to the producers of goods for domestic consumption, because it is at this point of contact between the consumer and the retailer that the extent of the demand and the price of one class of produce as compared with another class is largely determined.

The economic investigations conducted by the Empire Marketing Board have been mainly directed to these problems. Preliminary experiments were carried out with a method of retail survey on a commodity basis. A sample number of retail shops of different types in selected areas were visited and information obtained from the proprietor or manager on a number of points previously prepared in the form of a standard schedule. As a check on the sample, visits were paid in certain districts to every shop selling the particular commodity under investigation. Following this experimental work, surveys of the retail marketing of butter and canned fruits have recently been carried out on a national scale. Other surveys which have been undertaken include the retail marketing of oranges, apples, cheese, honey and other products.

Retail surveys have already yielded a large amount of uniform data, hitherto unavailable to producers or their representatives. The information obtained deals with the variation in price of the same commodity in different shops and districts; with the distinctive policies of multiple, cooperative and single shops in regard to the range of choice offered to the consumer; seasonal variation of stocks held and methods of buying. Regional market preferences are studied in different districts and exact information regarding the internal distribution of various products is gradually being built up.

As a field for economic research, consumption is probably more neglected than any other and yet it opens up some of the most interesting lines of investigation. There can be no difference of opinion as to the essential place of the housewife in the sale of foodstuffs. The demands of the consumer are the ultimate controlling factors in the quantities of particular classes of produce which can be sold and the price at which they can be sold. But the expressed demands of housewives are determined by a number of considerations, just as surely as soil and climate and local custom determine the types of farming carried on in different parts of the world.

Producers of foodstuffs are often relatively ignorant of the extent of these influences. The demands of consumers are transmitted to the selling agencies through the retail and wholesale trades, but the original demands of the consumer may have to be translated to conform with the retailer's business policy, and to some extent the same may be true of the wholesale trade.

Knowledge of the facts of preference and of the effect of price changes on demand is acquired by the retailer in the ordinary course of his business, but the underlying causes can only be revealed by a study of the consumer and of the buying habits of different groups. In so far as these habits determine the policy of retail traders and are thus passed on to the wholesale market, an investigation of this kind is of direct interest to the producer. The determination of consumers' preferences and the extent to which these may be influenced by various methods is an essential preliminary to any systematic attempt to extend demand

THE PRODUCER

One aspect of the producer's problem is how to market his produce. As has been pointed out, this resolves itself, so far as the Empire Marketing Board is concerned, into a continuous study of the United Kingdom market, in order to provide a knowledge of supplies, the requirements of the consumer, and of the working of the marketing machine. The second aspect of the producer's problem is what to produce; what changes in farming policy should be made to meet future world developments. The answer to this question clearly implies a measure of forecasting of the trend in world production and world consumption.

In this connection, the Empire Marketing Board has published two reports on world production and trade, the one on oranges

the other on cocoa. The investigations of the United Kingdom market already mentioned may be expected to give some enlightenment on consumption, but very extensive investigation is necessary in this field if reasonably complete information is to be obtained.

Economic research on the production side is a subject for the individual country. The part of the Empire Marketing Board is limited here to the stimulating of interest in research and in the possibilities of coordination of methods and to some extent of results. The Board has given a grant to the Agricultural Economics Research Institute, Oxford, for the purpose of keeping in touch with these aspects of economic research. On the side of coordination of effort, a comparative study of the economic factors affecting the production of butter-fat is being planned.

Assuming that a readjustment of farming policy is advisable, there remains the question of the nature of the readjustment. On this aspect, the Empire Marketing Board has endeavored to assist producers by a scheme of experimental consignments. Consignments of produce have been sent to the Board from various countries for the purpose of testing the possibility of an export trade to the United Kingdom markets. Where the produce is of a perishable nature, information is supplied on prescribed lines in regard to pre-shipment treatment, time of picking and method and conditions of transport. On arrival, the consignment is examined and observations are taken as to condition, method of packing, size and type of container, grading and the like. Selected samples are kept under observation in the laboratory, and samples are submitted to members of the wholesale and retail trades concerned for technical opinion. Information is also obtained as to quantities and prices of competitive supplies and seasonal distribution. In the reports, suggestions are frequently made for further experiment and in some cases a series of consignments to test different factors has been arranged.

To sum up briefly, the Empire Marketing Board endeavors to extend the demand for Empire produce in the United Kingdom by publicity campaigns, by scientific research and by the development of agricultural economic research either by outside agencies or by its own organization. On the marketing side, it provides intelligence services and undertakes research into market conditions and into the mechanism of the wholesale and retail trades. On the production side its function is mainly directed to stimulating and coordinating research by individual countries.

SCIENCE AND TECHNIQUE UNDER CONDITIONS OF A SOCIALIST RECONSTRUCTION OF AGRICULTURE

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AGRICULTURE, the basic industry, almost immobile for ages, is now entering upon a new phase. Events of extraordinary significance to agriculture are taking place, events whose meaning is still difficult to comprehend by a contemporary mind amidst present-day conditions. Out of millions of small individual holdings, organized along medieval lines on primitive, egotistical principles, based upon ancestral customs and routine, agriculture in the U.S.S.R. is assuming new forms and is being transformed into a rational, collective, socialist system of farming, composed of large units constructed on a scientific plan.

The general significance of these developing events is determined first of all by geographical data. Of the total area under cultivation in the world as a whole, estimated at 650 million hectares, about 130 million hectares (1930) belong to the Soviet Union, or about one-fifth of the cultivated area of the globe.

By carrying out during the next decade the plan for an extension of the cultivated area in Siberia, Kazakstan, the Far East, and the Northern Region, by the thorough and efficient cultivation of lands now lying idle (about 40 million hectares), and by other measures which are technically quite feasible, the Soviet Union will be able to increase its cultivated area within a few years to 200 million hectares.

To carry out this vast plan the mobilization of science and technique is inevitable. Science is no longer merely an auxiliary aid or a friend; it is one of the chief weapons for constructing life on new principles. The exceptional requirements of a socialist reconstruction of agriculture in a vast country are primarily directed to scientific workers in agronomy and related subjects. From them the country must expect a most active participation in the realization of a new rational type of agriculture on a socialist basis.

In the past, Russian science, as many know, occupied a comparatively high level; the scientists of the Soviet Union are upholding this tradition. Soviet agronomists have made valuable contributions, the importance of which extends beyond the bound-

aries of the Soviet Union. In soil science, agricultural chemistry, agricultural physics, plant and animal physiology, genetics, and plant breeding they have made undoubtedly notable contributions to science.

Not by chance or accident was the Second International Congress of Soil Science held in the Soviet Union (1930), where, notwithstanding the existing difficulties of intercourse, a considerable number of foreign scientists attended the meetings. A number of Soviet textbooks—on agricultural chemistry (Prianishnikov, Hedroiz), on plant physiology (Maximov, Kostychev), on soil (Glinka, Hedroiz)—have recently been translated into German and English.

It is indeed not for us to judge objectively the part played by scientists of the Soviet Union in the world's science. Still we may say that the general level of our scientific institutions and higher agricultural schools is not below those we know abroad. Our district agricultural experiment stations in Poltava, Shatilovo, and Saratov are large institutions. The experiment stations of the Sugar Trust are very nearly equal to those in western Europe. The author has visited many agricultural experiment stations abroad (in 35 countries) and has worked in some of them.

Not long ago opinions were expressed in Soviet Russia to the effect that science had far outgrown life and that we should promote its dissemination rather than further research. But now things are changing. The enormous requirements called for by the large unified socialist system of farming soon revealed the fact that our knowledge, and our scientific training, were inadequate for an efficient solution of urgent problems brought forward by the whirlwind development of socialist reconstruction on a large scale. Moreover, even the general level of agricultural science may be deficient in this respect. The investigator realizes as never before that his work does not keep pace with life.

Until recently our experimental agronomy had to deal with small-scale farming with its limited possibilities and its lack of ability to apply scientific knowledge. Large farming abroad and even in our country certainly made more use of this knowledge. The experience of America, western Europe, colonial agriculture in Java, the Philippines, and Formosa confirms this.

The institution of large-scale farming based on socialist principles—the size of the farms tending to exceed that of even the largest capitalist farms—had the immediate result that our scienti-

fic institutions were called upon for aid on a much larger scale than our scientists had been accustomed to. Practical problems of large, specialized agricultural enterprises; questions of seed production for state-organized large-scale farming; problems of the increase of cultivation of industrial plants and of the introduction of new plants and cultures, arose before the agronomists of the U.S.S.R.

Not long ago the attention of our mechanics was fixed upon the problem of substituting the steel plow for the primitive light wooden plow ("sokha") in creating a suitable type of light plow for the peasant's horse. Some of our investigators worked for years upon that problem. Now quite different problems—problems of the mechanization of agriculture, and of the standardization of large agricultural machinery—are looming before us. The tractor, which before the revolution 99 per cent of the population had never set eyes upon, is now an essential factor in the reconstruction of agriculture. The Soviet Union not only buys tractors abroad but is already beginning to manufacture them, and in a short period of two or three years the number of tractors in use will attain the unprecedented figure of several hundred thousands. Production of the latest type of machinery is now the question of the day.

In all branches of agriculture—in grain farming, in animal husbandry, in the cultivation of industrial plants such as cotton and various sub-tropical plants, in problems of eradication of pests—the deficiency of our present fund of knowledge and training is quite evident.

It suffices to indicate the scale of changes experienced last year. The total increase in the area under cultivation for 1930 is about 8,000,000 hectares. The acreage under cotton this year amounts to 1,600,000 hectares, as compared with 1,000,000 hectares last year, *i.e.,* an increase of 60 per cent. The area under sugar beets has increased 30 per cent. A considerable increase has been attained for potatoes and maize. Tea plantations, which before the war covered only about a thousand hectares, this year covered 13,000 hectares, and undoubtedly within the next five years will attain an acreage of 100,000 hectares.

Scientists and investigators are faced with immense, concrete problems which require definite, straightforward answers. The problem of the expansion of the acreage under cultivation is con-

fronting us. Only about 5 per cent of the land is under cultivation in the Soviet Union, 95 per cent lying idle. This same percentage is typical of the whole world. In general, only about 5 per cent of the entire land surface of the globe is under cultivation. Even the surface of the earth has as yet been utilized by mankind to only a very small extent. Recently Professor Glinka attempted to compile a world's map of soils. Not until the last International Congress of Soil Science could data be obtained for several regions of Africa and Asia. The history of agriculture shows that only during the last seventy years has agriculture spread over the most fertile regions, the black soils of Eurasia and the New World. Our investigations have shown that ancient agriculturists were confined to the mountainous regions of Southern Asia, the Mediterranean region, Abyssinia, and the southern Andes region in the New World

The problem of problems in agriculture for the Soviet Union, as well as for the world as a whole, is that of the expansion of agriculture. Lack of organization, the small size farm holdings, their dispersion, the backwardness of many countries, have in the past constituted the reasons for vast tracts of land remaining idle and uncultivated. This big problem has been insufficiently investigated as applied to conditions in the Soviet Union, where production per unit of population has always been very low and where this task of appropriation of new territories for colonization, and for reclamation, is of primary importance.

Even the number of agricultural scientists, which but lately seemed quite adequate, now has proved to be insufficient. We have about 22,000 agronomists of higher qualifications, but today we need five times this number.

The need of specialization in research and concrete knowledge has become evident. "Encyclopedism," a characteristic of the older agronomists, now seems inadequate for an efficient solution of practical problems. If a few years back our agricultural experiment stations could point out their achievements with satisfaction, now one has to reflect rather disconcertedly about the deep chasm between life's practical problems and the comparatively modest fund of knowledge we have at our command in many important lines.

Scientists must acknowledge these facts frankly and draw inevitable conclusions therefrom, *i.e.,* the necessity of organizing re-

search on a broader and deeper basis, and of adapting scientific investigation to the requirements of new large-scale socialist agriculture. No doubt this is possible. The will to achieve, enthusiasm, and above all, comprehension of the extraordinary changes which agriculture is undergoing, are necessary. All thoughts of rest must be forsaken. Sustained efforts are necessary to complete the revolution in agriculture, whereby it will be transformed into a scientifically-organized, large-scale socialist industry.

The reorganization of agriculture in the Soviet Union has necessitated a new development of scientific investigation. New experimental stations have been opened. On June 25, 1929, the Soviet Government issued a decree concerning the foundation and organization of an All-Union Academy of Agricultural Sciences. This academy, known as the Lenin Academy of Agricultural Sciences, represents an association of a number of institutes, including the Institute of Mechanization of Agriculture, the Institute of Economics and Organization of Socialist Agriculture, the Institute of Collective Farming, the Institute of Plant Breeding, the Institute of Animal Husbandry, the Institute of Dry Farming, and the Institute of Reclamation and Irrigation. Since last year special institutes for the study of maize, soy beans, tea, fruits, vegetables, and viticulture have been organized. Many new stations for animal husbandry have been opened in 1930. These institutes are planned on a large scale and represent first-class scientific laboratories. Old experiment stations must also be reorganized on the basis of the regional specialization of agriculture. Last year the Agricultural Academy elaborated a general regional plan for the development of agriculture, comprising important changes due to rationalization of agriculture. This plan must be taken as the basis for the reorganization of experiment stations, which must specialize along definite lines and on definite forms of agriculture. A new network of experiment stations is to be organized, whereby the number of such stations will be doubled. Next year there will be more than 300 experiment stations in the Soviet Union.

This reconstruction of agriculture has just begun; it is only in its early stages. The organization of large-scale and collective farming is in its first phase. The primary task of the Agricultural Academy and the experiment stations is, so far as we can judge, to carry on thorough and original investigations for the purpose of solving practical problems. Agriculture and agricultural industries

are, notwithstanding their antiquity, most backward. New methods must be worked out, creative efforts must be encouraged, and knotty problems solved. Agricultural problems are very concrete and local, but at the same time we need a synthetic knowledge of the country and its conditions. The fundamental tasks of the Agricultural Academy are to synthesize the investigations of district and provincial experiment stations, to coordinate the work of these investigations, and to promote similar methods of research.

Science is international. True scientists are internationalists. In seeking out our own path, in investigating our own conditions, we must keep up to the scientific level of international science—we must know its achievements. Investigators in the U.S.S.R. are confronted with an immense field of work. Science and the socialist reconstruction of agriculture are indivisible, and their relations must grow closer as the years go by. Science is a necessary part of a socialist state. We are organizing agriculture according to a plan, but this plan on its large scale can be worked out only with the aid of scientific data and as the result of definite scientific knowledge.

Unable to solve its manifold problems by the efforts of its own scientists alone, the Soviet Union is willing to invite foreign specialists. The problem involved in a socialist reconstruction of agriculture will be solved by sustained, collective effort. Important practical problems, impossible of solution by solitary scientists, must be solved by large scientific societies, or institutes—by scientific collectives. Due to the imperative needs of agricultural production the organization of scientific institutes for research must be closely allied to industry. Laboratories must be transformed so as to enlarge their capacity. Investigations must be industrialized, in order to accelerate the obtaining of results.

Among the most difficult tasks of agricultural science in the Soviet Union are those of perfecting the art of dry farming, of overcoming drought and winter killing of wheat. Our yield depends upon weather conditions. The continental climate, with its extremes of heat or cold, brings good or bad harvests. The drought conditions in the United States in 1930 are an ordinary phenomenon in Russia, where practically every four or five years we have drought in a large area in the southern and eastern part of the Soviet Union. The agricultural experience of the world can aid us very little in this respect. All the best American drought-

resistant varieties of wheat are our common Russian varieties, which do not satisfy our needs. German and Swedish wheat under our conditions perish immediately the first year. Thus the Soviet plant-breeder is confronted with tasks hard to solve but which must be solved.

It would be erroneous to suppose that the immense practical problems created by large-scale socialist agriculture can be solved by every-day methods, by mere good luck, or by foresight or intuition. Our investigators must broaden their knowledge by a study of the achievements of science throughout the world. In solving practical problems our scientific institutes must be versed in theory. In organizing institutes for research, called upon to solve practical problems, we must likewise guarantee the development of theoretical science, without which the very level of scientific investigations will be lowered Only the harmonious development of scientific thought along both theoretical and practical lines can give the best and quickest solutions to practical problems. The most important achievements of the nineteenth and twentieth centuries were linked up with discoveries in theoretical science. A scientist nowadays has no right to avoid practical problems, but he is needed primarily as a theorist. Immortal fame was achieved by Pasteur not because he occupied himself with the practical problems of the wine and brewery industry, sericulture, and the cure of contagious diseases, but because, in approaching practical problems from the heights of science, he could solve these problems in a new and general way, which had been sought in vain by practical men.

Our tasks are indeed of a general nature. The transformation of agriculture in the Soviet Union, affecting science and technical problems, is certainly introducing quite new principles. Large-scale socialist agriculture and the organization of agricultural industry on a new basis must stimulate scientific thought. The problems now affecting science and engineering in the Soviet Union must attract, we believe, the attention of the International Conference of Agricultural Economists. The problems of today in the U.S.S.R. are the problems of tomorrow in other countries

THE ADMINISTRATION AND CONTROL OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

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ON JUNE 7, 1930, the International Institute of Agriculture concluded its twenty-fifth year of existence. Although there is a greater demand now than ever before for the services which the Institute was intended to render, there is a widespread opinion that it has not embraced its opportunities. Its abilities are questioned. Discussions in the last General Assembly indicated that the record of its twenty years' existence is not such as to inspire confidence. Agricultural interests are turning to other international groups for services which the Institute might reasonably be expected to furnish. What are the causes of this situation? The usual explanation put forward by the administration is scarcity of funds. But this plea lacks conviction when one appreciates that the budget of the Institute for the period since 1925 is larger than for any similar period in its history. International agricultural problems are deserving of larger financial support than that accorded the Institute. But experience indicates that governments will be slow in according such support until the Institute demonstrates its ability to expend efficiently the funds at its disposal There is reason to suspect that lack of funds is a result and not the cause of the present situation. One must look to administrative practices for an explanation.

There is reason to believe that certain methods employed in the management and control of the Institute are in substantial violation of the treaty establishing that organization. In some essentials it has ceased to be international. Scientific and technical interests tend to become submerged in political and diplomatic considerations. It is evident that the authors of the treaty had in mind a purely scientific fact gathering agency. Furthermore the treaty was designed especially to prevent control by the representatives of one or a few nations. That the plans of the founders have gone astray cannot be attributed to faulty workmanship on their part. Rather has the present situation come about through a failure to follow the principles laid down by them and embodied in the convention of 1905

This convention places the control of the Institute under the supervision of two bodies. Executive authority is entrusted to the Permanent Committee—the governing board—composed of one representative from each adhering nation. In theory this committee is expected to enforce the policies formulated by the General Assembly—the legislative body. To quote the treaty, "the general assembly shall exercise supreme control over the international institute of agriculture." First let us turn our attention to the Permanent Committee.

The treaty specifies that the president shall be elected by the Permanent Committee from among its members. But since the founding of the Institute this position has been held by the representative of Italy. This practice which has gathered the force of custom deprives the governing body of the control of this officer. Since the representative of Italy is automatically elected president, he is in reality appointed and dismissed by his government, and responsible only to that government. This situation has given rise to difficulties David Lubin, the American representative on the Permanent Committee, in his first annual report to the State Department in 1909, accurately described the situation when he states that "Like all strong men, the President of the Institute has some decided opinions. He is of the opinion that the chief executive of this Institute should really be the 'Institute,' that the Permanent Committee ought merely to act as his advisers. In fact, he considers that his prerogatives as President of the Institute should be similar to those of the President of the United States toward his Cabinet. . . . ."

Nearly twenty years later the American delegate reported to his government that the representative of Italy, as President of the Institute "insisted that his position automatically confers upon him the chairmanship of all standing committees and auxiliary organizations." He holds the following Institute positions:

1. President of the Institute.
2. Chairman of the Finance Committee.
3. President of the Joint Consultative Committee with the International Labour Office.
4. President, International Scientific Agricultural Council.
5. President, General Assembly of 1926.

This would be somewhat akin to a situation where the Speaker of the House of Representatives held the chairmanship of all standing committees of that body. The American delegates reporting were different individuals. Presidents had also changed. Unfortunately, policies of administrative control remained much the same.

The General Assembly formulates the policies to be carried out by the Permanent Committee. Without doubt it is an open violation of the spirit of the treaty for the President of the Committee to occupy also the position of President of the Assembly—the supervising agency of the Committee. The fact that the President of the Committee insisted in the name of his government that he be made President of the Assembly does not promote the cause of international cooperation.

By the terms of the treaty, the Permanent Committee shall appoint and remove all members of the staff of the Institute, but because of influences exercised largely through diplomatic channels, the Secretary-General, the scientific directing head of the organization, has always been of Italian nationality. The first President put forward an employee of the Italy Foreign Office, one wholly without agricultural training or experience, as a candidate for the first Secretary-General. Mr. Lubin, the American representative, reports that "a decided protest was expressed to me by the leading members of the Permanent Committee against this candidate. Presently, unwarranted, significant, extraneous pressure was exerted, which forced this opposition to dissipate and result in the election of said candidate to the post of Secretary-General of the Institute." The same significant extraneous pressure is still exerted in the election of Secretary-Generals. This lack of freedom of choice of its scientific director tends to weaken the control of the Permanent Committee over his activities. Repeated attempts to restore to the Permanent Committee its right of unrestricted freedom in the selection of its chief executive officer have failed. The Permanent Committee has become an acquiescing rather than a supervising and controlling body. It is not a deliberative group exercising full freedom of discussion.

The question naturally arises as to why the Permanent Committee, composed of government representatives should permit control to pass from its hands. This is explained by an analysis of the make up of the Committee. It consists of:

15 Italians (no other nationality has more than one representative).
26 diplomatic delegates resident in Rome accredited to the Italian government—ambassadors, ministers, consuls, and so forth.
8 special agricultural delegates, of whom only 4 reside in Rome. The other 4 reside in their respective countries.

The following states are represented by Italians:

1. Bolivia
2. Columbia
3. Costa Rica
4. Ecuador
5. Guatemala
6. Haiti
7. Italy
8. Eritrea
9. Cyrenaica
10. Italian Somaliland
11. Tripoli
12. Nicaragua
13. Paraguay
14. Peru
15. San Marino

The fact that some of these countries are far in arrears in their payments to the Institute has not limited the votes cast in their name. Added to this situation the fact that a high official of the Italian foreign office is President of the Institute makes it evident that the wishes of the President will prevail if he chooses to approach the diplomatic delegates through his foreign office contacts

Now let us turn our attention to the General Assembly, the body which according to the treaty has "supreme control" over the Institute. The American delegation secured the adoption by the 1924, 1926 and 1928 General Assemblies of resolutions designed to place the management and control of the Institute on an international basis. The results of these efforts are well illustrated by the developments which have taken place during and since the last General Assembly.

The American Delegation to that Assembly restated the desires of its government. They were:

"The American Delegation believes it to be highly essential that this Assembly take definite action designed to assure adhering Governments that they will not again be faced with the troublesome issue of international control of executive responsibility. Such assurance requires the adoption and the faithful execution, in spirit as well as in letter, of three fundamental principles which are embodied in the following resolutions:

1. That the duties of the office of President of the Permanent Committee be limited largely to those of presiding officer;
2. That the executive responsibility be placed in the hands of the Secretary General operating under the direct control and supervision of the Permanent Committee;
3. That the Permanent Committee be permitted to exercise unrestricted freedom in the selection and dismissal of its chief executive officer, the Secretary-General."

These principles are based upon the simple philosophy that since the President is appointed and dismissed by his government and responsible only to that government, he is not subject to the control of the Permanent Committee—the governing body. For that reason he should not exercise executive authority. Executive authority should be vested in one employed by the Permanent Committee and responsible to it. This executive should be chosen without restrictions as to nationality.

In a large measure the 1928 General Assembly accepted the above principles, but even the most optimistic would hardly say that they have been applied in good faith. An enumeration of significant events will furnish an indication of the reception accorded these principles by the administration of the Institute.

1. During the closing minutes of the final meeting of the Assembly the Italian Delegation issued a blanket reservation regarding its acceptance of the work of the Assembly. This reservation implies that the Italian Government considers itself free to reject any or all acts of the Assembly. The reservation reads:

"During the present General Assembly, divergences of opinion have arisen on various fundamental questions of interpretation concerning articles of the Convention and provisions of the Statutes. Considering the declarations made by some delegations which affect important problems of principle, and which cannot meet with the full approval of the Italian delegation, the latter—referring also to the position taken by it during the discussions and when votes were taken—wishes to declare that its attitude is designed to leave to the Government which it represents full and entire liberty of action with regard to the decisions that it will ultimately take."

It is clear from the position taken by the Italian Delegation in the Assembly that the reservation is pointed toward the intention, or at least the possibility, of rejecting certain acts of the Assembly. In fact, the Italian Government has already repudiated the article in the statutes ratified by the last General Assembly giving the subcommittees the right to elect their own officers.

2. The President is an employee of the Italian Government and responsible only to that government. The 1928 General Assembly decreed that he should limit the duties of the office of President to that of a presiding officer As late as January 18, 1929, the President formally communicated a written statement to the Finance Committee announcing that his Government insisted that the President of the Permanent Committee be *de jure* President of the Finance Committee. The Statutes of the Institute grant and have always granted to the subcommittees of the Permanent Committee the right to elect their own officers. This statute was reaffirmed by the 1928 Assembly. Yet the President at his own insistence is chairman of every standing subcommittee and auxiliary organization. This procedure is contrary to the spirit of the Statutes, and to precedent. It violates accepted international principles as well.

3. The keystone principle advocated by the American Delegation and adopted by the Assembly pertains to the right of the Permanent Committee to select its chief executive officer—the Secretary General—without restrictions as to nationality. This resolution was acknowledged to be a dead letter at the time of its adoption. Never had the Italian foreign office used its diplomatic influence more openly and so determinedly as it did a few days preceding the General Assembly. It informed a number of foreign diplomatic missions in Rome that it would denounce the Treaty and withdraw the building from the use of the Institute were a "foreigner" elected to this position. Under the circumstances no responsible "foreigner" could be expected to permit his name to be put in nomination, nor can it be recommended seriously that he do so, until there is assurance that all nationalities will be judged on the same basis.

Only candidates of Italian nationality were approached or seriously considered by the nominating committee. No effort was made to get in touch with "foreign" candidates.

The issue is not that the Secretary-General shall be other than Italian. It hinges on the basic principle that the Permanent Committee shall be free to make its own choice without consideration as to nationality. The essential point is that the Permanent Committee supervise and control the Secretary-General, which control in the last analysis is inseparable from the power of appointment and dismissal. Without this freedom of selection of the directing

head of the Institute, the three principles involved in the American demands are greatly weakened. They must stand or fall together.

The nullification by the administration of the Institute of instructions of the Assemblies and of certain statutes governing the activities of the Permanent Committee has convinced the government of the United States that the machinery created by the treaty for the control and management of the Institute is inoperative. It has ceased to function with regard to the application of certain principles of international cooperation. For this reason the Institute has been notified that the United States under prevailing conditions has "ceased to be interested in participating in the affairs of the Institute, or contribute toward its financial support in excess of the obligations specified in the treaty of 1905." Governments can not be expected to exhibit any considerable degree of enthusiasm for an international undertaking which persists in violating fundamental principles of international control.

THE RECONSTRUCTION OF AGRICULTURE IN THE SOVIET UNION

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PRE-REVOLUTIONARY Russia appeared in the world market primarily as an exporter of agricultural products. This position was not the result of a high level of development of the productive forces of the country—the necessary prerequisite for the export of a marketable surplus from a producing country. The export of farm products from pre-war Russia was based on the rule of the large land owner, which compelled the mass of small farmers to turn over to the market, domestic and foreign, the fruits of their labor, even at the expense of satisfying their own most elementary needs.

Agriculture in pre-revolutionary Russia was characterized by a considerable concentration of farm property in the hands of the wealthy landlords, by the great predominance of small producers among the masses of peasants and, together with this, by the semi-feudal dependence on the landlords existing among the bulk of the peasants. If we divide the land-holdings of pre-revolutionary Russia into four groups according to size of holding, the relation between the various groups will be shown in table 1, which gives the data for 1905 when the census on which it is based was taken.

Table 1. Number of Holdings of Various Sizes in Pre-Revolutionary Russia, 1905
(Based on census data)

Group of landholders	*Range in size of holding (hectares)*	*Average size of holding (dessiatins*)*	*Number of holdings (millions)*	*Total area in holdings (millions of dessiatins*)*
Ruined peasantry, oppressed by semi-feudal exploitation	Up to 16 6	7 0	10 5	75 0
Middle peasantry	16 6-22 0	15 0	1 0	15 0
Upper strata, or wealthy peasantry ...	22 0-550 0	46 7	1 5	70 0
Semi-feudal estates	550 and over	2,333 0	0 03	70 0
Total Average		17 6	13 03	230 0

* 1 dessiatin equals 1 1 hectares or 2 7 acres

The great bulk of peasants during this period, the group classified as the ruined peasantry, were oppressed by the exploitation of the wealthy landlords and did not even possess means sufficient for the maintenance of the physical conditions of existence. The chronically miserable conditions prevailing among the mass of poor peasants in Russia is illustrated by the progressively increasing proportion of rejections from military service on account of physical unfitness. According to official data for 50 provinces of European Russia, the percentage of those rejected or reprieved from military service due to physical unfitness, during the period 1874-1902, was as shown in table 2.

Thus, the transition of the agriculture of pre-revolutionary Russia from a primitive economy to capitalism was a process accom-

Table 2. Percentage of Rejections or Reprieves from Military Service on Account of Physical Unfitness, Fifty Provinces of European Russia, 1874-1902

Period	Per cent rejections or reprieves
1874–78	11.2
1879–83	14.9
1884–88	16.9
1889–93	17.9
1894–98	17.6
1899–1902	22.1

panied by the impoverishment of the great mass of the peasantry, by their pauperization, and by their being forced out of agricultural production to a great degree.

The contradictions between the desolate condition of the mass of the peasantry, the capitalist development of agriculture, and the domination exercised by the big landlords over the land—the basic means of agricultural production—were the fundamental cause of the revolution of 1905 and was also one of the basic underlying factors in the revolutionary outbreak of 1917. Having crushed the revolution of 1905 by means of the punitive expeditions of the czarist troops, and by executions and death sentences, the czarist government was at the same time compelled, by means of the so-called "Stolypin laws," to stimulate the development of agriculture along commercial and capitalistic lines at a heightened tempo. But these attempts could not create sufficiently favorable conditions for the liquidation of the conflict of interests between

the landlords and the peasantry, inasmuch as the power and the profits remained in the hands of the ruling, land-owning class. As a matter of fact, the contradictions were actually aggravated by the Stolypin reforms, despite the fact that the czarist government attempted to base itself on certain groups in the villages by affording these groups the possibility of expanding their hold-

Table 3. Comparative Distribution of Land in a Number of Districts in Russia Before and After the Revolution

District and group of farms (classified according to the value, in rubles, of the means of production owned)*	*Area per farm before the war (dessiatins)*	*Area per farm in 1924–25 (dessiatins)*	*Change (dessiatins)*	*1924–25 area in percentage of pre-war*
Ukraine (steppe sections)				
0 200 rubles	1 5	4.9	+3 4	327
201 500	4 0	7 0	+3 0	175
501 800	7 6	8 5	+0 9	112
801 1,400	12 9	11.8	−1.1	93
Above 1,400	29.0	18.2	−10.8	63
Ukraine (wooded steppe sections)				
0 200 rubles	1 1	2 3	+1 2	209
201 500	2 8	5 0	+2 2	179
501 800	6 0	7.3	+1.3	122
801 1,400	12 1	10 8	−1 3	89
Above 1,400	18 5	13 4	−5 1	73
Tambov Province				
0 200 rubles	3 0	3 9	+0 9	130
201 500	5 7	7 3	+1 6	128
501 800	7 1	9 1	+2 0	129
801 1,400	12 3	11 5	−0 8	93
Above 1,400	43 0	17 7	−25 3	41
Smolensk Province				
0 500 rubles	0 2	3 1	+2 9	1550
201 200	4 3	5 8	+1 5	135
501 800	8 5	7 7	−0 8	91
801 1,400	12 5	10.9	−1 6	87
Above 1,400	16 5	14 4	−2 1	87

* 1 ruble equals 51 cents

ings through the plundering of the common land. In spite of the decisive measures taken in this direction, the outbreak of the revolution, hastened by the war, led to the overthrow of the czarist régime and to the overthrow of the capitalist class, which had attempted to seize the power after the March revolution.

The victory of the November revolution led to the final elimination of landlordism and of land ownership, confined principally

to the upper strata of the village; at the same time it brought about a considerable parceling out of land among the poor and middle peasantry. This may be seen in table 3 which gives the comparative distribution of land in a number of districts before and after the revolution.

These tables give a fair indication of the results of the process, brought about by the revolution, of taking land from the upper groups and parceling it out among the lower. For all the lower groups of the peasantry there was, generally speaking, virtually a doubling of the land at their disposal, and sometimes even more. The expansion of land holdings also extended to the middle peas-

Table 4 Redistribution of Land During the Revolution Among the Various Strata of the Rural Population in the Ukraine

Group of landholders	*Farm area (millions of dessiatins)*				
	Before the revolution	*Confiscated*	*After the revolution*	*Change*	*Percentage change*
Poor and middle peasant farms	20 0	—	34 5	+14 5	+72 5
Kulak (rich peasant farms)	8 6	6 8	1 8	−6 8	−79 0
Large land-holdings and church land	12 1	12 1	—	−12 1	−100 0
City land	0 6	0 3	0 3	−0 3	−50 0
State and common land	—	—	4 7	+4 7	—
Total	41 3	19 2	41 3	—	

antry, who added to their holdings in almost all sections of the country. Only from the upper groups did the revolution take part of their land, this part increasing in proportion to the size of the holding.

A summary of the results of the redistribution of land among the various strata of the rural population in the Ukraine is given in table 4.

Thus, post-revolutionary agriculture is characterized by the elimination of the large landlord economy, by a considerable reduction in the land-holdings of the rich peasantry, and by the rule of the so-called middle peasant—the small producer—in agriculture.

In the very first year after the revolution the Soviet State was confronted with the question as to the proper path for the devel-

opment of agriculture. It was quite apparent that the system of agriculture prevailing, with its small-scale production, was not equal to the task of regenerating this most backward branch of national economy and of bringing about a decided improvement in the living conditions of the poorer peasants. At that time Lenin, the head of the Soviet Government and the theoretical and practical leader and guide of the November revolution, wrote of the "necessity of giving all possible support to the *transition from small-scale peasant economy to large-scale socialized production.*" Lenin continually emphasized the necessity of "organizing the reconstruction of the entire economy, the passing from the single, individual, small-scale, trading economy to socialized large-scale economy."

But such a transition required as a necessary condition the development of an industry which would be able to supply agriculture with the machinery and implements needed for the carrying on of a large-scale socialized economy. "This transition," wrote Lenin, "can be speeded up only by means of such assistance to the peasant as will afford him the possibility of improving in a great degree his entire technique of land cultivation, by reorganizing it from the very bottom."

Without first restoring industry, ruined by the war, blockade and intervention, and without considerably advancing the industrialization of the country on the basis of the rehabilitated industry, it would have been impossible to think of a transition from small to large-scale agricultural production—a transition from individual to socialized production.

The period of the rehabilitation of industry is thus co-existent with the prevalence of a small peasant economy. What was small-scale production able to achieve during this period of its domination in agriculture? First of all, it should be noted that the system of government of the U S.S.R. created the necessary prerequisites for raising the economic level of the small peasantry, instead of its wholesale ruination. This was demonstrated by the rather rapid restoration of animal and plant husbandry, which had been almost destroyed by the war, blockade and famine. Also the sown area grew from year to year.

The rapid restoration of agriculture in the U.S.S.R. took place not only under conditions of a growth in savings and investments in production, but also was accompanied by an improvement in

the living conditions of the agricultural producer. According to data of the Statistical Administration, the consumption of meat by the rural population in 1925 was over one-third more than the pre-war consumption in the villages. In the following years the consumption of meat showed a continuous gain, as is indicated in table 5.

The decided betterment in the living conditions of the agricultural population has brought about a sharp decline in the death rate of the rural population since the revolution. Thus, the death rate in rural districts amounted to 28.6 per 1,000 persons in 1911-13, to 21.7 in 1926, to 21.8 in 1927, and to 18.7 in 1928.

Even more clearly is this process of the improvement in the conditions of the great mass of the peasantry illustrated by the

Table 5. Annual per Capita Consumption of Meat and Bacon in Villages, 1924-25 to 1928-29

Year	Per capita consumption of meat and bacon (kilograms)*	Per cent of 1924–25
1924–25	16 05	100 0
1925–26	16 54	103.1
1926 27	18 29	114 0
1927–28	18 71	116 6
1928 -29	22.41	139 6

* 1 kilogram equals 2 20 pounds

decided reduction in the infant mortality rate. During the period 1911-13, in the European part of the empire, the infant mortality rate (for infants up to one year old) was 266 per 1,000; in 1926 the infant mortality rate among the rural population was 174, in 1928, 156. The foregoing figures bespeak a considerable betterment in the standards of living of the village masses, resulting in a notable decline in deaths among infants, in increased longevity, and in a corresponding gain in the natural growth of the population. In 1911-13 the annual natural growth in population amounted to 16.9 per 1,000, in 1926 it reached 24 per 1,000 for the village population, and in 1928, 26.3 per 1,000.

Along with the general growth of agricultural production, the great mass of the peasantry—the poor and middle groups—were confronted, in all its magnitude, with the problem of the conditions which would enable them to progress to the higher level of socialized production.

The more rapid development of production for sale signified the taking advantage of market conditions, primarily by the larger producers. This is clearly brought out by a comparison of the results accomplished by the various groups of peasants (table 6).

It will be seen that the larger holdings have a lower production cost per unit and consequently more favorable conditions for development and for building up their resources. The differences in the conditions of production existing between the various groups of small-scale producers created the differentiation of the village,

Table 6. Relation of Size of Holding to Net Return per Centner of Grain, Ukraine Steppe, U.S.S.R.

Type of wheat and group of farms (classified according to the value, in rubles, of the means of production at their disposal)	*Outlays per hectare of sown area (rubles)*	*Yield (centners* per hectare)*	*Production cost per centner of grain (rubles)*	*Differences between price and cost per centner (rubles)*
Winter wheat				
Up to 750 0 rubles	47 7	6 4	5 9	+2.5
750 1–1500 0	55 1	9 5	4 6	+3.8
Above 1500 0	55 4	10 6	4 2	+4 2
Average for region	52 9	8 9	4 8	+3 6
Spring wheat				
Up to 750 0 rubles	45 1	5 0	7 2	+1 2
750 1–1500 0	50 8	7 0	5 8	+2.6
Above 1500 0	50 3	7 1	5 1	+3 3
Average for region	49 2	6.8	5 8	+2 6

* 1 centner equals 1/10 of a metric ton or 220 46 pounds

and stratification into separate groups. Parallel with the development of class antagonisms among the different groups of small producers, the period of economic restoration revealed in all clearness the limited means of production which the small peasant producer was able to command. The unprofitable character of small-scale production, and its limited field of operations, are indicated by a number of factors relating, on the one hand, to the means of production which the small holding is able to apply and, on the other hand, to the manner of their application. Thus, for instance, the use of more or less complicated machinery is a prerogative enjoyed only by a limited group of farms. In the U.S.S.R. the number of farms possession their own grain cleaning machines

and triers amounted to 11..6 per cent of the total, those owning seeders to only 3.7 per cent, reapers 6.2 per cent, and threshers 4.3 per cent.

The foregoing data indicate, in the first place, that the great mass of peasants were forced to limit themselves to the most primitive conditions of cultivation, without such elementary necessary means of production as seeders, reapers, grain cleaners, and threshers. On the other hand, a considerable number of peasant farms

Table 7 Relation of Size of Farm to Per Cent of Farms Working Land with Hired Working Livestock and Implements

Farms grouped according to sown area (dessiatins)	*Percentage of farms working land with hired working livestock*		
	1924	1925	1926
Up to 2	64.3	64 5	70 1
2–4	34 4	34 4	37 0
4–6	20 1	19.7	19 3
6–9	12.0	12 0	11 1
9–15	5 4	5 7	5 3
15 and over	1 5	2 0	2 0
Average	38 0	38 2	36 6
	Percentage of farms working land with hired implements		
	1924	1925	1926
Up to 2	66 0	65.7	70 7
2–4	36 3	36 7	38 8
4–6	22 3	21 6	22 4
6–9	14 5	14.8	15 6
9–15	7 7	8 0	9 5
15 and over	2 7	3 0	3 4
Average	40 0	39 7	38 8

were compelled to resort to the hiring of means of production, without which they would have been unable to avail themselves of whatever equipment they had at their disposal. The extent to which this hiring of agricultural equipment was carried may be seen from table 7.

For those farms which rented out means of production, the income from the renting out of working livestock and agricultural implements reached a substantial figure (table 8).

The inherent contradictions and the backwardness of small-scale production are also illustrated by the great degree of the non-utilization of the available labor power, a large part of which the

Table 8. Income from Renting Out the Means of Production, in Percentage of the Total Estimated Net Income of the Farm, in Different Provinces, U.S.S.R.

Province	*Per cent which income from renting out means of production is of total estimated net income per farm*	
	For farms with means of production valued at 801–1,400 rubles	*For farms with means of production valued at more than 1,400 rubles*
Tambov	7.3	5.2
Ukraine (wooded steppe region)	5.1	7.8
Ukraine (steppe region)	16.5	12.2
Novosibirsk	7.4	9.4

small-scale producer is not able to apply due to the insufficiency of the means of production (table 9).

The limitations of small-scale cultivation are also quite clearly reflected in the factors indicating the efficiency of production among the various social groups of the village. This may be seen from the data in table 10 relative to the grain yield and the productivity of the milch cattle.

It is clearly evident that while the middle peasant holdings show a lower level of productivity in comparison with the highest group, the poorest group shows an even lower productivity than the middle peasant holdings.

In an especially clear-cut fashion may be seen the limitations of petty-peasant production by comparing its productivity and its means of production with that of the collective and state farms. Let us examine a comparison of investments per unit of labor as

Table 9. Unused Working Time in Per Cent of the Available Labor Supply in Various Regions, U.S.S.R.

Region	*Unused working time in per cent of available labor supply*	
	Proletarian and semi-proletarian holdings	*Small-scale commodity producers*
Ukraine	43.2	40.7
Northern Caucasus	41.1	41.3
Lower Volga . . .	61.1	46.3
Siberia	39.2	39.2
Central Black Soil	47.7	41.7
Moscow Industrial .	46.5	41.7

Table 10. Yield of Wheat per Hectare, and Milk Production per Cow, in Different Regions and on Different Classes of Holdings, U S.S.R.

	Class of holding*				
	Proletarian and semi-proletarian farms	Petty commodity producers	Petty capitalist farms	In percentage of poor peasant level	
				Middle peasant	Kulak
Ukraine					
Yield of winter wheat [1]	8 1	10 0	10.8	123.6	133 3
Milk yield per cow[2]	1,030 7	1,074 9	1,376.9	104.3	133.6
Northern Caucasus					
Yield of winter wheat [1]	7 2	8 2	9 6	113.9	133.3
Milk yield per cow[2]	646 0	768 1	956 2	118 9	148 0
Middle Volga Region					
Yield of winter wheat [1]	12 8	12 9	13 1	100 8	102.3
Milk yield per cow[2]	1,228 9	1,249 4	1,364 5	101 7	111 0

* The proletariat and semi-proletariat of the village are peasants selling their labor power, to whom this source of income is of primary or secondary importance

Small market growers are independent farmers who do not hire any labor or who hire labor to a very small extent,

Petty capitalist households are farms on which hired labor is used to a comparatively large extent

[1] Wheat yields are in centners per hectare

[2] Kilograms of milk produced per cow

among the different groups of individual peasant holdings and collective and state farms. The investments per working day for the various types of farms are given in table 11.

Thus the limitations of petty production, and its unprofitable-

Table 11. Investment per Working Day for Various Types of Farms, U.S.S.R.

Region and product	Investment per working day (rubles)					
	Individual sector			Socialized sector		
	Proletarian and semi-proletarian holdings	Petty commodity producers	Petty capitalist holdings	Collective farms		State farms
				Artels	Communes	
Central Volga						
Spring wheat. .	0 5	0 6	0.7	3 6	4.2	11 2
Siberia						
Spring wheat	0 5	0.7	0 9	—	4 2	4.2
Central Black Soil						
Winter rye	0 5	0.6	0.7	1.8	2.6	3 3
Northern Caucasus						
Winter wheat	0.8	0 8	1.1	3.5	3.7	6.6

ness, is revealed with sufficient clarity as compared with the great possibilities of large-scale farming in the form of collective and state farms.

The process of industrialization of the national economy of the U.S.S.R. has considerably increased the supply of agricultural machinery and the importation of the more complicated machinery from the countries of western Europe and America. This has led to the quantity of agricultural machines and tools employed in agriculture mounting steadily from year to year. The value of agricultural machines and tools on all farms amounted to 988 million rubles in 1926-27 and to 1,404 million rubles in 1929-30. The amount required to supply additional machinery for agriculture in 1930-31 is estimated at about one billion rubles.

There has simultaneously taken place a considerable development of agricultural cooperation. The spread of different kinds of machine associations and other forms of cooperation in agricultural production for the purpose of the adoption of a new technical basis is of wide extent, especially in connection with the government support rendered such agricultural collectives. The membership of these agricultural cooperatives was as follows:

1924	...2,869,000
1925	.6,589,000
1926	..7,813,000

Especially characteristic of the development of cooperation in agricultural production is the considerable growth of the simplest forms of producers' associations, which increased their membership during the same years from 172,000 to 882,000, *i.e.,* more than five-fold. This growth involved the creation of machine, milk, cattle-raising, horse-breeding and seed-raising associations, and constituted the first preparatory step in the process of collectivization, which has spread so widely during these last years.

It is necessary to lay special stress on the enormous rôle played in the growth of collective agricultural production by the financial and credit aid which the Soviet state has rendered to all forms of cooperation and to collective farms. The tax payments of the collective farms and cooperative societies have been considerably reduced. Often they have been entirely exempted from the payment of a certain portion of the taxes. In addition, the collective farms receive and have received considerable financial support in

the form of cash credits and also of special credits for the purchase of machinery. By decisions of the Soviet Government, the bulk of the expenses involved in land organization within the collective farms was assumed by the state. These tax exemptions and this financial support by the Soviet state have considerably stimulated the development of collectivization.

All these factors, together with the greater unity and better organization brought about among the masses of the poor and middle peasantry, have led to a strong and energetic development of the collective farm movement, which has spread widely since 1927.

On November 1, 1927, the number of collective farms in the U.S.S.R. was 14,832, embracing 195,000 peasant holdings. By

Table 12. Percentage of Peasant Holdings in the U.S.S.R. Which Had Joined Collective Farms at Various Dates

Date	*Percentage of peasant holdings which had joined collective farms*
June 1, 1927	0 8
June 1, 1928	1 7
June 1, 1929	3 9
October 1, 1929	7 6
May 1, 1930	24 1

June 1, 1928, the number of collective farms had mounted to 33,258, comprising 417,000 peasant holdings. By June 1, 1929, the number of collectives had increased to 57,000 with 1,003,000 peasant holdings. By November 1, 1929, the number of such farms had grown to 67,436 and the number of holdings which had joined the collective farms, to 1,919,000. Finally, in May, 1930, there were in the U.S.S.R., 82,276 collectives embracing 5,778,000 holdings.

The tempo of collectivization of peasant holdings may also be realized by a comparison of the percentages of peasant holdings in the U.S.S.R. which had joined the collective farms at various dates (table 12).

This process is even more clearly evident when the percentages are given for those individual regions where collectivization embraces considerably larger strata of the village. The table which follows shows the percentage of the total number of peasant farms

which joined the collectives in three of the chief agricultural regions (table 13).

The collective farm movement has made big strides throughout the U.S.S.R., extending through the grain regions of the south and embracing to an ever greater extent the central and northern regions of the country.

What has led to such an enormous growth in the collectivization of agriculture in the U.S.S.R.? The answer to this question lies in those advantages of large-scale collective production which were disclosed in the process of collectivization in the first years of the formation of large-scale collective farms. First of all the collectivization of peasant holdings eliminated boundary strips, and, in

Table 13. Percentage of Peasant Holdings Which Had Joined Collective Farms in Different Regions of U S S R, as of Various Dates

Region	*Percentage of peasant holdings which had joined collective farms*				
	June 1, 1927	*June 1, 1928*	*June 1, 1929*	*October 1, 1929*	*May 1, 1930*
Northern Caucasus	1 6	5 2	7 3	10 0	55 2
Lower Volga	1 6	2 1	5 9	18 3	34 8
Steppe Region of Ukraine	1 6	3 8	8 6	16 0	45 4

connection therewith, increased the utilization of the means of production in the large-scale farms thus formed. An enormous rôle in this uniting of the small peasant strips into the large tracts of the collective farms has been played by the nationalization of land in the U.S.S.R. and by the abolition of private ownership in land. This has provided the indispensable basis for combining the many thousands of small scattered strips of land, constituting the peasant holdings which entered into the collective farms, into the large land tracts of the collective farms, organized in conformity with the topographical conditions, with the nature of the soil, and with the best technical methods. Moreover, even wherever there are no tractors as yet on the collective farms (and there is still a considerable shortage of tractors, despite their ever wider distribution throughout the agricultural areas of the U.S.S.R.), the advantages of large-scale production are clearly in evidence.

First of all, one must point out the increase in the productivity of agricultural labor as a consequence of the uniting of the small peasant holdings into large collective farms. Thus the number

of hectares sown per farm laborer on the collective farms has increased as follows in comparison with the peasant holdings prior to their entrance into the collective farms (in 1929): in the Ukraine, 31.6 per cent; in the Middle Volga Region, 73.1 per cent; in the Central Black Soil Region, 23.0 per cent; in the Lower Volga Region, 78.0 per cent; in the Northern Caucasus, 50 per cent.

At the same time, there has been a considerable increase in the utilization of draft cattle, which on the small peasant holdings had never been fully utilized. Thus, according to budgetary data, the percentage of draft cattle which were not used had been as follows: in the Ukraine, 68.6 per cent; in the Northern Caucasus, 78 per cent.

On the collective farms the draft cattle have been utilized much more productively than was the case on the petty peasant holdings. In the Ukraine the utilization of draft cattle has increased, in comparison with the peasant holdings prior to their collectivization (in 1929), 24.1 per cent; in the Middle Volga Region, 30 per cent; in the Central Black Soil Region, 7.4 per cent; in the Lower Volga Region, 25.2 per cent; in the Northern Caucasus, 34.6 per cent.

The significant increase in the productive possibilities of the farms which have joined the collective farms is evidenced both in the rate of growth of the collective farms themselves and in a decided improvement in the well-being of the members of the collective farms. The improved living conditions of the members of the collective farms, and the increase in their well-being, are based on the increase in productivity of labor of the members of the collective farms. These new rates of growth in the productivity of labor in agriculture have resulted in the current year in new rates of growth in grain production. Prior to last year the annual increase in sown area in the U.S.S.R. was from 4 to 5 per cent, while in the current year, as a result of the increased productivity of labor in the collective and state farms, the increase in the total sown area amounted to 10 per cent, and in the collective farms, to from 30 to 40 per cent. Moreover, the collective and state farms are already manifesting great productivity in the field of animal husbandry. We may thus expect that the development of animal husbandry in the socialized sector of agriculture will in the course of the next few years make up for the present damage

which was inflicted on animal husbandry during the past year due to lack of feed and to the resistance to collectivization on the part of the kulaks.[1]

On the collective farms, organized in 1928 and in operation in 1929, the increase in value of all means of production amounted in Uzbekistan to 110 per cent; in Turkmenistan to 109 per cent; in Kirghizia to 133 per cent. Together with the general growth

Table 14. Annual per Capita Consumption of Various Products by Different Peasant Groups

Products and regions	*Peasant group (consumption per capita in kilograms)*				
	Proletariat and semi-proletariat	*Petty commodity producers*	*Petty capitalist farms*	*Members of artels*	*Members of communes*
Meats and fats					
Northern Caucasus	12 2	16 5	20 3	20 9	32 1
Volga Region	5 4	13.4	24 4	15.6	27 9
Siberia (southwest)	11.6	25 0	36 1	38 9	42.4
Milk and butter*					
Northern Caucasus	69 1	142 9	225 9	235 0	178.6
Volga Region	159 7	182 5	206.9	204 0	269 0
Siberia (southwest)	129 6	199 2	238 5	177.6	421.5
Grain products					
Northern Caucasus	199 4	227 8	245 1	238.3	222 0
Volga Region	203 8	228 3	229 9	220 5	208.2
Siberia (southwest)	247 3	243 7	264 5	178.7	217.7
Potatoes					
Northern Caucasus	56 2	60 8	69 7	82 6	112 8
Volga Region	99 0	115 0	103 5	112.1	112.4
Siberia (southwest)	110 8	111 3	97 7	83 6	168 4

* In terms of milk.

of production in collective farms, there has been taking place a considerable improvement in the living conditions of those joining the collective farms, an improvement incomparably more rapid than in the small holdings. This improvement in the standard of living of the members of the collective farms is evident from a comparison of the annual per capita consumption of various products by different peasant groups (table 14).

[1] In 1930 the number of live stock was reduced as follows bulls—10 per cent, cows—12 per cent and hogs—40 per cent.

The table here presented bespeaks most eloquently the fact that the food standards of the bulk of the village population which have joined the collective farms, the poor and middle peasantry, have advanced notably in comparison with the period when they were individual landholders, and that their standards are already approaching those of the petty capitalist entrepreneurs, which the mass of peasantry could not have attained, of course, if they had remained petty, individual landholders.

The most important rôle in large-scale socialist production has been played by the so-called "Sovkhoz," or Soviet state farm. The development of these state farms has been marked by a gradual and general transition from the most rational assimilation of the most advanced technical forms found abroad, to the crea-

Table 15. Percentage Distribution of the 131 Farms Organized by the Grain Trust up to 1930, According to Size

Size in hectares	*Per cent of all farms*
Up to 25,000	11
25,000 to 40,000	34
40,000 to 80,000	50
80,000 to 100,000	3
Over 100,000	2

tion of new models of production, such as are almost entirely unknown in the most advanced countries of today, or are met in isolated instances only. To illustrate this it is sufficient to consider the activity of one of the largest state bodies for the organization of state farms, the Grain Trust.

The work of the Grain Trust began in 1928. It had organized 55 farms by 1929, 131 by 1930 and, according to estimates, will have organized 230 by 1931.

The total area of arable land in the 131 farms of the Grain Trust amounts to 7,620,000 hectares. The distribution of farms according to size is shown in table 15.

An analysis of the capital structure of a state grain farm, will show that a large mechanized enterprise of this type is in this respect on a level with modern industrial enterprises.

The fixed capital of the grain farms amounts to 5,081,500 rubles. Working capital amounts to 1,250,000 rubles, of which wages

amount to 520,000 rubles. Consequently, the percentage of the constant part of the capital to the total capital is as follows:

$$\frac{5{,}081\ 5+1{,}250\ 0-520.0}{5{,}081\ 5+1{,}250} \text{ or } 91\ 8 \text{ per cent.}$$

This is a proportion that may well be compared with that found in industrial enterprises that are technically more powerful and better equipped, as, for example, the "Red Putilov" (Leningrad) tractor and machine building plant, where it amounts to about 95 per cent.

As regards their power base, the grain factories likewise approximate industrial enterprises. The expenditure for fuel per 100 rubles of products in the metal industry amounted to 529.8 calories of "standard fuel equivalents," in the textile industry to

Table 16. Expenditures by the State Grain Farms per 100 Rubles of Product

Item	*Rubles expenditure per 100 rubles of product*
Wages	28.40
Seeds	21.00
Amortization	18 60
Spare parts	4 96
Fuel	16.50
Sundry materials	2 54

103.0, in the food industry to 64, and in the state grain farms to 267 calories.

The state grain farms thus constitute in agriculture a type of industrial grain factory sharply distinct from the old farms of the landowners and approximating modern industrial enterprises, both in regard to the composition of the capital invested and to the level of technical equipment.

This is likewise revealed with sufficient clarity by the above table showing the items of expenditure entering into the cost of agricultural production on the state grain farms (table 16).

Thus, a large portion of the cost of production of the state grain farms is made up of items representing industrial products. This causes a state grain farm to stand out as a distinct and new type of economy in comparison with those types which were hitherto the rule in agriculture.

The Soviet state has boldly carried over the experience of large-scale industrial production into agriculture. When this question was up for consideration in 1928, the majority of the big specialists in agriculture, having agreed to the exceptional importance of such an approach to the problem of grain-raising, emphasized that at the same time this would be a first experiment and hence its success could not be guaranteed.

But the provision of ample resources for this mode of grain-raising proved of decisive importance in securing a solution of the grain problem as a whole, in as much as the mass collective farm movement which at this period took the form of small collective farms, was thus afforded a clear demonstration of the advantages of real large-scale farming. The state grain farms in a practical way answered the question as to the possibilities and advantages of large-scale socialist agriculture.

Along these two lines—the collectives and the state farms—there will be developed the complete collectivization of the Soviet village.

One of the most important developments in the collectivization movement was the creation of machine-tractor stations which had their first trial on one of the state farms, Shevchenko, in the Ukraine. This experiment, whose initiator was A. M. Markevich, an agronomist, spread widely, and received the support of the Soviet Government. A machine-tractor station, according to the definition of Markevich, is a center for all the mechanical power and the technical equipment necessary for supplying to the fullest extent the production needs of agricultural enterprises. This makes possible an immense economy in technical means of production and their maximum utilization through machine-tractor stations within limits of a radius of more than 15 to 20 kilometers.

Collective farms, which have been organized on territory served by a machine-tractor station, enter into agreements with the latter as to conditions for the cultivation of the fields of the collective farms by the machine-tractor station. The agronomic aid rendered by the machine-tractor stations and the enlisting of members of the collective farms into the working staffs of these stations decidedly transform the aspect of the countryside served by these stations. Machine-tractor stations first of all lead to the growth of the sown area and to the bettering of production. Thus, in the Berezov district on farms served by machine-tractor stations and

organized in 1928, the planted area increased as much as 28.4 per cent, while in districts not served by stations the planted area either remained unchanged, or increased on the average about 4.5 per cent.

Table 17. Expenditures, Gross Income, and Net Income in Rubles per Ten Hectares, under Various Forms of Farm Organization, U S S.R.

	Form of organization		
	Individual peasant households, without horses (rubles per 10 hectares)	*Individual peasant households, with horses (rubles per 10 hectares)*	*Members of collectives served by machine-tractor stations (rubles per 10 hectares)*
Expenditures:			
Maintenance of draft horses	—	150 00	
Maintenance of equipment	—	10 00	
Maintenance of buildings	4 00	5 70	0 80
Hire of labor power	—	10 50	
Hire of draft horses and inventory against payment of one-half	260 10		
Seeds	—	60 30	50 00
General and miscellaneous	20.20	30 20	15 00
Payment to machine and tractor station out of part of harvest	—	—	165 00
Total expenditures	284 30	266 70	230 80
Gross income.			
Grain	438 85[1]	491 25[2]	700 00[3]
Straw	25 20[1]	28 80[2]	37.50[3]
Total gross income	464 05	520 05	737.50
Net income from field crops per family[4]	179 75	253.35	506 70
Second and third columns in per cent of first	100%	141%	283%

[1] 67 centners of grain at 6 55 = 438 85
84 centners of straw at 0.30 = 25.20
[2] 75 centners of grain at 6.55 = 491.25
96 centners of straw at 0.30 = 28.80
[3] 100 centners of grain at 7.00 = 700 00
125 centners of straw at 0.30 = 37 50
[4] Gross income less expenditures.

The income of members of collective farms served by machine-tractor stations has considerably increased, as is evident from the figures presented in table 17, recording the experience of the Shevchenko station. (In the calculations we have taken the net yield and the sales value of the products).

These figures, showing the enormous growth in the income of members of a collective farm which has entered into an agreement with a machine-tractor station, explain the broad extent and development of the machine-tractor stations and their significance in the further reconstruction of agriculture.

The machine-tractor stations lead to a decided increase in yield due to better cultivation of the fields and to the agronomic aid

Table 18. Tasks Set, Actual Results Attained, and Highest Results Attained by Machine and Tractor Stations in U.S.S.R.

	Task set by tractor center	*Actual results attained*	*Highest results attained by machine and tractor stations*
Number of working hours of tractors for spring sowing campaign			
International 10/20		537 00	831 00
International 22/36		685 80	882 00
Average	510 00	530 00	—
Length of working day in tractor hours			
International 10/20		15 90	20 10
International 22/36		18 70	20 10
Average	16 00	16 20	—
Hectares cultivated per tractor*			
International 10/20	—	170 00	304 00
International 22/36	—	297 60	405 00
Productivity in hectares per tractor hour, International 10/20 plowing sod lands	0 30	0 31	0.38

* In terms of soft soil plowing

rendered the farms. They played a big rôle in the sowing campaign of the current year, by cultivating an area of 1,999,700 hectares. It is necessary to direct special attention to the indexes, which are furnished by machine-tractor stations, as regards utilization of tractors. These are shown in table 18.

The total annual number of working hours per tractor will be 2,300 hours in 1930. Under the plans for establishing machine-tractor stations their number is expected to increase in 1931 to 551, in 1932 to 796, in 1933 to 798, with a combined horse-power of 3,987,300.

As a result of such a development of the machine-tractor sta-

tions over a territory which in 1929 comprised 56,700,000 hectares of sown area, it is anticipated that the area under cultivation may be increased 58 per cent by 1933.

The reconstruction of agriculture in the Soviet Union is already in full swing. It is sufficient to analyze the data as to the share of the several groups of grain producers before the revolution, in 1927, and in the present year, in order to see the nature of the changes which have taken place in agriculture in the Soviet Union during the period of revolutionary reconstruction. Before the war there fell to the share of the large grain farmers, landowners and kulaks, 34 per cent of the sown area, 40 per cent of the gross yield of grain, and 61 per cent of the commercial grain crop, exclusive of local village consumption.

By 1927 this proportion had sharply changed in favor of the small and middle peasant holdings. To the share of the large kulak holdings, fell about 6 per cent of the sown area, 8 per cent of the gross production, and 20 per cent of the commercial grain crop. The rest of the agricultural production was in the hands of the small and middle producers and of the poor and middle peasantry.

The elimination of the landowners, the decided curtailment of kulak production, the predominance of petty individual holdings in the production of grain—these were the results of the first years of the revolution. This scattered agricultural production the Soviet Government has now definitely turned onto the path of socialist large-scale production, and in 1930 we have in the sector of large-scale socialist grain farms (state and collective farms) about 30 per cent of the sown area, 30 per cent of the gross yield, and 62 per cent of the commercial grain crop, exclusive of local village consumption.

At the same time, during the first years of the revolution there took place an uninterrupted growth in the number of peasant holdings. Their number showed an annual increase of 500,000 holdings, 2 to 3 per cent, on the average. The present year is characterized by a definite curtailment of the number of small holdings and by the replacing of 5,778,000 peasant holdings by 82,276 voluntarily organized collective farms.

The collectivization of the small and middle peasant holdings has already, in the first stages of its development, shown the enormous advantages of large-scale socialist farming. Small producers

who have joined the collective farms have been able already in the first year of the existence of these farms to lay the foundation for large-scale farming; they have been able to derive advantages from this large-scale farming in the form of an increase in the labor productivity of the members of the collective farms, and in the form of a better utilization of the means of production which the collective farms had at their disposal, as a result of the collectivization of the means of production formerly belonging to the individual peasant, and as a result of the acquisition of means of production in conformity with modern technical standards.

These advantages of large-scale production are evidenced in an increase of yield, a lowering of the cost of production, an increase in profits, and likewise in the higher standard of living of the members of the collective farms.

The collective farms have inaugurated a new pace of development in agriculture. Whereas up to recent years the total annual increase in the sown area had not exceeded 4 to 5 per cent, this year, with the state and collective farms as a basis, the sown area in the U.S.S.R. has increased more than 10 per cent.

Thus, both from the point of view of the general progress and increased volume of agricultural production and from that of the interests of the small and very small producers themselves, collectivization signifies a change bearing the greatest advantages.

THE APPLICATION OF ECONOMIC RESEARCH TO A VILLAGE IN BENGAL

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I FEEL I am here under false pretenses. I can claim to be neither an economist nor an agriculturist by profession, and for this reason I trust you will excuse a few words of personal explanation.

In February, 1922, at the invitation of Dr. Rabindranath Tagore, and as part of the work of his university, twelve of us, including ten Indian students and one member of staff, set out to take possession of a small farm on the edge of the village of Surul in order to try and discover what lay behind the apparent breakdown of village life throughout that region. Perhaps it was natural, fresh from two years' study of agriculture at Cornell, to wish at first to find a way out mainly through agricultural improvement and a study of the agricultural economics of the village. Those of you who are familiar with any part of rural India will know, however, that the village over most of that vast country is not just an agricultural unit of production but a social organism with not less than 3000 years of civilisation behind it. The village takes precedence over the single family, the single farm or the single enterprise as the significant unit and must therefore be looked at from every aspect and not solely as an economic problem. In the application, therefore, of the results of such research work as is available, there has to be a coordination of method and attack of a kind that will take into account the emergency of the whole village situation. The research-worker must examine social and industrial as well as agricultural conditions. In addition to this, as those of you will know who come from countries where agricultural economic research is still fighting for funds and even for existence, when there is only a very limited budget allowance for the tackling of a very practical and sometimes a desperate rural situation, the amount of money available has to be spread very carefully between research and those methods of extension and education whereby the emergency is dealt with on the spot

I propose, therefore, to sketch for you a threefold picture. The first describes an attempt between the years 1922 and 1924 to establish in the district of Birbhum in western Bengal an Institute

of Rural Reconstruction. This was to be a center of research into every aspect of village life and a training school for extension workers. The second is an account of the economic aspects of a single village drawn from a survey in 1925, which will serve as the background for the third picture, a report of the results of five years of extension work applied to this same village.

Bengal lies on the east side of the peninsula and forms the delta of the Ganges and Brahmaputra rivers. Rice, jute and fish are the chief products of the deltaic area. Birbhum forms the most westerly district of Bengal and is an arid upland area lying between the delta and the hills of Bihar. Here the rain falls during three months in the year only, and the cultivator, unless blessed with irrigation water, is fully occupied for not more than three and a half months. Looking back at the records of the first two years' research, the following sentence was used to sum up the situation as we found it. "At the basis of the social and economic troubles of the village in this area lie malaria, monkeys and mutual mistrust."

With an incidence of malaria rising often to 95 per cent among the cultivators just when their full time and energy is needed on the land, the economic wastage is considerable. The staple article of diet being rice, it is difficult without fresh fruit and vegetables to withstand any general epidemic, but the monkeys in this area made vegetable and fruit growing almost impossible. They can destroy completely a crop of sugar cane or potatoes. The scourge of malaria seems to have come into the district with the railway some sixty years ago. The felling and clearing of timber that followed resulted in the rapid elimination of the old grazing grounds through soil erosion; and economic stability, always liable in older days to be upset by occasional famine, had disappeared altogether and with it social stability inside the village. Fear of what may happen tomorrow and of the ever possible destruction of his last resource turns every villager's hand against his neighbour and makes difficult the building up of any element of trust between him and his fellows or between him and any extension service however well-meaning and well organized. In such an atmosphere it is very easy for the economist to try and justify his existence by concentrating on what he calls pure research and by publishing his figures and facts without having to visualize the end for which he exists, or to concern himself

with the building of that bridge of mutual trust across which must travel the results of his research if such a situation is to be remedied. The following quotation from Mr. K. M. Ghose, the head of the village work of the Institute for the last nine years, will illustrate the difficulties of an extension service in a village typical of the area. "Forty years ago there were 300 families in this village; in 1923 there were 88. Progress is difficult because the villagers are indifferent and do not trust their headman; they have no energy or vitality and an attempt to combine them for anti-malarial work in 1924 failed; 95 per cent on examination by a qualified physician showed enlarged spleen; the village is full of jungle and malarial pools; the tanks built to store water for irrigation and household purposes are silted up; no vegetables are grown; the landlord is money lender and legal adviser to the village; his tenants are all in debt to him but are rapidly decreasing in number." It was five years before this village opened its doors to extension work and began to put itself in order.

In 1922 the Institute of Rural Reconstruction was established as a permanent part of Dr. Tagore's educational enterprise. After a preliminary survey of the area we set out to study and master methods of dealing with what seemed the most serious problem—the prevalence of disease. We planned to educate students in preventive methods and at the same time to explore possible ways of extending a knowledge of simple health precautions to the village. Our health work, in fact, offered us our first opening into the neighbouring villages where we had been for some months regarded with the greatest suspicion and even with hostility. Closer touch with the individual village showed us the necessity of studying the decay of village industry as well as the depression of agriculture, since the prevalence of disease was so often directly associated with the absence of any economic resource. The hereditary weavers and most of the hereditary leather workers we found living in a state of perpetual semi-starvation, so we set up research into these two industries and later established training centres in both. At the invitation of one of the villages we were at last able to gather their small boys together in the evening. For these boys we worked out a system of elementary education directly applicable to their surroundings. Through them we introduced vegetable growing, a fire-fighting organization, an anti-malarial control programme as well as the playing

of games and the singing of group songs. Within two years there were in eight villages groups of boys trained in this way and they formed the backbone of our early extension service. Through them we were at last able to establish a living touch with our environment, to begin to gather significant facts and to extend to the village the early findings of research.

In 1924 the staff which had grown considerably by this time were ready to undertake a detailed survey—social, economic, industrial and agricultural—of one village where the success of some preliminary health work had established a measure of confidence. The staff were already convinced that any fundamental and lasting progress would only be possible where they could establish one of their trained extension workers permanently in one village, in such a way that he could earn his living and make his home there and occupy a part of his spare time in village organization, education and extension work. The Institute, by this time, included the following: an office and store; textile, tannery, garden, farm and poultry departments; a work shop; a training school with headmaster and some fifteen students; a day school for village girls; an orphanage; a boarding school for small boys; a dispensary; and the village extension work department. In the spring of 1924 I left India with Dr. Tagore and an all-Indian staff has carried the work on ever since.

The survey of the village of Ballabhpur was published in July, 1926. I propose to quote from it only sufficient facts to provide a background for further comment since the report is published This village must not be regarded as typical of India nor even of Bengal any more than a village of Germany or Spain could be regarded as typical of Europe.

Ballabhpur is a small village typical of the uplands of western Bengal. It has an area of 1,248 acres; 916 acres are for the most part eroded waste; 14 acres are occupied by the village; 14 acres are tanks or excavated ponds which from ancient times formed the water reservoirs for irrigation and household use and which for the most part have been allowed to silt up and breed malaria; 67 acres are grazing ground; 87 acres are arable fields; 150 acres are unclassified.

The village is owned by one landlord who has drawn $300 rent a year for the last twenty years at a rate of $1 an acre. He lives in a village two miles away. The main cash crops were rice,

sugar cane, and potatoes. The livestock included the following: 2 bulls; 36 bullocks for working purposes; 77 milk cows, 15 of which were in milk at the time of the survey, giving an average daily yield of one pound of milk each; 50 calves; 40 goats; two pigs; and forty-four head of poultry. The village imported $430 worth of cotton cloth annually.

The population in 1820 consisted of 500 families, most of them weavers for the East India Company. By 1920 there were only 100 people living in the village; by 1925 there were 84 people and 24 families. Of the 84 people, 38 belong to the higher castes including six families of Brahmins, three families of weavers, one family of potters and one of barbers; 46 belong to the lower castes including seven families of tanners. All except seven landless labourers depend on agriculture for their living.

The caste system is the outcome of two factors dating from the descent of the Aryan invaders into India not less than 3000 years ago. They were priests or soldiers by birth and established in India a permanent connection between profession and family. The conquered tribes were given the less skilled tasks and in order to safeguard the blood of the conquerors were termed of lower caste and forbidden to intermarry with the invaders. These lower caste folk often keep their original tribal names and are sometimes referred to as the depressed, sometimes as the untouchable classes, according to the strength of the caste system in the particular area.

In 1925 the income of the one family of means amounted to $569 and the expenditure to $530, leaving a surplus of $39. This family rented 10 acres. Among the depressed classes the average expenditure of a family was $93 and the average income $63. The total indebtedness of the village was estimated at $1,650.

The one thriving concern in the village was the liquor shop which belonged to the landlord. On an annual expenditure of $735 the profit and loss account showed an income of $1,172 out of which a commission was paid to the Government of $287. The net profit to the owner was $417.

In 1923 eighty to ninety per cent of the population was infected with malaria. After some preliminary work this number had decreased to 20 per cent in 1925. In the course of five years 22 people had died from malaria—a quarter of the population—

and 29 babies had been born, 20 girls and 9 boys. There was no system of sanitation and no pure drinking water supply.

You will see from this picture that here was an emergency problem which could certainly be measured in figures but the cure to which was necessarily a change in attitude of mind. At the time when the survey was taken the people were all anxious to leave the village but were too poverty stricken to do so. They distrusted each other and the better off exploited the poorer; they put no trust in the Institute and laughed at any suggestion put forward. So much for the survey of 1925. I shall now turn to the account printed in January, 1930, of the results of five years' extension effort.

In 1925 while the survey was being taken, a Cooperative Health and Reconstruction Society was formed and registered with the Government. This represents perhaps the most primitive of all forms of cooperative activity. It opened with 23 members, each paying eight cents a month, two cents being credited towards the purchase of a share and six cents going to improve the sanitation of the village. Poor members contributed half a day's work and then were credited with full membership. From its foundation the District Board contributed an equal amount to that raised by local contribution. Twenty-three dollars was raised by the village; $22.50 was received from the District Board. The District Board is the county unit of local administration, and is an elected board of Indians.

The following works were undertaken by the Cooperative Association: In 1925, two stagnant pools were filled, 440 yards of road were made, 900 yards of drain were opened, most of the jungle was cleared, kerosene was put on water in the tanks, and quinine pills were distributed. In 1929, 18 pools were filled, 43 yards of road were made, 1,800 yards of old drains were cleaned twice, and 272 yards of new drains were dug. By the end of 1929 the total of 4 years' work included the following: 48 pits filled, 943 yards of road made, and 2,270 yards of drains dug.

The test of such a society must be the results which it obtains over a period of years. The foregoing figures give certain evidence that a bridge of trust had been built, across which the findings of research from the Institute have traveled to the village, and across which emergency problems from the village have

traveled to the Institute. How then has the bridge stood when confronted by the more complicated social problems of debt, party quarrels, and law suits; by the struggle to improve industry, agriculture and education?

Unless complete confidence has been established between extension worker and village, it is always a difficult matter to discover the exact amount of indebtedness, but there were already figures to show that in 1925, 23 out of 24 families were in debt, to the amount of $1,650. By 1929, 18 out of 24 families were still in debt; and the amount had increased to $1,956. This increase was largely due to the famine of 1927 when crops failed completely. Of this debt $663 was owed to the cooperative bank, $654 was owed without mortgage, $625 on the mortgage of land and $15 on pawned property.

The following are the usual methods of obtaining loans:

1. Loans on mortgage where the creditor obtains from the debtor temporary possession of some land until the principal is fully paid up. Use of the land takes the place of the usual interest payment.

2. Loans on the mortgage of land at 18 to 24 per cent compound interest.

3. Loans made on condition of automatic transfer of mortgaged land if principal and interest are not paid up by a given date. As a result of drought and failure of crops in 1927, many cultivators, who were paying the landlord 25 per cent interest on their arrears of rent, borrowed funds on condition of automatic transfer at 37½ per cent to meet the expenses of cultivation. Most of them failed, automatically lost their land, and became labourers.

4. Loans at an interest rising to 37½ per cent against pawned ornaments, jewels, and household utensils.

5. Loans taken on note of hand bearing 37½ per cent interest.

6. The paddy loan system. This system is common with the small cultivator whose stock of paddy or unhusked rice runs low in May. He borrows paddy to feed himself and his hired labour and for seed at a rate of 50 per cent payable in paddy after the harvest in November.

7. Loans taken by the landless labourers from the Kabuli merchants of Afghanistan bearing anything from 150 to 170 per cent interest. Once in the clutches of these men the labourer rarely escapes during his life except by bolting from the neighbour-

hood—hence the high rate of interest which more than covers this risk.

8. Loans from a Village Cooperative Credit Society inspected, audited and guaranteed by the Provincial Government at not more than 10 per cent.

Loans are taken to pay expenses of cultivation, to meet marriage and funeral expenses, and, on the occasion of decimation of working bullocks by disease such as rinderpest, or foot and mouth disease, to buy new cattle.

In December of 1927 the Government Registrar of Cooperative Societies established a Central Cooperative Bank at Surul, under the control and supervision of the Institute, which is audited and backed by the Provincial Government. With the assistance of this bank, in January, 1928, a cooperative credit society was opened in the village of Ballabhpur under the guidance of the extension worker, with eighteen members. This society proceeded to borrow $950 at a reasonable rate of interest. With this money in hand nine members were able to clear their high interest loans; two bought cattle and manure; one met his household expenses; and two re-excavated their tanks in order to establish a fishery, a better water supply and irrigation for a vegetable garden. In 1929 every member paid his debt to the bank and the society borrowed $750 more from the Central Bank at the Institute. By the end of the year the villagers had begun to deposit their own money in the bank and their working capital amounted to $2,808.

The chief difficulty about the Central Bank from the cultivator's point of view is that he is as yet unable through his Cooperative Credit Society to obtain from it a long term loan. The chief difficulty about the cultivator from the point of view of the Central Bank at the Institute is that so many of the 258 Unlimited Credit Societies affiliated to it when the Branch was transferred in 1927, remain stagnant and even unsound for lack of the trained leadership of an extension service such as exists in the village under discussion, and of a competent rural economist. A list of the various types of society which have been organised directly by the Institute will show how powerful a weapon a Central Bank can be when it is harnessed to a competent organisation for research, extension, and educational work. The bank has, under the direct supervision of the extension service of the Institute, financed 64 irrigation societies; 8 societies of depressed class mem-

bers, mostly landless labourers; one cooperative sale and supply society; one cooperative rice store; and twelve rural reconstruction and health societies in the villages immediately around the Institute.

So much for the attack upon rural health and indebtedness The effort to stimulate the villager into raising his standard of life through other kinds of extension and educational work has to take many additional forms. In 1929 there were in Ballabhpur sufficient boys of the right age to make possible the formation of a village troop. This troop was organised like those of 1923 for the introduction of games and sports and was drilled as a fire brigade. The boys were made responsible for the putting of kerosene on the tanks against the malaria larvae, for administering the pills of cinchona, and for recording the completion of the swallowing process. Most of these boys are busy during the day herding the village flocks and herds and therefore give their evenings to their troop activities as well as to the gatherings around the fire in the winter for the singing of songs and reciting of tales after sunset.

One of the most depressing elements in a rural area where poverty, disease and economic disintegration dominate society is the prevalence of party quarrels and expensive recourse to the lawyer and the law-court. To realise a debt of $50 a man has to spend $20, only $10 of which is recoverable from the debtor if he wins his case. Four years of cooperative experiment in the field of health and of indebtedness made possible in 1929 the election of a "panchayat," that is of five men, before whom all disputes in the village are now brought before recourse to the courts. This step forward probably represents the high water mark of village extension work in this area. Five disputes were settled during the first year of the existence of this body.

Until a competent extension service for women has been trained and organised it will always be difficult in India to reach the inside of the home. The three midwives of this village have, however, received special training at the Institute and this is probably a fundamental step. A Women's Association has been established through which the women have learnt tailoring and needlework.

In 1926, a night school was established with 12 boys all of whom can now read and write. In 1929 a day school was introduced with a paid teacher, and the report records that the

furniture was provided by the District Magistrate for the sum of $12 and that the local government authority, the District Board, contributes a grant of $1 a month to each school. Boys from two other villages use the day school.

At an earlier stage in this paper, I referred to village industries and agriculture. It is not difficult to see, however, that progress in these fields is dependent upon the degree to which the extension worker is able to establish an understanding of the elements of cooperation in dealing with village quarrels and village health. Water, capital, bodily strength and mutual trust form the bed-rock upon which alone profitable agriculture and industry can flourish in this area. Certain new crops, tried out first on experimental plots and then on the demonstration farm at the Institute, have been established in the village. Cotton and mulberry were both extensively cultivated in this area up to 1815 when thousands of cotton and silk weavers in this area were thrown out of work and sacrificed on the altar of the newly established power loom industry in Lancashire. High tariffs were established by Parliament to prevent manufactured cotton goods reaching England from India, and India was compelled to accept, without tariff, cotton goods manufactured in Lancashire from her own raw cotton. This action destroyed many of her indigenous crafts, upset the economic balance of village life in the area under discussion, and one of the finest varieties of cotton ever known disappeared from cultivation. In those days there were neither research nor extension men to examine, to record, or to alleviate the suffering.

The growing of tomatoes, entirely new to the area, and of bananas, was made possible only by the killing down of the monkeys. In 1929, twelve were shot. Twelve households have new and successful vegetable gardens; and the Village Health and Reconstruction Society has itself leased from the landlord one tank from which the water and fish can now be sold. The members undertook the re-excavation themselves. For a variety of reasons the Institute failed in its effort to establish better poultry husbandry among the depressed classes. One other setback may well be mentioned here. The village became so confident in 1929 of its capacity to withstand malaria without consuming the necessary but somewhat unpalatable pills that the incidence rose to 34 per cent as against 17 per cent the previous year.

In the field of industry one village leather worker was trained

at the Institute in the use of scientific method and there is a ready market for his improved product. In the weaving industry it is not generally realised that thirty per cent of the cotton cloth used in India is still the product of the rural handloom industry with factory spun yarn, and that any improved form of small scale ginning and carding and spinning machinery that could be handled in the village would deprive factory industry in India or in Lancashire of a serious proportion of the other seventy per cent. The hand loom in India has withstood every attack by modern industry. Local demand for a special pattern still gives limited markets that no factory wants to fill. In the buying of yarn, in the marketing of his finished product, in the financing of his industry and in his conservatism, the worker has laid himself open to every kind of ruthless exploitation, but the industry has survived. Here again the Rural Credit Bank on the one side and textile research at the Institute have come to the assistance of the weavers in Ballabhpur. The extension worker and his pupils have already worked out from experience dependable figures upon the capital and equipment needed to ensure a reasonable financial return.

As the work of the Institute grows, the problem of marketing the surplus crops and manufactured products is beginning to arise and to engage the attention of the staff at the Institute. Here careful research is needed of a kind that has hardly been undertaken in Bengal, not only into the possibilities of cooperative purchase, storage, and sale of commodities, but into the need for dealing with surplus production and of making proper provision against famine.

I have tried in this paper to give you a picture of an attempt, with limited financial resources, to assess the emergency and to take a long time view of a rural situation, and from small beginnings to mobilise some of the forces of research, education and extension in a coordinated attack. The situation may seem far removed from the experience of any here, but I am inclined to think that the principles of attack are the same whatever the situation. Even where research and graduate training run hand in hand with higher education, the most serious tendency of educational institutions is to drift into isolation from their environment. When the Institute or some member of it has been able and vigorous enough to initiate not only research into facts and conditions at his door, but to establish actual enterprises, agricultural or industrial, and to

run such enterprises on a strictly commercial basis, education, research and extension work have all reaped the benefit.

Intimate touch with the facts of any neighbourhood is not easy to establish inside an institution and this can only be gained when the staff is thoroughly cooperative and so wedded to a common purpose that teacher, research specialist, and enterprise manager are able on occasion to get out into the field on extension work. Unless the extension worker also possesses a feeling that he has in the Institute a home to come back to, with valuable experience of the field from which to teach, he can easily become disheartened and isolated, and fall into a rut of routine.

Out in the field, attention to principle involves a determination so to study the psychology of the villager that nothing is done for him which saves him the trouble of making every effort within his own range and capacity. It means that progress for him must never be measured merely by an increase in his material standard of living but by the quality of his life. In a land of small villages it is probably better for an extension worker to be able to practice some specific profession in the village, part of his time. Men who try to earn solely by the word that proceeds out of the mouth will always be somewhat suspect in a world of very practical people.

If the cultivator of Bengal can once command control, through cooperative effort, over his purchasing, his marketing, and his producing, he can, by making due provision against natural calamities, stabilise his standard of living and devote his effort to the enriching of his leisure. Bengal is full of the memories of a rich and creative village life. Drama, poetry, music, dance, decorative craft and art, all these served to enrich the ample leisure of the villager. Natural events and processes in life were often invested with social, religious or dramatic significance. Cooperative celebration at feast or festival frequently overcame caste distinction. This capacity to cooperate for the enriching of life still exists even though the economic basis that once gave it liberal expression has vanished, but the India of tomorrow will lose much if she fails to rediscover and reestablish it through education, research and extension work.

THE NEW FORMS OF AGRICULTURAL PRODUCTION IN MEXICO

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BEFORE proceeding with the reading of this brief report, I shall have to begin by asking this distinguished gathering for their indulgence for my rather limited command of the language in which I am speaking, since it was my sincere desire to cooperate in the scientific labors of this congress within the scope of my powers that prompted me to prepare this paper on the Mexican agricola-economic organization.

When I was invited, through his Excellency the Ambassador of Mexico, to read a paper on some of the many topics of agricultural economics, I thought that it would be most timely and appropriate —taking into consideration the limited time at my disposal to gather data and other materials on the subject—to present a succinct but at the same time ample exposition of the new methods of agricultural production in Mexico, which methods came as a result of the agrarian legislation which had its inception in the law of January 6, 1915, and of the new tendencies of the various Mexican administrations since the promulgation of that law.

The fact that the agrarian reform in Mexico has been widely discussed abroad and at home, without, however, having at hand, except in a very few instances, adequate information upon which to base opinions, imposes upon me the duty of explaining from its origins the essence of the agrarian reform, citing its causes, pointing out its system, and explaining at the same time its present status from an absolutely technical point of view. To enable us to understand the organization of Mexican agriculture, it is necessary to consider it from the standpoint of three important factors: (1) the distribution of the lands, (2) the social and economic position of the rural population, and (3) the systems of agriculture. These factors are projected, historically, throughout the life of Mexico as a free people before the Conquest, as a subjected people during the Colonial Period, and as a free people again, after having achieved independence.

Before the conquest by the Spaniards commanded by Hernan Cortes, Mexico was a country inhabited by a number of Indian tribes scattered throughout the country. All seems to indicate that

their civilization was an advanced one; they were acquainted with the arts of reading and writing and with the mathematical and astronomical sciences; they were excellent architects, great painters, and as far as agriculture was concerned they knew four or five of the main crops, which permitted them to meet their domestic needs. Their political organization which consisted of a plutocratic monarchy, established, as in all other similar organizations throughout history, the granting of the lands under three distinct forms of appropriation: the lands of the king, those of the nobility and the church, and the lands of the villages or communal lands, known in the native languages as "calpulli." The lands of the king and those of the nobility were tilled by serfs and by slaves captured in the wars. The products were used in maintaining the wealth and splendor of the Royal House, of the nobility, and of the church. The "calpulli" were tilled by free farmers who held the land in private ownership. These lands were divided in parcels which belonged to the heads of the families, and which upon their death, were inherited by their children. Tendencies in the system of land tenure were openly individualistic, and each parcel of land constituted within the "calpulli" a single unit, separate and independent. The agricultural products produced in the "calpulli" were used to meet the domestic demands of the villages after paying the tributes due to the king. All the investigations which have been carried out fully demonstrate that communistic tendencies, insofar as possession of the arable land was concerned, did not exist, and only the usufructs of the grass-lands and forest were enjoyed in common. The farming systems were simple and primitive, and they used mainly as agricultural tools the pick, the iron bar, the long pointed wooden stick, the hoe, the machete and the ax. The plow which they used was made of wood, and was very similar to the Babylonic plow. Occasionally it was provided with an iron point. The main crops were corn, tobacco, cotton, beans, cacao and chile.

In each "calpulli", plots were held by the heads of the families with permanent tenure and inheritance. These plots were inalienable and were transferred only in case the owner failed to till the land, or in case of disappearance of the family. In addition to the parcels held by the family, there were lands for other purposes, as for the maintenance of local officials, the payment of tributes for religious purposes, and for the prosecution of the wars. Be-

sides this widely spread system of land ownership, there was a beginning of feudalism with bound serfs and "latifundia" belonging to the nobility. Both of these pre-colonial land systems have made their contribution to the character of the existing land holdings of Mexico, the "haciendas" and the "ejido."

The three hundred years of Spanish domination were characterized by a persistent trend in the direction of concentration of land ownership. The Spanish conquest was carried out by a very small number of soldiers, adventurers, and gold-seekers who took possession of the country in the name of the king and were compensated by him with the rights of ownership over the land conquered. They subjected the native population to their own servitude and profit. The tribute which characterized the pre-colonial system of land tenure was simply transferred to the conquerors and the allotments took the name of "repartimientos" or "encomiendas."

The "encomiendas" which were originally meant to last only for one generation, were extended from one to another until the 18th century. Besides the lands possessed by the conquerors by rights acquired from the crown, other systems of concentration were established, among which the church came to be one of the most important. The total area of the lands held by the church through its various religious orders is not known definitely, but authorities on the subject estimate that towards the end of the Spanish domination almost three-fourths of the total area of the present Republic was held by the clergy.

Therefore, it can be stated that during the Spanish domination no free agricultural production was carried on in Mexico, except the very limited amount carried on by the small Spanish land-holders who lived in continuous litigation in order to preserve their lands, and of the few Indian tribes whose life in the mountains afforded them a relative independence. Generally speaking, the native Indian found himself subjected to agricultural labors imposed upon him by his masters, who, however, did not bring with them any improvements over the native systems of cultivation. The Indian worked as a slave on the land of his masters, that is, the clergy and the Spanish land-holders, and he did not receive any remuneration for his labors. His education was completely ignored and with the exception of the attempts of the religious orders to substitute the Catholic faith for the native religion, it can be stated that he did not receive any instruction what-

soever. The Spaniards brought to Mexico a few new crops such as wheat and certain vegetables, as well as some animals unknown until then, such as the horse, the mule, and the ass.

It is true that during the Spanish domination several attempts were made to improve the condition of the subjected Indians and to give them back the free use of the land to meet their own needs. In fact, new legislation under the title of the Laws of the Indies was enacted. However, its effects were only of a temporary character on all matters relating to the restitution of the lands formerly held by the Indian villages. Almost all of the villages existing in Mexico were granted considerable extensions of arable lands by the Spanish Crown, which lands were again wrested from them by various means, and the Indian returned again, sooner or later, to his former condition of serfdom.

It is also needful to point out the fact that the conquerors of Mexico were soldiers who came from a country which up to that time had not achieved a high degree of agricultural development. Friars and soldiers only had a secondary interest in agriculture in the conquered country, and the division of the land was primarily a means of distributing the subjected Indian population. Undoubtedly, it was during the Spanish domination when the evolution of a type of farming was brought about, commonly known as "hacienda," which, up to a few years ago, was the only more or less well organized system of agriculture in Mexico.

The constant increase of the rural population which had been dispossessed of its lands; the influence of the independence of the United States of America; the influence of the French Revolution, and above all, the precarious economic condition of the great majority of the population, brought about the War of Independence.

The first tendencies in the direction of changing the basis of the distribution of the land appeared after independence was achieved. Throughout the frequent civil disturbances there can be seen constant tendencies to destroy the systems of "latifundia" organized under a system of agriculture whose purpose was not only to exploit the land, but also to exploit the persons employed on the land. The Laws of Reform follow the same course as the Laws of the Indies, and prescribe the recognition of the property rights of the native villages to the lands granted by the Spanish Crown during the Colonial Period. Unfortunately the Indian

the excellent cooperative aptitude of the Mexican rural population. While it is true that the problem has not been solved in all of its phases, it is also true that the general situation has been greatly improved. This statement will undoubtedly be borne out by the figures of the 1930 Census.

Besides the ejidos, there have been established cooperative societies formed by small holders who are seeking through cooperative methods to improve their credit facilities and the methods of marketing their products. This type of cooperative organization is very similar to that of other countries.

As regards the granting and restitution of the lands, it may be stated that the activities along this line have been greatly increased, and up to the latter part of last year 18,837,250 acres had been allotted and that thereby, nearly 300,000 peasant families became land owners.

The Mexican Government has been struggling for some years with the problem of building up a more efficient system of farming on the small holdings which have been allotted. Among other things which have been done with the object of improving agricultural conditions, it has created a chain of credit institutions known as Agricultural Ejidal Banks with a capital of 250,000 pesos each. Since 1925, there have been in operation eight of these institutions in the states of Puebla, Hidalgo, Mexico, Guanajuato, Michoacan, Durango, Jalisco and Chihuahua. These institutions are subordinated to the Department of Agrarian Organization and Credit of the National Agrarian Commission, and according to the latest statistics the greater portion of the banks have sold their shares in full and have doubled their circulating capital. Since the initiation of these measures was in the nature of an experiment, the federal government was rather conservative in the furnishing of funds. However, in view of the excellent results obtained, the present administration will increase, according to recent reports, the capital of each one of these banks to one million pesos, and will open two new banks very soon. The Agricultural Ejidal Banks operate through 525 agrarian cooperative associations with a membership of over 56,000. These cooperative associations may obtain loans at 6 per cent interest to finance their agricultural operations or to establish cooperative stores.

It is a source of pleasure to observe the excellent results which have been obtained by the cooperative stores of the agricultural

cooperative associations, many of which, with a working capital of 3,000 pesos, have been able to double it during the first year of their operations. There exist cooperative associations (there are a number in the state of Tamaulipas) which have a yearly volume of business of 175,000 pesos with a membership of only 150.

The National Bank of Agricultural Credit, with a capital of 20 million pesos subscribed by the federal government, loans directly to both large and small farmers and to agricultural associations organized by the Bank itself. These associations are known as Regional Societies of Agricultural Credit, and Local Societies of Agricultural Credit. The National Bank of Agricultural Credit loans to individual farmers charging 9 per cent interest per annum. It charges the associations 8 per cent per annum, and these in turn charge their borrowers 9 per cent or 10 per cent, depending upon the rate prescribed by their by-laws.

The Mexican Government is considering the widening of the scope of its operations with the credit associations since the annual balances of the National Bank of Agricultural Credit have shown that the paying capacity and the security of the investments are 50 per cent greater in the organizations of small farmers, especially of the ejidal type, than in the associations of large land holders or in the case of private enterprises.

tares, only 19 million hectares are under cultivation. On the other hand, as much as 77 million hectares is grazing land. Forests cover but a very small area in this province (11.2 million hectares). Land not suited for agriculture forms an area of about 99 million hectares.

With the aid of the tractor we expect to bring about in this region a considerable expansion of crop acreage at the expense of grazing land. Enormous capital investments will eventually be required here for irrigation.[1]

Southern U.S.S.R. is largely devoted to agriculture. Forests are few and there is but little land that is not suited for agriculture. The utilization of land by provinces in this area is given in table 2.

Table 2. Utilization of Land by Provinces, Southern U.S.S.R.

Province	*Total area*	*Plow-land*	*Pastures and so forth*	*Forests and wooded lands*	*Not suited for agriculture*
Ukraine	43 4	29 9	6.4	3 4	3 7
Crimea	2.6	1 5	0 5	0 3	0.3
Northern Caucasus	29 2	14.6	7 7	3 2	3 7
Middle Volga Region	23 7	15 0	3 6	3 5	1 6
Lower Volga Region	32 8	13 4	14 7	1 0	3 7
Central Black Soil Zone	19 2	13 5	2 8	1 7	1.2
Tartar Republic	6 7	4 0	1 1	1 1	0 5
Bashkir Republic	15 2	5 4	2 7	5 9	1 2
Total	172 8	97 3	39 5	20 1	15 9

A further increase in crops will be brought about in this region through the combination of small scattered strips of land and the elimination of boundaries which now divide them, and through the reclaiming of lands now unsuitable for agriculture.

There is still some land available in this region for an expansion of agriculture which is relatively accessible. Further progress here, however, will be brought about chiefly through the adoption of intensive methods of cultivation, as there is an abundant supply of labor which is better suited to intensive farming than in any

[1] No figures are available in regard to the distribution of land according to utilization in the other Central-Asiatic territories of the Soviet Union, or in Transcaucasia. The total area of each of the different regions is as follows.

Transcaucasia .	17.9 million hectares
Uzbek Republic .	17.1 million hectares
Tazhdik Republic	14.2 million hectares
Turkmen Republic	44.4 million hectares

other part of the Soviet Union. This region also has the best developed net of railways and it includes a number of large cities and industrial centers. There will be a growing market here for vegetables, fruit, poultry, dairy products, and so forth.

In the northern part of the Soviet Union, both in Asia and in Europe, railway development is an urgent need. Work is about to be started on the construction of the Great Northern Trunk System, which will extend from Murmansk to the Pacific coast. It is also planned to construct a railway across Kazakstan, which will greatly facilitate the settlement of the Steppe regions in that area.

It is safe to estimate that within the next two years the total

Table 3. Estimated Increases in Crop Area Within Two Years, by Regions, U.S.S.R.

Region	*Estimated increase within 2 years (millions of hectares)*
Ukraine	2
Northern Caucasus	5
Lower Volga	5
Siberia.	8
Kazakstan	9
North (Europe)	12
Central Black Soil Zone	1
Other regions	7
Total	49

area under crops in the Soviet Union will be increased by about 49 million hectares. This will be achieved without any very great capital investment, in as much as the land to be utilized is well adapted to cultivation. The estimated increase in crop acreage in each of the several regions is given in table 3.

There are great possibilities ahead of us for increasing crop acreage. It is not at all unlikely that within the very near future the area under crops will be doubled, while that under pastures will be trebled.

Among the factors that make this rapid growth possible should be listed, first, the abolition of private ownership and the nationalization of land. This has made it possible to do away with boundary strips and to eliminate many obstacles which would have otherwise been unsurmountable. The collectivization movement

(amount, variability, and effectiveness) and does not take into consideration varying topographical and soil conditions. It is certain, however, that there is a large area of land now used for grazing which is well suited to wheat production under dry-farming conditions. This type of farming, however, calls for large capital and few men. The gradual realisation of the nature of the agricultural frontier is bringing about a change in the land policy of the states. So far this policy has been based on the idea of the living area—*i.e.,* on getting the maximum number of people on the land at a decent standard of living; the change is in the direction of getting the maximum economic returns from the land, irrespective of the number of people settled upon it.

In his classification Professor Taylor draws attention to the limited area in the temperate region receiving more than 30 inches of rain per annum—the area that in other countries is used for intensive cultivation and carries a dense farm population. This area in Australia is limited to a narrow strip on the east and south-east coasts and a small corner in the south-west. Small sections of the semi-arid land are suited for and can be irrigated for intensive cultivation, but this involves high capital charges. Of the total estimated crop-land probably not more than 7 per cent has been under cultivation.

In addition to its land resources, Australia has considerable coal resources, mostly in the eastern states, and some minerals, but so far no oil in commercial quantities has been found—a fact of great importance since the development of the internal combustion engine. It also lacks good waterways, which accounts in part for the fact that there is more railway mileage per capita in Australia than in any other country. Professor Taylor has estimated that if Australia had 20 million people it would be as densely populated relative to its natural resources as is the United States with 120 million people. This estimate has been much criticised, but it serves well enough as a basis of comparison between the natural resources of the two countries.

The population of Australia has been increasing rapidly over a long period at the average annual rate of 20 per 1,000. It is characterised chiefly by its homogeneity, about 98 per cent of the people being of British stock. This is the result of a deliberate national policy which has had almost unanimous support. Chinese

immigration was first restricted, then Japanese. When the American immigration laws went into effect, part of the tide from southern and eastern Europe was diverted to Australia. The result was most noticeable in Queensland where increasing numbers of Italians entered the sugar industry despite local opposition which eventually forced the Commonwealth Government to enter into agreements with various European governments for the limitation of the numbers of their nationals emigrating to Australia. The net immigration from Europe is now negligible. This attitude to foreigners is important from the point of view of settlement because it means that on the whole the only immigrants welcome in Australia are the British. But they are almost entirely from industrial centres. The difficulties involved in settling industrialists in a new country have led to an increasing importance being attached to juvenile immigration particularly of youths from 14 to 21 years of age. But juvenile immigration has its own difficulties and these have not always been successfully overcome.

This small homogeneous population is highly urbanised—about 62 per cent living in metropolitan and provincial urban areas. It is perhaps more important to note that it is highly centralised, nearly half the total population being concentrated in six capital cities. The effect of such centralisation on the development of rural areas is very great, both from an economic and a social point of view.

Turning to the economic organisation of Australia, one important fact to be noted is the part played by the governments, especially the state governments, in providing capital for developmental works. In 1928 the total public debt per capita was 174 pounds sterling; of this 59 pounds represented Commonwealth debt and practically the whole of this was dead-weight war debt—a small matter which seems to have escaped attention at international debt conferences. Most of the state debts are for public works, especially railroads. Australia was not an attractive field of investment for private capital last century except for the sheep industry, and when the gold diggings were exhausted and large numbers of men were looking for work, pressure was brought on the state governments to find capital for opening up the country. Government borrowing in Great Britain has been facilitated by the status of colonial loans which are treated as trust securities, and

with the cost of living, a system which is open to criticism as "tending to deprive employees of any interest in the prosperity of the industry in which they are connected." No one has been able to work out a satisfactory alternative.

With your permission I shall now outline the settlement policy and experience in the past decade. Under the constitution the states retained authority over the land resources, so that settlement schemes even though promoted by the federal government are administered by the states. After the war, the government endeavoured to fulfill war-time promises to make provision for returned soldiers who wanted to settle on the land. Construction works were undertaken at the peak of prices. Since then, the chief occupation of the departments concerned seems to have been writing down the capital charges. Up to June, 1927, over 45 million pounds sterling had been advanced on soldier settlements and of this over 36 million pounds was still outstanding.

While the states were still busy with the returned soldiers, a series of proposals was made by the British Government for the settlement of British immigrants in the various dominions including Australia.

So far as this affected Australia, these proposals provided for contributions from the British Government towards costs by making cheap loan capital available and by giving assistance in passage money. The Commonwealth Government was to take over all administrative machinery for the selection and transport of immigrants and the states were to settle them on the land. Separate agreements were at first entered into with various states and finally in 1925 a general agreement known as the 34 million pound agreement was signed by the British and Commonwealth Governments. It provided that not more than 34 million pounds loan money, including the sum of 14 million pounds already made available to Victoria, New South Wales, and Western Australia, was to be made available by the Commonwealth to the states for schemes which would open up new settlement areas, or provide for the construction of public works tending to develop or expand settlement areas, or to increase the capacity of already settled areas. The money was to be loaned the states at an interest rate of 1 per cent for the first 5 years and at one-third the effective interest rate for a second five years. Great Britain was to pay 130,000 pounds

for every 750,000 pounds of loan money, and for each such contribution, 10,000 assisted immigrants from the United Kingdom, including 750 families, were to be satisfactorily settled within 10 years. By this means nearly a half million people were to be transferred to Australia.

Meanwhile the states had gone ahead with a large program of developmental work to facilitate settlement—roads, railways, irrigation, resumption of private estates, capital advances and so forth—and this program was extended by the agreement between the states concerned and the Commonwealth Government for the development of the Murray River Basin at an estimated cost of about 15 million pounds (up to 1929 about 7 million pounds had been spent upon it). The state governments borrowed actively at home and overseas; and their debts increased from 519 million pounds in 1922 to 723 million pounds in 1928 or from 93 pounds per capita to 115 pounds per capita, and reached an annual maximum of 56 million pounds in 1927-1928. It was a period of rapid expansion in primary and secondary industries, the most spectacular single development being in the new wheat fields of Western Australia. Imports increased to 165 million pounds sterling over an average for 1921-27 of 141 million pounds. Immigration, which averaged about 38,000 per annum during the period 1921-27, reached a maximum of nearly 49,000 in the latter year.

That was the turning point. In 1928 the rate of increase in population declined from slightly over 20 per 1,000 during the period 1921-27, to 16 per 1,000, and in 1929 to 12 per 1,000. In the latter year net immigration totalled less than 9,000.

The fact is, creditors were becoming uneasy as to the general economic position in Australia. Much of the money borrowed for public works was believed to have been wastefully expended. But even more serious was the question as to whether the new areas opened up for intensive cultivation would be profitable owing to the increasing difficulty in marketing specialised products overseas. This question as to the future of intensive agriculture in Australia was brought prominently before the public by the reports of the Development and Migration Commission, a body set up in 1926 by the federal government under the chairmanship of Mr. H. Gepp, a successful business man, to formulate plans for the most effective and rapid methods of utilising the resources of

THE PROCESS OF SOCIALIZATION OF AGRICULTURE IN THE U.S.S.R.

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AGRICULTURE—at least one of its basic branches, grain culture —is at present undergoing a technical revolution, the main feature of which consists in the replacement of live draft power (horses and oxen), by mechanical power (the tractor, automobile, and truck). The change in agriculture from the horse to the tractor is somewhat analogous to that which took place in industry over a century ago when man-power was replaced by the steam engine. Of course, the analogy is not absolute, since, in the first place, the tractor has not been as universally adopted as the steam engine, and, in the second place—and this is even more important —the change in agriculture to the tractor is less striking than the transition to the steam engine in industry, for the following reasons: (1) in agriculture the change is not from man to machine, but from a considerably higher power unit, the horse and ox; (2) the tractor is quite limited as compared with the steam engine in its possibilities of concentrating motive power. It is for this reason that in agriculture the replacement of the tractor by electric power will proceed at a much quicker pace than was the case in industry with steam motive power.

For agriculture, however, the invasion of the tractor constitutes the greatest technical advance which it has ever experienced. The new motive power has already resulted in the manufacture of tractor attachments and of powerful machines adapted to mechanical draft by tractors, of which the combine is at present the highest achievement.

The tractor and its offspring, the combine, are beginning, under our very eyes, to revolutionize agriculture, one of the most backward realms in the economic activity of man, which has preserved in its technical organization, up to recent times, very much that is in common with the agriculture of gray antiquity, and which has permitted the existence of small individual holdings at the cost, naturally, of the most atrocious and ever-growing waste of labor power of the small peasants and at the cost of the undernourishment and the lowering of the standard of living of these petty proprietors. Just as in industry it was not original "manu-

facturing," where motive power was still supplied by man, but the steam-operated factory which definitely proved able to crowd out the artisan (although the process had already begun with the advent of "manufactured" goods), so in agriculture it will not be the old-style farming based on horse draft power but modern, large-scale farming based on mechanical tractive power which will definitely prove able to crowd out the small peasant, although this process has already been begun by such large-scale farming as is still based on horse draft power.

The twentieth century is thus fully confirming the tenets, for a long time combatted in the most violent manner, of the greatest thinker of mankind, Karl Marx, to the effect that the extinction of small-scale production was inevitable also in agriculture.

The tractor and the combine made their first appearance in the most advanced capitalist country of today, in the United States, and have here brought about the organization of exceptionally large, centralized grain farms using mechanical tractor power. But at the present time it is the U.S.S.R. which has established the largest centralized, mechanized, tractor-operated grain farms in the world, and it is the U.S.S.R. which has established the largest number of such farms and which is continuing to establish them at a most amazing rate.

The success of state agriculture in the U.S.S.R. (the largest, best equipped, centralized, and mechanized agricultural enterprises in the U.S.S.R. are state enterprises, called "sovkhozi" or state farms) is due to a number of special features in the Soviet economic system. The most important of them are: nationalization of the land, which makes it possible to utilize large tracts of land (as a rule, of course, unclaimed land), which are free from any obstacles or the impediments of private ownership; nationalization of large-scale industry; monopoly of foreign trade; and based on the foregoing, planning of national economy, which enables the Soviet government to concentrate the necessary financial and technical resources on the speedy development of large-scale, mechanized agriculture by including in the production plan of state industry the manufacture of the necessary agricultural machines, implements, and so forth; and, finally, the management of industry not by capitalists but by the organized workers themselves, which creates an enthusiasm for work unknown in capitalist countries The latest examples of such enthusiasm are the so-called "shock

ever larger? How did this transformation take place which has obliterated in the course of a few months the thousand-year-old boundary strips separating the lands of millions of petty peasant proprietors and which is shattering their age-old customs? This change is perhaps even more amazing than the one consummated by the October Revolution, which transferred into the hands of the working class thousands of large-scale capitalist enterprises—industrial, transportation and commercial enterprises, as well as credit organizations which are now being developed on a new socialist basis at a rate heretofore unprecedented.[1]

The collective farm movement is a movement of the many millions of peasants themselves, but it would have been impossible without the influence of the working class upon the small and middle peasant masses and without the aid and leadership of the workers, who are in control of the state power and of the material resources of the national economy, which in the U.S.S.R. embraces practically the whole of industry and transportation. The point of view of the working class is characterized by the fact that it does not begin with a rejection of individual peasant economy but culminates in such a rejection, after stressing the fact that individual peasant economy is the starting point of a development which must pass through a number of stages. Only in this way does it lead up to a rejection of individual peasant economy.

The peasant cooperative movement under the Soviet Government, even in that period when it did not directly concern itself with the production end of agriculture, marked the initial step on the path of socialist development, as was pointed out by Lenin eight years ago. This is true regardless of the fact that the Soviet peasant cooperatives were during the last ten years the arena for a stubborn struggle between socialist and capitalist tendencies in the development of peasant economy. Due to the influence of the working class the socialist tendencies in the Soviet peasant cooperatives were victorious and the ascendency was gained by those peasant elements who were inclined to collectivized rather than individual farming and who were looking for means of improving the lot of the large masses of small and middle peasants. Thus the Soviet peasant cooperatives served within the framework

[1] The state industries of the U.S.S.R., having exceeded pre-war production in 1926-27, are now showing a yearly increase in production of from 20 to 30 per cent and are planning to make even higher gains in the coming year.

of the Soviet economic system as a preparatory school for the mass collectivization movement which developed last year, a school both for the broad masses of small and middle peasants and for the future leaders of this mass collectivization movement.

The broadening of the activities of the Soviet village cooperatives resulted in the transfer of the center of gravity of their work among the masses from the trading field (selling products, buying supplies, and so forth) to the field of agricultural production. At first the Soviet peasant cooperatives entered the field of agricultural production indirectly, without eliminating individual economy, under the system of contracting (*i.e.*, contracts between the peasants and the government for the delivery of certain amounts of agricultural products at fixed prices, the peasants usually receiving an advance allowance from the government to enable them to plant and cultivate the crops), but later they penetrated the field of agricultural production directly, *i.e.*, through the medium of collectivization.

Collectivization, in the initial stages of its mass development, did not lead the small and middle peasant far afield from the individual method of farming to which he was accustomed. For a certain period (a period when the collective farm movement was already quite widespread) the basic mass of collective farms consisted of the simplest forms of small collective farms. They were merely small associations for the common cultivation of the land, frequently without these lands being concentrated in one place and without the whole of the land-holdings of their members being included in this common cultivation. This stage is now a thing of the past and has been left far behind.

Under the Soviet economic system the process of consolidating small and middle peasant holdings is radically different from a similar process under capitalism. In capitalist countries peasant consumers', producers', and credit cooperatives rise as a result of the contradiction between the limited range of small-scale farming and the power of the market. In capitalist countries the cooperatives are from the very beginning dependent on capital (primarily on the large banks), and the capitalist strata of the peasantry predominate in them. Under the Soviet economic system peasant cooperation is radically different in character, as Lenin pointed out. It assumes a socialist character. In particular, there is a radical change, under the Soviet economic system, in the

the transition from a collective utilization on the individual farms of the means of production of the members of the cooperative group to a collective utilization of the private means of production of the members of the cooperative group on their communal lands (at least as regards field crops). After the organization of the land has been carried out the cooperative group for the common cultivation of land passes on to the next higher stage of development.

The socialization of the means of production of the members of a cooperative group constitutes another step forward—the joint use of common means of production in a common enterprise. The collective farm has thereby reached a higher stage of development; it has changed from a cooperative group for the joint cultivation of land into an agricultural *artel.*

Finally, by creating the so-called "non-divisible capital funds" of the collective farms, their means of production acquire such a form as makes it impossible for them to revert to private means of production. The so-called "non-divisible capital funds" of the collective farms are no longer simply group property but already actually constitute socialized property, which for the time being is used by the given collective farm, since in case of the dissolution of the collective farm the property is not divided among the members of the collective but is transferred to other collective farms for use. By the formation of these non-divisible capital funds the agricultural *artel* passes on to the next higher stage of development. If in addition to completely socializing the means of production the collective farm also creates enterprises to take care of the individual needs of its members, such a collective becomes a *commune.*

The term "collective farm" is used to designate a most diversified mass of agricultural enterprises, which form an endless chain connecting the individual petty peasant holding with its opposite extreme, the large-scale state enterprise, the state farm. Approximating the state farms most closely in their organizational form are those collective farms which are served by state machine-tractor stations. Such stations constitute the most important, although not the only example of combination of a state enterprise with collective farms.

While in their lowest forms the collective farms constitute consolidations of private holdings, exhibiting, as a rule, a growth in

elements of socialization, in their highest forms they constitute various types of socialized farms with remnants of some of the old private-property traditions of their members, while they are differentiated from the state farms by the fact that they are not state enterprises.

The outstanding feature of the collectivization movement consists in the fact that it is a movement of the small and middle peasantry, consequently a movement of the petty bourgeoisie toward socialism. This mass movement of millions of peasants is essentially a voluntary movement, prepared for by the entire previous development of the U.S.S.R. The violations of the principle of voluntariness, which took place to a considerable extent in the spring of this year on the part of the local organs of the Soviet power, were, as is known, definitely stopped by the intervention of the central organs of the Soviet power. But the petty bourgeoisie—the petty proprietors operating individual farms—is unable independently to pass over to the method of collective economy. Only under the leadership and with the help of the working class, which is in control of the state power and of the material resources of national economy, has our small and middle peasantry been able to achieve a mass transition to the method of cooperative groups and to collective farming, a transition which from its very beginning is raising the standard of living of the peasantry and enabling it to take part in the technical revolution in agriculture.

This sweeping process has, of course, been developing in an exceedingly stormy fashion. Regardless of the fact that the peasants were better organized than ever before and that their organizations had very deep roots, embracing the very foundation of their economic existence, the collectivization movement revealed obvious features of an uncontrollable elemental force. To what extent the tempo of collectivization was unforeseen is evident from the enormous under-estimation in the program for the collective farm movement as set forth in the comparatively recently adopted Five-Year Plan, an under-estimation which became evident almost immediately after the adoption of the Plan. In the course of a few months the collectivization movement has by far transcended the limits set for it by the Five-Year Plan for the end of the five-year period.

The movement for the collectivization of farming aroused great

and the burden of the pioneering work in the collective farm movement, lay mainly on the farm laborers and poor peasants, who constituted the advance guard of the members of collectives. Without the prolonged labors of this advance guard such an exceptional up-surge of the collective farm movement as occurred in 1929-30 would have been impossible. They constituted a direct support of the working class in the reconstruction of the Soviet village.

The collectivization movement, which has assumed such large dimensions by drawing into the collective farms the farm laborers, and has made it no longer necessary for the small and middle peasants to rent livestock and implements from the rich peasants (kulaks), constitutes in itself a sharp and ever-progressing contraction of the economic base of the capitalist strata of the peasantry (the kulak class), which has evoked violent resistance on the part of the latter to the collective farm movement.[4] Being in the interests of the great mass of the small and middle peasants, the collective farm movement went strongly against the interests of the capitalist strata of the peasantry. In areas where collectivization became complete, *i.e.,* where it embraced almost the entire mass of small and middle peasants, the struggle with the capitalist strata of the peasantry, the kulaks—who violently opposed and tried by all means to defeat collectivization, which was threatening their future existence—resulted in the complete liquidation of the kulaks as a class and in the expropriation of their properties in favor of the collective farms.

The gigantic sweep of the collective farm movement was made possible solely in consequence of the successes of socialist industrialization in the Soviet Union. These successes created those technical and, in part, organizational precedents without which the present sweep of collectivization would have been impossible. The tremendous growth in the production of agricultural machinery, the growth in the production of building materials, the rise in the cultural level of the working class, which had proved able to turn out tens of thousands of organizers for the collective farm movement—all these constituted direct prerequisites for the gigantic sweep of collectivization in the Soviet Union.

[4] According to estimates of their trade union the number of laborers who are expected to join collective farms this year is 1,000,000 *i.e.* a majority of all the farm laborers employed on private farms.

At the basis of these prerequisites lies, as already stated, the development of socialist industrialization in the Soviet Union. The tempo of development of manufacturing industries in the U.S.S.R., which is almost entirely in the hands of the state, can be illustrated by the data in table 1.

As early as in 1926-27 the gross output of manufacturing industries in the Soviet Union had exceeded the pre-war volume.

As is well known, as a result of this unprecedented growth of industry, the Soviet Union is at present experiencing a shortage

Table 1. Annual Increase in the Gross Value of the Output of Manufactured Products in U.S.S.R., 1920-21 to 1930-31

Year	*Annual increase in gross value of output of manufactured products (in percentages)*
1920–21 (compared with 1920)	32*
1921–22	33*
1922–23	48*
1923–24	22*
1924–25	53*
1925–26	45*
1926–27	17*
1927–28	21*
1928–29	23**
1929–30	32**
1930–31 (estimated)	47**

*At pre-war prices.
**At 1926–27 prices

not only of skilled but even of unskilled workers. The supply of labor on the labor exchanges lags considerably behind the demand.

This extraordinary growth of industry has fundamentally changed the relative position of industry and agriculture in the national economy of the Soviet Union. Agriculture in the U.S.S.R. has shown an increase from year to year in its commodity production (if we take agricultural products in the aggregate and not individual output). But in recent years the increase in commodity production in the field of agriculture, carried on in the main by small individual producers (the majority of whom, despite all the successes of cooperation, have not yet joined cooperative groups) has proved insufficient, because this growth of commodity production in agriculture has lagged behind the far greater growth of industry, which, for the main part, is in the

hands of the Soviet state. This insufficiency is clearly revealed by the data as to agricultural production and exports, given in table 2.

Thus, contrary to the situation in 1926 and 1927, when the increase in the marketable production of agriculture was accompanied by a still greater increase in agricultural exports, in 1928 and 1929 the progressive gain in the marketable output of agriculture was attended by a decline, instead of a gain, in agricultural exports. This shrinkage in agricultural exports, along with the difficulties in the supply of food and raw materials, indicates clearly the insufficiency of that growth of marketable output of which the agriculture of the U.S.S.R., composed largely of small producers, has shown itself capable.

Table 2. Annual Growth of Soviet Agriculture, 1925-26 to 1928-29

Year	*Annual growth (in per cent)*	
	Marketable production	*Exports*
1925–26	+30	+51
1926–27	+4	+8
1927–28	+7	−30
1928–29	+10	−4

Another factor which shows this insufficiency of the growth of marketable farm products, is the index of agricultural prices, both absolute and relative to the index of industrial prices. From 1928 on, we have had in the U.S.S.R. an advance in agricultural prices, both absolute and relative to industrial prices. This increase of agricultural prices reflects likewise the insufficiency of the agricultural output and specifically of the growth of the marketable output.

In a word, the agriculture of the U.S.S.R., based primarily on small peasant production, taken as a whole with all its branches, has proved incapable, despite an increase in the marketable output, of meeting those requirements which the rapidly developing industry of the country has placed upon it.

Furthermore, the agriculture of the U.S.S.R., composed as it was of millions of small units, not only showed itself incapable of developing the same rate of progress as that maintained by the industry of the country but, due largely to the uncontrolled and almost elemental character of its development, it came into

conflict with the planned and controlled development of the state industries of the U.S.S.R.

The elemental character of agricultural development manifested itself in the uneven movements of its branches. Contrary to the progress made by industry, which has been uninterrupted in *all* its basic branches, the progress of agriculture, even in recent years, has been irregular in character, with a succession of ups and downs in the various branches. Thus, if we take as an example, a few of the larger branches of agriculture, we obtain the picture shown in table 3.

The movements of the total output and the marketable surplus of agriculture (expressed in 1926-27 prices) presented like con-

Table 3 Annual Growth in Sown Area and in Number of Livestock, 1926 to 1928

Year	Annual growth (in per cent)		
	Sown area		Number of livestock*
	Grain	Industrial crops	
1926	+9	−6	+7
1927	−6	+7	+4
1928	+2	+19	−1

* Expressed in terms of large stock

trasts in recent years. The general increase in the output of agriculture in the U.S.S.R. has proceeded, as the figures show, irregularly, now involving a shrinkage in one line of output, now in another. The elemental character of the development of Soviet agriculture was bound to come into conflict with the planned development of large-scale industry and of the entire state economy of the U.S.S.R., from the very moment that the insufficient growth of agricultural production, as compared with the growth of industrial output, became apparent.

This insufficient growth was not the result of any natural conditions of Soviet agriculture but of the peculiarities of its social and economic structure. Up to very recently more than 95 per cent of the basic funds used in agriculture were in private hands. So long as the growth of agricultural production, based on small-scale, individual farming, was sufficient to satisfy the requirements of industry, which was only beginning to develop (and beginning

from a very low level), so long did this growth proceed, in the main, within the framework of small-scale organization. There was a constant growth during these years in the relative importance of the village cooperatives although there were not as yet producers' cooperatives (collectives), but principally cooperatives of other types, namely, mutual credit societies, marketing organizations, and consumers' cooperatives. These cooperatives prepared the ground for the later impetuous development of collective farming. Both the collective and state farms performed during the early years a great amount of work in strengthening their internal forces which laid the groundwork for their later extraordinary growth. The growth of the non-producing types of cooperative organizations prepared as well as foreshadowed the future transformation in the character of agricultural production itself. This change occurred when the rapid growth of Soviet state industry made demands upon agriculture which the small-scale, individual farming organization was unable to satisfy. The disparity between the social and economic structure of small-scale agriculture, on the one hand, and the demands made on it by the rapidly growing state industry, on the other, found its reflection in the difficulties of the grain supply in 1927 and 1928, which in turn led to a sharpening of the class struggle in the villages and was the prologue to the fundamental reconstruction of the social structure of agriculture in the U.S.S.R. It led to an accelerated establishment of large-scale state farms and, in 1929-30, to a revolutionary tempo in the change by tremendous masses of poor and middle peasants, under the guidance and with the aid of the working class, from private to collective economy and, in regions of complete collectivization, to the liquidation of agricultural capitalism or "kulakism."

The change, on a broad scale, from small, individual farm economy to large collective and state farms signalizes the entrance of the U.S.S.R. into an era of an extraordinary growth in the productive forces of agriculture. This growth under new organizational forms will require a complete reconstruction of the agriculture of the country, a change in the character of the existing agricultural regions, a change to specialized agricultural enterprises, and so forth.

The technical revolution in Soviet agriculture will develop fully in these new forms of large-scale, agricultural organizations. The

U.S.S.R. already enters the scene as a country in which have originated and are rapidly growing the largest and most completely organized agricultural enterprises. Whereas the industry of the U.S.S.R. still merely follows the best models of technique and technical organization of the enterprises of the most advanced capitalistic countries, its agriculture already passes beyond the limits of what capitalism has accomplished in this field.

The impending extraordinary release of the productive forces of Soviet agriculture, which is bound to be sweeping in scope, should aid in eliminating the existing disparity in the rates of development of industry and of agriculture. This process should help to eliminate the retarding influence which the insufficient growth of agriculture has exercised upon the development of industry(especially industries which produce consumers' goods) and should lead to a still more pronounced growth of Soviet industry It should accentuate the favorable achievements in the rate of industrial growth which the U.S.S.R. has already recorded, in comparison with capitalist countries.

At the same time this great historical fact of a gigantic mass of peasants, over a hundred million strong, drawn into a powerful movement away from individual farming and private ownership of the tools of production to collective socialized economy, not only without a destruction of the productive forces of agriculture but even with a material enhancement of them, signalizes a still closer union in the future between the workers and the peasants of the U.S.S.R. It promises to convert the basic masses of the peasantry, who up to now have been to a great extent merely allies of the workers, into real and firm supporters of the working class in the work of socialist reconstruction of our immense country. It signifies a further strengthening of the Soviet economic system.

This fact creates the firmest social and economic foundation for the further advance of the U.S.S.R. along the path of socialist development. Up to now all our plans, which sometimes appeared even to us very bold and seemed to the capitalistic world often altogether fantastic, have invariably not only been realized but even surpassed by our actual accomplishments. Our Five-Year Plan, as is well known, has not only been completed in some parts and even more than completed, but it will be completed for industry as a whole, according to all indications, in 1930-31, and in all branches of national economy, in 1931-32, *i.e.,* in four years.

Had we announced plans a year ago to liquidate unemployment this year to the extent to which we have actually succeeded in doing, or to bring about the collectivization of agriculture on the scope which has been revealed in the past year, the capitalist countries would hardly have taken these projects seriously. But the U.S.S.R., a country of socialism under construction, has at its disposal extraordinary internal resources. Both the liquidation of unemployment and the development of the collectivization of agriculture are undisputed facts.

The development of the U.S.S.R. is only beginning. The socialization of the agriculture of the country, in which we have achieved this year our first decisive successes, will play a most important rôle in the present stage of development of the U.S.S.R.

THE MOBILITY OF AGRICULTURAL PEOPLE

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IN AGRICULTURAL economics, as in most things, it is stimulating, on occasion, to examine the particular problems presented in the light of first principles.

"Economic distribution," and that matter so directly bearing upon it, the transferability of labour and capital—of people—from where they are into other employments, is no exception to this rule.

For the better understanding of some of the ideas advanced, it may be explained that the area specially considered, the south-eastern one-third of Scotland, is a district of large "capitalistic" farms—large in the number of workers employed. The typical farm may be several hundred acres in extent. It is operated by a tenant farmer employing a number of workers, and paying cash rent to a landlord who takes no interest in the farm management.

Under such conditions, obviously, "distribution" or the way in which income is shared between the partners—landlord, farmer, and labourer, respectively—becomes important.

People in the United States are, of course, less concerned with this subdivision of the agricultural income than are Britons, since in America, agricultural land, capital, and labour, are, more often than in Great Britain, provided by the same individual. Agricultural economists in all countries are, however, vitally interested in the way in which the whole national income is divided between agriculture and other industries.

THEORIES OF RELATIVE WAGES AND PROFITS

The shares are all prices. Wages are the price the particular type of labour concerned sells for, farmers' profits the price of their capital and skill, rent that of the use of land and buildings. Like other prices they are controlled by supply and demand.

Adam Smith tried to explain how the pricing process worked. "The whole of the advantages and disadvantages of the different employments of labour and stock must, in the same neighbourhood, be either perfectly equal, or continually tending to equality. If in the same neighbourhood there was any employment evidently

either more or less advantageous than the rest, so many people would crowd into it in the one case, and so many desert it in the other, that its advantages would soon return to the level of other employments. This at least would be the case in a society where things were left to follow their natural course, where there was perfect liberty, and where every man was perfectly free both to choose what occupation he thought proper, and to change it as often as he thought proper."[1]

The assumption that "every man was perfectly free both to choose what occupation he thought proper, and to change it as often as he thought proper" was, of course, contrary to observed fact. Smith, when he postulated "in the same neighbourhood," admitted that distance may hinder the mobility of labour and "stock." Mill, in particular, saw the limitations of such a simple theory, and, in stating his version, introduced many qualifications.

Nevertheless the idea was accepted readily. Like many classical "laws" it had the merit of being very convenient. If it were correct, all that society required in this connection from its governors was to be left alone. The regulation of economic affairs was an easy task in the days of *laissez-faire.* Even today the thought crops up, for example, in the statement, made not uncommonly in Great Britain at the present time, that the intensity of the demand for rented farms is evidence that "farming pays."

Observant people would point out that, however true the theory may be that relative wages and profits tend to be such as to equalize the advantages of different employments in the "long run," in the "short run" there exist far too many impediments to the free mobility of labour and capital for it to be anything like true. Every man is *not* "perfectly free both to choose what occupation he thinks proper, and to change it as often as he thinks proper." When, for example, in a particular industry, there happens to be too many prospective workers, wages fall, and the surplus people may wish to leave. Their desire is, however, of no avail, unless, and until, they can leave. They have acquired skill in their present occupation. Elsewhere they may be merely general labourers without the muscle, endurance, and versatility required by successful general labourers. Their homes and family ties are, moreover, localized, and can be uprooted only with very great difficulty. In

[1] "Wealth of Nations," Book I, Chapter X.

consequence the workers may have to stay where they are even though they feel sure they would be better off elsewhere. Further, unless there should be other employments nearby, whose training-cost is within reach, their children may have to remain also. Alternatively, of course, both they and their children may remain in the industry because they do not even know that chances are better elsewhere. People who see such things would reply to the man who says that the number of applicants for rented farms is evidence that "farming pays," by pointing out that it is just as likely to indicate that more farming youngsters are trained up in agriculture than their neighbourhood can provide farms for.

A viewpoint, diametrically opposed to the theory of relative wages and profits outlined above, is taken by some other economists, who go so far as to assert that, in some instances, mobility does not exist.

It has been said, for example, that the small farmers in a certain district have "no refusal price at all," meaning, presumably, that they would stay where they are even though their rewards should shrink to nothing. This statement is no doubt intentionally exaggerated to give it force. It would seem that even if the descendants of the small farmers who are alleged to have "no refusal price at all" had to beg their way elsewhere, some of them sooner or later, would move away.

MOBILITY AND THE AGRICULTURAL ECONOMIST

To summarize, it may be admitted at once that the greater the freedom of movement from one job to another obtaining, the more likely it is that, in the various occupations, rewards will be those which equalize their advantages and disadvantages; that is to say, the nearer Smith's postulate of perfect freedom of movement is approached in fact, the more true will be his general theory.

All economists will agree that the right place for every separate bit of capital and labour in the world to be employed is where it will do most to satisfy the world's wants. If any bit is engaged, at present, in producing goods or services for which society evidences little need, and is in consequence badly paid, the enlightened social economist should wish to transfer that bit to where it will "tell more" in production.

The economist here has two jobs. First, he should assist the

farmer or other producer to find out how the rewards he receives compare with those of men in other branches of his industry, or in other industries. Second, if the underpaid producer is not free to move into other lines of production, the economist must endeavor to set him free.

Towards the first half of his duty, the agricultural economist has done a great deal. Very much less attention has been given, in agriculture at least, to the second part. There is no reason for this. Economists try to assist producers in carrying out the business of production to the best advantage. It is surely at least as important to help them find, and get to, the most promising field of production.

AN EXAMPLE OF THE IMPORTANCE OF MOBILITY

A case can be stated for the opinion that, because of their immobility agriculturists may be underpaid. The view was advanced by the author, in a paper published some time ago that there tended to be too many people in agriculture.[2] Whatever may result from the long-time operation of the law of diminishing returns, progress in agriculture has resulted, to date, in the labours of a single farm worker feeding an increasing number of people. The proportion of the world's workers required for food production has, therefore, diminished, that is to say, the demand for them has fallen. Owing to the higher birth rate and lower death rate obtaining amongst the rural population (British statistics were used), the supply of farm people tends to increase. There is, then, a surplus of prospective food producers, and, should the flow of this surplus into other industries be hindered by barriers such as have been mentioned, it can be expected that rewards in agriculture will be low. In other words, as has been well said, "instead of the population pressing on the food supply, the food supply may be pressing on the population."

INFORMATION AVAILABLE CONCERNING MOBILITY

The second part of the task set the social economist—it is admitted that he has others—was to discover how far movement was possible, and, if necessary, devise means to facilitate it.

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[2] "Population and Rewards in Agriculture," Scottish Journal of Agriculture, April, 1929.

Some progress has been made in the investigation of movement, more, it may be said, in the United States than in Great Britain.

SPECIAL POSITION OF THE LARGE-SCALE FARMING UNIT

Inquiries made in the Edinburgh area indicate the possibility that the mobility of farmers may be much more free in an area of large farms, than where the holdings are small.

Farming on a large scale is often precarious, in the sense that, other things being equal, it can be expected to show greater fluctuations in profitableness to the operator than does small-scale agriculture.

This fact is seen readily by consideration of what would occur if a hypothetical group of ten small farms, each wholly operated by the farmer and his family, were to be thrown into a single large holding carrying on the same type of agriculture. Suppose that each small operator had made an average annual profit of £200 of which three-quarters represented payment for labour and one-quarter remuneration for capital and management. Suppose, also, that the "average profit" of £200 was, in fact, the mean of annual balances ranging from £100 to £300. Leaving aside the question of whether efficiency would be affected, on the change taking place we could expect that the large farm would have annual balances (available as payment for labour, capital, and managerial activities) ranging from £1,000 to £3,000, with an average of £2,000, *i.e.,* ten times the amounts for each small farm. Of the £2,000, £1,500 would go in payment for labour, on a farm of this scale, presumably, wholly to paid workers. There would remain £500 as remuneration for farmers' capital and managerial skill.

In a "bad" year, when the margin was £1,000 only, the operator, with a wage bill of £1,500, would lose £500. In a "good" year, the balance being £3,000, he would make £1,500. Instead of ten small farmers, each making profits varying from £100 to £300 in different seasons, there would be one large operator, the recipient of "rewards" ranging from minus £500 to plus £1,500, and a number of hired workers—nine presumably—receiving steady wages. The implications of this aspect of the size of farming units are important from the point of view of society, and do not always receive consideration. Incidentally, this factor may help to explain the depression on the large arable farms in the eastern portion of Great Britain.

Further, it is a well known fact that good and bad years do not alternate. Instead, a boom lasting several seasons may be followed by a depression of similar length. The ten small operators may have been able to weather without reserves, by a process of "belt-tightening," a long series of seasons each bringing in £100. The large-scale farmer who has replaced them will require considerable reserves, or extended credit, to face recurring losses at the rate of £500 per annum.

The logical thing for this large-scale operator to do is to invest outside his business some of the profits which accrue in the "good" years against times of depression. "Outside the business" because it is only thus that his reserves will be available when farming is doing badly. An extra farm, stocked in a boom, is worse than useless at a time when farms bring in minus £500 a year to their operators.

The habit of "outside investment" seems, therefore, to be a more or less essential corollary of systems of agriculture whose financial results show great fluctuations, and, as has been pointed out, it is, other things being equal, on large farms where this is most to be expected. Where the small-scale farmer can, if he chooses, save up in "good" years to extend his farming operations, the large farmer invests, or it would seem ought to invest, outside agriculture. There is a good deal of evidence that this practice is followed in the Edinburgh area, by farmers of the type under discussion.

THE FARM OPERATOR

Such a farmer becomes familiar with non-agricultural channels of investment, and, because of this, he a man of considerable capital, may come to regard his farming as an investment. If other investments, of a type whose risks seem to him to be comparable with those attending agriculture, yield him 7 per cent, and show 8 per cent or 9 per cent "on earnings," then he may think, and with some justification, that his farming is doing badly if it does not return him 7, 8, or 9 per cent, according to whether he judges his investments by "yield" or "earnings."

Further, if he is a tenant, this farmer can, should he choose to do so, transfer his capital into channels other than agriculture, although the mobility of this capital is restricted if the operator's labour is not transferable also. Unlike many other forms of activity, tenant farming does not require large quantities of fixed

plant. Much of the tenants' stock is converted into money in a short time in the ordinary course of events—when it reaches the marketing stage. This consideration applies even to breeding stocks if the time allowed is lengthened. To interpret the profits accruing from large-scale tenant farming, where outside investment is familiar, on the same lines as those adopted with family farmers, unfamiliar with, or even antagonistic to, non-agricultural investment, or with owner-occupiers, much of whose capital is fixed and immobile, is plainly absurd.

Mobility, or "transferability," is, it would seem, a fundamental consideration in the interpretation of farming profitableness. The owner of land, the landlord in a tenancy system, or the owner-occupier, owns property which cannot be transferred readily to other industries if farming pays badly. He has to be content with what he can get out of the business he is in. The small operator, commonly unfamiliar with outside investment, may be in the same position. The large-scale tenant farmer, may, if times remain bad, demonstrate that his capital is free to move by actually moving it elsewhere.

The question of whether the farm operator's labour is transferable is, of course, equally important in influencing his decision to stay in agriculture or move out of it. Capital and labour, here, are often tied together, in the sense that the same mind guides their direction. The man whose capital and labour are both mobile is, plainly, free to move. The owner of a holding which has proved unprofitable may, if only his labour is mobile, abandon what he had thought to be his capital, and move elsewhere. The vacant farms in the eastern United States bear witness to this fact Similarly, the large-scale tenant farmer, with considerable capital, may, if he fails to make farming pay to his satisfaction, transfer his mobile capital away from agriculture, even though he cannot find, readily, another sphere for his labour. The only man completely immobile is he whose labour is not transferable, and who has no considerable amount of mobile capital.

Some information is being collected in the Edinburgh area regarding the mobility of farm labour. It seems evident that the children of large-scale farm operators commonly get a good education, remaining at school until old enough to choose a life-work for themselves. Further, capital is available to finance any training necessary, or to purchase equipment. Farm born boys may

have an agricultural bias in making their choice of occupation, but inquiries have revealed no lack of instances of farmers' sons moving into industry, into trade, or the professions. "Younger sons" may have gone, even when farming was fairly prosperous, because the large capital required to farm in the locality was not available. Others went because they thought farming prospects looked black, or because they preferred some other occupation. For whatever reasons they moved, a sufficient number of them have gone to demonstrate that movement was not difficult. Possibly it may be less easy for town-bred boys to enter agriculture than for farmers' sons to leave the industry, but again, instances of such movement are not uncommon. It would seem safe, therefore, to postulate comparatively free mobility *between successive generations.*

Even within a single generation, the possibilities of movement may be very considerably higher with large than with small farm operators. On large farms, managerial skill tends to assume more importance than does technical knowledge as a factor of success. Such skill is not without value in other occupations where acquaintance with the technique of ploughing or milking would be no qualification. Farmers possessing it in a well-developed form can be expected to be more mobile than their fellows with no such advantages.

THE PAID WORKER

Hitherto the position of the farm operator only has been dealt with. Farming on a large scale, as defined here, postulates hired workers without capital of their own. In the Edinburgh area this class is numerically by far the most important. In the United States this is not the case, and Americans, accordingly, can be expected to be less interested.

In brief, it may be said that the more important considerations governing mobility between one generation and another seem to be:

First, the proximity of other employment. Evidently, if it is possible for the children of poorly paid workers to live at home, although employed in some occupation other than that followed by their parents, mobility will be comparatively free. Near towns this is, of course, always possible. The more industrial plants are spread over the countryside, the better will be the position regarding labour transference between agriculture and other indus-

tries. Modern electrical developments, and better rural transport, are obvious improvements.

Another factor is the cost of training and maintenance. Evidently, as most economists who have given thought to this matter have noticed, the better paid the parents, the more easy it will be for their children to enter occupations whose training and equipment are expensive.

Into the question of the transferability, within a single generation, of workers whose only asset is their toil, all kinds of considerations enter. A single example will illustrate their type. In our generation the practical disappearance of the horse from city transport has removed one alternative occupation with which farm workers were familiar. If agriculture were to come to depend on motors, the old position would be restored. On such matters, common-sense and a little thought, tells us a great deal, but only patient investigation will reveal, and keep up-to-date, the facts.

TENANCY PROBLEMS IN JAPAN

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TENANCY problems are looked on as the center of rural problems in present Japan. Of course, we have had tenancy problems in the past. Tenants have appealed to landlords to have the contract rent reduced owing to bad crop conditions, sometimes even to the extent of cancelling all of the rent. However, through mutual sympathy and local customs, landlords and tenants were usually able to solve such problems quickly and satisfactorily. Difficulties were generally temporary.

But recently, especially since the war, the relation between landlords and tenants has changed, having been affected by the pressure of rural economic difficulties on the one hand, and influenced by the new social ideas and social movements on the other. If trouble happened to arise between the landlord and tenant, they did not solve the difficulty themselves as heretofore. They disputed insistently about their lawful rights, or organized themselves into unions which were unsympathetic toward one another and only attempted to emphasize the merits of their own particular case.

Many tenants are constantly at odds with their landlords. Such cases have not only increased rapidly but have become worse and worse. Some refuse to make new temporary agreements with the landlord for reduced rent, hoping for a permanent revision of the lease. To bring pressure to bear, not only have the tenants resorted to mass movements, but they have also appealed to the courts. There are many instances where the conflict of interests between tenants and landlords has served to disturb the normal peace of whole rural communities.

In 1926, there were about 2,700 of these mass movements in Japan, with about 250,000 tenants and 40,000 landlords involved. There were relatively few cases in certain districts of the main island until about fifteen years ago. Now, such cases prevail in every district of Japan, and although the number of cases varies according to crop conditions in different years and according to local conditions, there is a tendency for the number to increase from year to year.

The appeals by the tenant to the landlord are very complex. They have many appeals such as for the continuation of the con-

tract after the landlord has served notice to quit; the recognition of tenancy or perpetual tenancy; compensation for the tenant when the contract expires; the improvement of the tenant's contract; and demands for a better social position. It is clear that almost all of their appeals represent attempts to get a more favorable division of the product.

In former times, appeals for a reduction of the contract rent occurred only in bad crop years, and even then the amounts involved were small. Recently the amounts have increased, and many such appeals have occurred every year. Many appeals are not related to crop conditions, but represent a demand on the part of the tenant for a perpetual agreement with the landlord at a lower rent.

In the past, whenever the tenant differed with his landlord, it was the custom for the tenant to visit the landlord and appeal to him for help on the basis of sympathy. But recently, the tenant has taken a militant attitude. In many instances where the tenants have used mob action, the landlords have been obliged to meet their demands, at least temporarily. Frequently the tenants united, swearing not to pay the rent to the landlord but to keep cooperatively their rental rice, and not return their leased lands to the landlord. If the landlord brought a suit against them, the tenants made excuses in order to delay the decision, or the tenant union employed lawyers who were prepared to defend such cases. Sometimes the tenant appealed to the public through demonstrations, sympathetic strikes in primary schools, resignations of firemen, withdrawals from the cooperative association, or agreements to delay the payment of local rates and other public assessments.

The landlords in turn brought pressure to bear on the tenants. If the landlord was forced to demand rent from a tenant who refused to pay, the landlord brought suit for the payment and executed the provisional attachment against the harvested or standing crops. The landlord might also bring suit for the return of the leased land by the tenant and execute the provisional right to prohibit any tenant's living on that land. Some landlords who took the land from their tenants or who had land which was turned back by the tenants, organized cooperative associations and corporations to raise crops on a comparatively large-scale basis, or to manage the rented land, thus avoiding the difficulty of dealing directly with tenants.

Expecting strong opposition, the tenants organized tenant unions to combat the landlords. The landlords in turn organized landlord unions. Of course, we had a few such unions prior to the present time, but recently they have increased very rapidly. For instance, from 1918 to 1926, the number of tenant unions increased from 241 to 3,926, and the number of landlord unions, from 224 to 605. At first the tenant union movement was mainly for economic reasons. Since universal suffrage was proclaimed, the movement has gradually changed to a political one, and many political parties have been established, supported by the tenant and other labor unions.

The landlord unions have been largely influenced by economic factors. Their principal object has been to secure a measure of protection against the tenant unions. To increase their power, they are establishing real estate companies, and some of them include several prefectures. Recently there have been developed the landlord and tenant arbitration unions which hope to establish goodwill and to prevent further disputes. In 1926, there were about 1,500 such unions compared with 75 in 1918.

Many measures for solving the tenancy problem have been adopted by the Japanese Government. Of these, the Tenancy Dispute Arbitration Act and the Small Holdings Act are the two most important. It was the intention of the former act that the arbitration of cases should be adapted to local conditions, customs, and the like. The Small Holdings Act was planned to help the tenant and other small farmers buy farm land in order that they might become landed farmers.

Of the causes of the tenancy problems the following are generally considered important:

A. Fundamental causes:
   1. Economic struggle between landlords and tenants.
   2. Unsatisfactory points in the tenancy system.
   3. Low profits in farming.
   4. The economic difficulties caused by the upward trend of the prices of commodities and of standards of living.
   5. Changes in the tenant's social ideas and increases in the many kinds of social movements.

B. Secondary causes:
   1. Bad crop conditions caused by insects, diseases, dry weather, and other factors.

2. The delayed payment of rent by the tenant.
3. The taking up of the leased land from the tenant by the landlord.
4. The tendency for any one tenant to follow other tenants who were at odds with their landlords.

It is my opinion that the fundamental causes of these problems are the small size of the farms, the close contact of the cities with the country, and the limited extent to which farms have been reorganized in Japan.

Statistics show that the number of farmers who operate farms of 2.5 acres or less, constitutes 69 per cent of all farmers, and that the average size of farms in Japan is about three acres. On the other hand, only 31 per cent of all farmers are landed farmers while 27 per cent are landed and leased farmers, and 42 per cent are pure tenant farmers. Moreover, the leased land makes up 49 per cent of the total arable land in the country. It is not necessary to mention the present day economic difficulties arising from these small farms, which were satisfactory during an age when a self-sufficient system of farming was carried on.

Japanese farmers have been obliged to follow the rapid commercialization of other industries. Of course, other industries have developed large-scale production very rapidly in recent years. The farmers themselves have recognized that their economic condition was not improving as rapidly as that of persons in other industries. At the same time, they have learned by contact with urban districts that the industrial laborers have fought their employers to improve their economic and social position. It is natural, therefore, that they should resort to the same methods. Tenants have been too busy fighting their landlords to improve their farming, which, under present economic conditions, is the fundamental way to improve their position and solve their economic difficulties.

We, in Japan, have heard the world wide discussion about the reorganization and commercialization of the farm, and to some extent it has been brought about in Japan. But it does not touch the fundamental problems of farm organization. The mechanization of the farm is another subject of great interest in Japan, and we are attempting to use many of the machines which have been introduced from foreign countries as well as those invented in Japan. In these days we can hear the explosions of the internal combustion engine in the rural districts, especially during the

threshing seasons. But since agriculture in Japan has developed as a manual occupation, the extent to which machinery can be used is generally limited to such farming operations as threshing grain, making straw-rope, pumping water, and so on. Of course, we have had some experience in using new machinery efficiently in the field. One of these was an experiment at the Kagoshima Prefecture Farm Land Utilization Experiment Station, where a comparison of the labor used on 2.5 acres of land was made. It showed that the conventional practice for weeding and cultivating cost $47.80 for 86.5 women and 39.1 men, while the use of the newly invented Japanese style cultivator resulted in a cost of only $21.50 for 46.7 women and 4.7 men, with 2.9 oxen and 1.8 horses. But we cannot expect similar results in every district, because certain cropping systems, especially the rice industry, do not permit using machinery efficiently on the land; also to use machinery efficiently on the land the acreage per working man must be increased. We can only expect such increases where many farmers have left their farms, or where we have enough uncultivated and arable land to increase the acreage of the fields. Such conditions exist only to a limited extent.

The farm mechanization movement in Japan has stimulated and contributed to agricultural development, but the reason that it has not greatly affected farm organization is that it has been tried mainly on the side of staple production.

I believe that the farms ought to be organized in three unit systems, namely, cropping, animal husbandry, and agricultural industry. The first two systems apply directly to the land, which means they are much influenced by natural conditions. Consequently they cannot be run like other industries. The agricultural industry system, however, has the same characteristics as other industries. It differs from them only in being a part of the farm business. Therefore, if the mechanization of agriculture had been tried on this side of production, it would have contributed much more to the development of agriculture than now, and all of the farmers would have been much more prosperous. Indeed, it would be easy to mechanize agriculture on this side of production in Japan. But cropping is generally the most important system of farm organization. It is for this reason that farm mechanization has been tried mainly on the side of staple production. If the mechanization movement were tried on the side of agricultural

industry, it is clear that the combination of the three unit system would be changed. Not only would the animal husbandry system be raised to the same level of importance as the cropping system in the farm organization, but agricultural industry would become most prominent.

The farmers in Japan are on farms of too small a size to operate profitably under the present rural economic system. Under such conditions we cannot expect to develop a new farm organization as indicated above. We shall have to change these conditions and to do so we should try to organize farms under the cooperative system to some extent. Moreover, it is necessary to change the rural economic system and farm organization, not only to control and adjust the departments of farm production to local conditions and to market conditions, but also to decentralize industry.

In short, by the mechanization of the farm, especially on the side of the agricultural industry system, the farm organization will be fundamentally reformed and industrialized. At the same time all the farmers will improve their businesses, and to some extent it will help to solve their economic difficulties as well as their tenancy problems.

FARM WAGES AND WAGE REGULATION IN ENGLAND AND WALES

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THE FIXING of wages by law is a very old English institution. It dates back to the statute of Edward the Third. Subsequent laws were the famous Act of Elizabeth, an Act of James the First, and an Act of George the Second (1747). The Act of Elizabeth provided that the justices of the peace should meet annually and fix the wages of labourers in husbandry, and of certain other workers. Penalties were imposed on all who gave or took a wage in excess of the amount fixed. The Act of James the First was passed to remove certain ambiguities that were believed to have embarrassed the operation of the Act of Elizabeth. Among the other provisions imposed was a penalty on all who gave a wage below the wage fixed by the magistrates. The Act of 1747 was passed because the existing laws were "insufficient and defective," and it provided that disputes between masters and men could be referred to the magistrates if no rate of wages had been made that year, by the justices of the shire where such complaint was made. It was generally taken for granted that this legislation was designed to keep wages down. So firmly was this believed that the Act of James the First, which provided penalties in cases where wages were given below the fixed rate, was generally ignored and it was only the Act of Elizabeth that was customarily referred to as an act for fixing the maximum rate. A bill was introduced into Parliament in 1795 by Whitbread to fix a minimum rate. His contention was that the Act of Elizabeth ought to be repealed because of the fact that the rates which it fixed were maximum rates.

The object of this bill was to explain and amend the Act of Elizabeth, which empowered justices of the peace at or within six weeks of every general quarter session held at Easter to regulate the wages of labourers in husbandry. The provisions of the bill were briefly as follows. At any quarter session the justices could agree, if they thought fit, to hold a general session for carrying into execution the powers given them by the act. If they thought good to hold such a general session the majority of them could rate and appoint the wages and fix and declare the hours of working of

all labourers in husbandry, by the day, week, month or year, and with beer or cider or without, respect being had to the value of money and the plenty or scarcity of the time. This rate was to be printed and posted on the church doors and was to hold good till superseded by another made in the same way. The young, the old, and the infirm were exempted from the provisions of the act. The bill was defeated. Whitbread made another attempt five years later, and introduced a second bill to the same effect, but this met with the same fate as his first bill, and was thrown out.

No further attempt to regulate the wages in agriculture was made during the next one hundred years. With the opening, however, of the twentieth century, the question of the desirability of establishing minimum wages in agriculture began to be mooted in various quarters. The establishment of the Trades Boards in 1909 had introduced such a system in the case of certain, comparatively small trades. But no attempt to deal with agriculture in a similar manner had met with success. On May 27, 1913, a bill was introduced into the House of Commons by George Roberts, M. P., and others representing the Labor Party, "to provide for the establishment of a minimum wage and the regularisation of the hours of labour of agricultural labourers." In introducing the bill Mr. Roberts said that whilst he "would prefer that every class of labour should be able to secure reasonable living conditions by associated endeavour through trade union organisations," Parliament would be "doing the right thing, when it finds depressed groups of workers, in enabling them, by fixing minimum conditions ultimately to help themselves to a higher standard of existence." The principle of the bill was that the wages, which were to be fixed by district boards, should be of "such a standard as to ensure to the agricultural labourer the possibility of maintaining himself and his family in a state of decency and comfort." This bill did not receive a second reading.

Mr. Lloyd George's Land Enquiry Committee which reported later in 1913, after an extensive examination of the question, reached the conclusion that the low wages then obtaining in agriculture had "set up a vicious circle, since by keeping down the standard of physical and mental development they tend to prevent labourers from being worth a higher wage." It considered that neither the growth of small holdings, increased agricultural pros-

perity, nor trade unionism could be expected to lead within a reasonable time to a satisfactory increase in wages, and it accordingly recommended the establishment of a legal minimum wage through the medium of some form of wage tribunal.

On the 14th of April, 1914, Mr. Leslie Scott, M. P., on behalf of the Conservative Party, introduced a bill called the "Agricultural Employment Boards Bill." This was described as a bill "to provide for the establishment of agriculture employment boards and for purposes incidental thereto." In this way, each of the three political parties in England was pledged to some system of fixing wages in agriculture by law. The outbreak of war prevented any further development in this direction. A Departmental committee on the production of food, referred, in 1915, to the importance of the retention of skilled workers on farms, but said nothing about their wages. In 1916, the Prime Minister (Mr. Asquith) appointed a committee under the chairmanship of Lord Selbourne with the following terms of reference:

"To have regard to the need of increasing home-grown food supplies in the interest of national security and to consider all reports upon the message of effecting such increase." This committee was termed the agriculture policy sub-committee, and was instructed to consider post-war conditions rather than immediate issues. The report was characterized by comprehensive surveys of the agriculture problem, and exhibited some recognition of the fact that the agriculture policy of the country had to be considered from a new standpoint.

The committee expressed the opinion that "the conditions of agriculture must be made so stable out of its profits that the agriculture labourer can be assured of a fair wage, the cultivator of the soil a fair rate for his capital energy and brains, the land owner a fair rate for the capital invested in the lands." They recommended that the state should fix a minimum wage for the ordinary agriculture labourer in each county, guarantee to the farmer a minimum price for wheat and oats, and take steps to secure the increase of production which is the object of the guarantee. This recommendation was at once accepted by the government and formed the basis of the policy announced by the Prime Minister (Mr. Lloyd George) in the House of Commons on February 23, 1917, and subsequently embodied in the corn production act.

The Government took the opportunity, when introducing a bill to deal with increased corn production, of coupling with their proposals in this respect provision for the establishment of machinery to deal with agricultural wages. Under the provisions of this bill, which became law in August, 1917, an Agricultural Wages Board was established, charged with the duty of fixing minimum rates of wages for agricultural workers. The board consisted of an equal number of representatives of employers and of representatives of workers, together with independent members. As originally constituted, half of the sixteen employers' representatives were elected by representative bodies, and the other half nominated by the Board of Agriculture and Fisheries, whilst half of the representatives of workers were elected by representative bodies, and the other half nominated by the Board of Agriculture and Fisheries in consultation with the Ministry of Labour. The independent members were appointed by the Board of Agriculture and were seven in number, one of them being selected as chairman.[1]

To assist them in their work the Agricultural Wages Board, under powers conferred on them by the act, appointed district wages committees for the various areas of England and Wales. These committees numbered in all thirty-nine, many committees acting for one county only, while others acted for two or more counties combined. The constitution of these committees was similar to that of the Agricultural Wages Board, but in their case the representative members were appointed by the Wages Board, and the independent members were appointed by the Board of Agriculture and Fisheries.

The right of fixing minimum rates of wages was vested solely in the Agricultural Wages Board, the district wages committees acting in a purely advisory capacity. In the first instance the committees were asked to recommend to the Wages Board what they considered to be the appropriate minimum rates for their area, and the board in arriving at a decision took these recommendations into account. After the first minimum rates had been fixed, however, it became the practice for most of the changes which

[1] In 1920 the system of appointment of the representative members was changed so as to increase the numbers elected by the organisations to 14 a side, thus leaving the number nominated by the Ministry of Agriculture to two on each side.

were made in the rates to be initiated by the Wages Board, the district wages committees being invited to give their observations on the board's proposals before an order was made.

In fixing minimum rates of wages, the Wages Board were required by the act to "secure, so far as practicable, for able-bodied men, wages which in the opinion of the Board were adequate to promote efficiency, and to enable a man in an ordinary case to maintain himself and his family in accordance with such standard of comfort as might be reasonable in relation to the nature of his occupation," and further, that the wages should be such as in the Board's opinion were equivalent to wages for an ordinary day's work at the rate of at least 25 shillings a week.

It was obligatory on the Agricultural Wages Board to fix minimum time rates of wages, but powers were also given to fix minimum piece rates of wages if the Board so desired. In effect, minimum time rates only were fixed, and workers employed at piece rates were protected by a clause in the act which provided that if the piece rate which they were receiving was, in their opinion, inadequate, they could complain to the Wages Board who had power to order the payment of arrears of wages representing the difference between what an ordinary worker would have earned at the piece rate and the wages to which he would have been entitled at the minimum time rate. It might be observed that considerable difficulty would have been experienced if any attempt had been made to fix minimum piece rates of wages. Conditions are liable to vary so greatly between one job and another that it would be impracticable to fix a reasonable piece rate to cover all jobs of one character. In practice, piece workers seldom accept any work at piece rates without having first viewed the work to be done.

In fixing minimum time rates of wages the Board adopted the week as the basis in the case of male workers, but in the case of female workers the rates fixed were hourly rates. Acting on their powers under the act, the Board also fixed overtime rates of wages and defined the employment which was to be treated as overtime employment.

The act took cognizance of the fact that it had long been customary for agricultural workers to be paid partly in kind, and the Board was therefore empowered to define the benefits or advantages which might be reckoned as payment of wages in lieu of

payment in cash and to fix the values at which such allowances might be reckoned. In the matter of fixing the values of benefits, the Board was largely guided by the recommendations of the district wages committees.

The district wages committees in addition to their advisory duties had delegated to them by the Agricultural Wages Board the duty of granting permits of exemption to workers who, by reason of mental or other infirmity or physical injury, were incapable of earning the minimum rate. Except insofar as such permits were granted, the minimum rates applied to all workers employed under a contract of service or apprenticeship.

In accordance with the terms of the act any decision of the Board with regard to minimum rates of wages could only be made enforceable after the Board had given notice of the rates which it proposed to fix in order to give an opportunity for objections to be lodged to the proposed decision. The Board was bound to consider any such objections which might be lodged within a specified period before the decision could be made operative.

The enforcement of the minimum rates was carried out by the Agricultural Wages Board, inspectors for the purpose being placed under its direction by the Board of Agriculture and Fisheries. The administrative staff attached to the Wages Board carried out the general enforcement work but cases of doubt were referred to a sub-committee of the Board for final decision.

The system of wage fixing machinery which was established in 1917 was abolished as from the 1st of October, 1921, by an act repealing the earlier legislation.[2] The latter act provided, however, that the Minister of Agriculture should have power to take steps to secure the voluntary formation and continuance of local joint conciliation committees for the purpose of dealing with wages or hours or conditions of employment in agriculture. It was provided that the representative members of the district wages committees should become interim conciliation committees pending the formation of voluntary committees, and in effect the district wages committees eventually merged into joint conciliation committees as contemplated by the act. Power was given to the conciliation committees to appoint an independent chairman, but this power was not taken advantage of in many cases.

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[2] The Corn Production Acts (Repeal) Act, 1921.

The act did not provide for any machinery for the nomination of employers' and workers' representatives, but in fact the employers' nominees on the conciliation committees were appointed by the National Farmers' Union, and the representatives of workers by the National Union of Agricultural Workers, and the Workers' Union.

The employers' representatives were in many cases in favour of the formation of conciliation committees for smaller areas than had existed under the Corn Production Act, and in consequence the number of conciliation committees was larger than that of the district wages committees and eventually reached a total of sixty-three, as many as five separate committees being formed in a single county.

Of the sixty-three committees, fifty-six reached agreements with regard to wages at some period during their existence, whilst the remaining seven reached no agreements at any time. The number of agreements in operation became rapidly less after the first few months and by the end of 1922, agreements were operative in only about one-third of the committee areas, whilst a year later this number had been halved. There is no doubt that the voluntary committee system was a complete failure, since only three committees out of a total of sixty-three maintained agreements throughout the period of operation of the act.

The Corn Production Acts (Repeal) Act of 1921 provided that the rates agreed upon by the conciliation committees should only be made legally enforceable in cases where the committee unanimously requested the Minister to register the agreement. Only five of the committees at any time requested such registration to be made, and consequently the great majority of agreements reached were not legally binding upon employers and workers. It is believed, however, that such agreements as were reached were fairly well observed.

The Agricultural Wages (Regulation) Act of 1924 was passed by the Labour Government, but owing to amendments which the Government was forced to accept, the machinery set up differed considerably from that established by the Corn Production Act.

A central Wages Board and local wages committees were established on similar lines to those which formerly existed, but the whole of the members representing employers and workers were to be nominated by the respective organisations, whilst in the case

of the local committees two impartial members were to be appointed by the Ministry of Agriculture and the chairman was to be elected by the committee. The power of fixing minimum rates of wages was placed in the hands of the local wages committees and the Central Agricultural Wages Board was only empowered to fix rates in cases of default by agricultural wages committees or at the request of a committee.[3] The Central Board's normal func-

Table 1. Average Agricultural Wages and Index Numbers of Agricultural Wages in England and Wales

Period	Average weekly wages		Index numbers of weekly wages (1914=100)
	s.	d	
1914	18	0	
August, 1917	25	0	139
First Wages Board Period.			
July, 1918–May, 1919	30	6	169
May, 1919–April, 1920	37	10½	210
April, 1920–August, 1920	43	0½	139
August, 1920–August, 1921	46	10½	260
September, 1921	42	3	265
Conciliation Committee Period			
1922	31	2	174
1923	28	0	156
1924	28	0	156
Second Wages Board Period·			
Summer 1925	31	5	175
1926 .	31	7	175
1927	31	8	176
1928	31	8	176
1929.	31	8	176

tions were confined to implementing orders giving legal effect to the county committees' decisions. The powers conferred by this act of fixing overtime rates of wages, of defining the employment to be treated as overtime and the benefits or advantages which might be reckoned as payment of wages in lieu of payment in cash, of granting permits of exemption and of hearing complaints as to inadequate piece-rates are similar to those obtaining under the previous act.

Under the present act, however, the responsibility for securing

[3] In practice no such occasions have so far arisen.

the observance of the minimum rates rests with the Ministry of Agriculture and Fisheries and not with the wage-fixing bodies.

There can be no doubt that the wages board system has made a marvellous change for the good in the working conditions of the agricultural workers of England and Wales. Agricultural wages, however, still lag far behind the wages of the workers in the towns and cities and there is very considerable difficulty in retaining the young people on the land. The annual returns taken by the Ministry of Agriculture show that in the last eight years male adult labour has declined by five per cent, whilst the number of juvenile workers under twenty-one years of age has declined in the same period by twenty-five per cent. If trade improves in England, there will, in the immediate future, be a serious shortage of labour in agriculture. Great changes are in process in the rural life of England. The old skilled agricultural craftsmen who ranked with the highest skilled workers in the whole country are slowly dying out, and there seems to be no one to take their place. England is too small a country to maintain two separate standards of life for its working class—one level for town workers and a lower level for rural workers. In the future, other adjustments will need to be made in wages and working conditions of the labourers or adjustments and changes in the type of British agriculture must inevitably result.

THE ORGANISATION OF WAGE EARNERS IN AGRICULTURE

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THE TERM "wage-earners" has been selected to differentiate the class of agricultural workers who most closely approximate to the class of workers in industry who form the great trade union movement. What proportion of workers in agriculture falls within that class in the different countries of the world it would be very difficult to state with any measure of accuracy. Agricultural statistics are notoriously deceptive for the unwary, and elusive for the careful investigator, and the material does not exist from which any useful statistics can be produced. Even if we confine ourselves to a single country it is difficult to classify the different groups, and any attempt to reconcile the statistics for different countries is quite hopeless.

Even the term "wage-earner" requires definition. The worker, as in England, who is regularly employed in agriculture and paid a cash wage, is clearly a wage-earner whose status is similar to that of the wage-earner in industry. The "deputat" in Germany is paid partly in cash and partly in farm produce, but for all practical purposes is clearly a wage-earner. Between these classes, however, we have a considerable variation until we reach the share enant (metayer) whose status approaches more nearly the position of a tenant farmer than that of the industrial wage-earner. Again, here is the very large class of peasant cultivators who work for wages as casual or seasonal workers on larger farms.

Attempts have been made in some countries, notably in Italy, to form organisations which would include all the different classes of agricultural workers, but the attempts have not been successful. Such organisations of agricultural workers of a trade union character as have been able to survive the initial efforts, have found by practical experience that they have to confine their activities to those workers who are dependent on wages earned under contracts of employment.

There is reason to believe that this class is larger than is generally realised. Certain figures are given for the different countries in the Report of the International Labour Organisation

on "The Representation and Organisation of Agricultural Workers." In Germany it would appear that one-third of the total number of persons engaged in the industry are wage-earners, and that the number of wage workers slightly exceeds the number of working members of cultivators' families. In Denmark in 1923, 84,000 holdings used no permanent outside help; 31,000 used the help of members of the cultivator's family over 15 years of age; and 79,000 holdings used permanent outside help. In Czechoslovakia wage-earners would appear to form 40 per cent of the total number of persons engaged in agriculture; in Belgium 35 per cent; in Great Britain 63 per cent; in Italy 40 per cent; in the Netherlands 65 per cent.

The trade union movement amongst the industrial workers is a growth of the last hundred years; in agriculture it has been a development of the present century, and cannot be said to be of any importance until the years succeeding the outbreak of war. There were spasmodic attempts made to organise wage-earners during the nineteenth century. The six Dorchester labourers, who in 1832 made their feeble effort to combine and suffered deportation for their temerity, occupy an honourable place in the history of the fight against the Combination Acts in Great Britain. Joseph Arch in the seventies was successful in creating a national organisation in England which, for a brief period, focused attention on the deplorable conditions of the workers in agriculture. In the eighties the shearers in Australia engaged in a series of strikes which led to the Compulsory Arbitration Laws of Australia. In Scotland, a Ploughman's Union led a precarious existence for ten years from 1886, not without result in improving the conditions of the workers even during the worst years of that depression in industry. But all such efforts were more in the nature of temporary agitations not without political relations, and never became trade union organisations in the strict sense of the term.

The existing trade union with the longest continued existence is the Dutch Landworkers Union formed in 1900 as a Dairy Workers Union, which amalgamated in 1909 with the newly formed Union of Landworkers. The National Federation of Landworkers in Italy followed in 1901, when a large number of organisations of wage-earners, share-tenants and peasants, some of which had had a more or less continuous existence for a considerable period, were grouped together to form the National Federa-

tion. Although the Federation was affiliated with the National Trade Union centre in Italy, and was one of the unions which formed the International Landworkers' Federation in 1920, there was always some doubt whether it was a trade union of wage-earners. It was suppressed when the Fascist organisations were set up by the Government. It is difficult to get any reliable information about the position of working class organisations in Italy and Fascist organisations are not recognized by the trade unions.

Hungary is another country about which it is difficult to secure any reliable information, but it is hardly likely that the Landworkers' Union formed in 1905 is in effective action today. The year 1906 saw the formation of the National Agricultural Workers' Union of England and Wales, the Danish Landworkers Union, and the Land and Forest Workers' Union of Austria. The German Landworkers' Union was formed in 1909, and the Scottish Farm Servants' Union in 1912.

In a number of European countries there were legal difficulties in the way of organising agricultural workers which were not removed until after the World War and the revolutions which occurred during that period. Immediately these difficulties were removed, stimulated by the labour unrest in the different countries, the unions in existence, sometimes with the help of the national trade union centres, entered upon intensive organising campaigns, while in the countries in which no organisations had existed previously, steps were taken to form landworkers' unions. When the International Landworkers' Federation was formed in 1920, the unions already named with the exception of the Hungarian Union, joined the Federation together with unions from Belgium, France, and Sweden. Later on, landworkers' unions from Poland, Latvia, Czechoslovakia, and Palestine joined the Federation. There is also a Russian Landworkers' Union but I have no authentic information about it.

In addition to these unions which are sometimes known as the "free" trade unions, or the Social Democratic trade unions, there are in some of the European countries Christian trade unions of agricultural workers. Particulars of these, and figures of membership of the various unions in each country will be found in the Report of the International Labour Office on "The Representation and Organisation of Agricultural Workers." I would refer those

interested to that report for fuller information as to the history of the efforts in the different countries, and as to the activities of the various organisations. A sentence from that report sums up the position very succinctly. "What strikes the observer about agricultural trade unionism is its youth and its very limited extent." I have given a brief outline of the history of trade unionism in agriculture and its youth is obvious. It is more difficult to assess its extent. Geographically it is confined to Europe except for the Jewish Union in Palestine and some organisation amongst shearers in Australia. In Europe, the effective organisations are to be found in central and northern Europe; such organisations as exist in the Latin countries appear to be less effective.

If the returns of membership in the agricultural trade unions be set against the total figures for agricultural wage-earners in the respective countries, the unions may be said to show a membership varying from 5 to 15 per cent of the workers eligible for membership. Even during the short-lived boom period at the end of the war, 30 to 40 per cent was probably the highest percentage reached in the most successful organisations. But such percentages are rather misleading. In Great Britain, it is doubtful if the trade unions of industrial and commercial wage-earners at the peak point ever reached 40 per cent of the workers eligible. The distribution of the organised workers is more important than the percentage of the total workers in considering the effective power of the organisation. In every country we find that in certain localities and in certain forms of production, the organisation of the workers in agriculture has been more successful than in the country generally. In Britain, it is where the large farms are the rule, generally in the cereal growing districts. In the stock rearing districts, organisation makes little headway. In Germany, organisation of dairyworkers has been successful in covering 60 per cent of the workers, while in the large farm districts and amongst forestry workers a considerable proportion of the workers have been enrolled in these unions. In the Netherlands, dairyworkers, and the workers on large farms form the bulk of the organised workers. In Czechoslovakia and Denmark the workers on farms where sugar beets are cultivated have responded best to the efforts of the organisers.

There are many causes which account for the youth of agricultural trade-unionism and for its limited extent. The legal

restrictions on the right of association in a number of European countries where large farming was the rule, prevented its development until the last decade amongst the workers from whom organisation might have been expected. It is just in these countries that it has made its greatest development since freedom of association was secured. In Great Britain where the status of the agricultural worker has most nearly approached that of the industrial worker, the industry has been continually shrinking, and the workers have been more anxious to escape from the industry than to endeavor to organise to protect themselves as agricultural workers.

Before trade unionism can be successful amongst any class of workers there must be a large body of workers employed under conditions of wages and working conditions which give these workers a large measure of common interests. In agriculture, these conditions are found only where farming in any district is conducted on a large-scale basis employing numbers of wage-earners. Large farms are a growth of comparatively modern times and in many of the countries are still the exception. Where the system has developed it will be found that before the organisation of trade unions the tendency was for wages and working conditions to be standardised. Under these conditions it might have been expected that trade unionism would have developed as in other occupations in which the workers were similarly situated. It did not do so, and it is worth while considering the reasons.

I would put as the first obstacle to the formation of agricultural trade unions the fact that agriculture is not regarded as a life occupation by the great majority of those who begin work in the industry as wage-earners. When a man serves an apprenticeship to a trade, or takes up coal mining, transport work, or work in textiles or the heavy industries, such a man normally regards that as his job and naturally looks to securing improvements in the conditions of work in that industry. He has a certain sense of the future and is prepared to take the longer view. This makes for continuity of effort, and organisation can be created with some measure of stability. In agriculture the reverse is the case. The industry cannot hope to continue to employ the young people reared on the farms even if they desired to remain in the occupation. But in every country in the world the agricultural workers seek to escape from agriculture into other walks of life. They

are less interested in attempting to influence the conditions of employment than in getting away from the industry, and the more vigorous and enterprising of them leave early, and those left have difficulty in throwing up leaders from among themselves, who are capable of making the effort to organise.

Other difficulties peculiar to the industry are the low wages and the fact that in most countries payments in kind form a considerable part of the wages, rendering it difficult to secure the contributions necessary. The dispersion of the workers over wide areas, the fact that the workers may be so isolated as to make difficult the formation of groups or branches sufficiently large to give a sense of community to the workers, renders organisation work difficult and expensive. Personal difficulties arise more easily amongst small groups, differences of temperament, jealousies, and family differences all creep in to render the work of organisation very difficult. There is little association in work and a lack of social organisation, so that the idea of organised effort has to be created. It does not arise naturally out of the living and working conditions as it does where large masses of workers find themselves working and living together and where organised effort is a necessity of every day existence.

There is the fact also that the farm workers have only lately emerged from being a dependent class. I have already referred to the restrictions on the right of combination. In most of the countries the farm workers still suffer legal and social disabilities which other workers have been able to rid themselves of. "The general characteristic of agricultural labour all over the world is that it is less well protected by law than industrial labour." This sentence from the Report of the International Labour Office very well sums up the situation. The protest of the organised agricultural workers against being regarded as "second class" citizens is justified.

A very large proportion of agricultural wage-earners live in tied houses, that is houses which are owned by their employers and which they can occupy only so long as they work for that employer. This lack of freedom and status makes independent and self-reliant organisations more difficult. Education as a rule in rural districts, in spite of recent improvements, still falls considerably below the standard of that in industrial areas, and rural children are taken from school at an earlier age.

What the future may be for trade unionism in agriculture only one very rash would venture to prophesy. The decade in which it has grown up has been far from normal. The period of inflation and the necessity of adjusting nominal wages to meet the rise in prices was favourable to the development of collective bargaining. The measures taken in certain European countries to ease the adjustment of wages and working conditions, varying from the legal minimum wage in England and Wales to the quasi-legal systems in Germany, Czechoslovakia, Poland, and Austria, helped the initial work of organisation. The succeeding depression in the industry during the period of deflation and the fall in world prices of farm produce has had an adverse effect on organisation. The history of trade-unionism in industry shows a steady growth over a long period but the movement rises and falls as boom and slump alternate. The rhythm in agriculture is different from that of the manufacturing industry and time will tell whether agricultural trade-unionism will follow a similar course to industrial trade-unionism.

Whether there is a place for trade-unionism in agriculture is a question which will be answered according to the social and political philosophy of the person answering. Even the most enthusiastic advocate of peasant cultivation or family farming is hardly likely to be hopeful of abolishing the wage-earner in agriculture. The wage-earners in the older settled countries are likely to continue to form the largest single class in the industry, and in no country has the problem been faced of how to keep in the industry an efficient class of workers. There may be variations as to the nature of the problem in the different countries, but it is true of all, that the industry has to be content to work with the less intelligent, less enterprising and less efficient of the workers who are reared in the rural districts. There are signs that the problem is likely to become more acute rather than less. Education in rural districts has been greatly improved during the last two decades. It is still far from what it ought to be, but the signs are that the improvement will be maintained. But every improvement increases the drain of the best of the workers from the rural districts and away from agriculture. We cannot ever hope to make the agricultural industry as attractive as the manufacturing industry to the more vigorous and alert of the workers, or to make social life in the rural areas as attractive as in the urban areas.

Undoubtedly a great deal could be done to remove the handicaps on the industry, but so far, little consideration has been given to the position of the wage-earner. We have all sorts of schemes for farmers, for small-holders, for young farmers and so on. The chemist, the biologist, the economist, and of course the politician, have all been at work diagnosing the disease and offering remedies. Except for the work which has been done in Germany, I am not aware of any attempt to deal with the problems of organisation and methods of work and that is only one aspect of the problem so far as the wage-earner is concerned. It is true that all research in agriculture is a matter of importance to the wage-earner and that he ought to be as much interested in such work as any one engaged in the industry, but he is not alone in being primarily interested in the things that concern him most immediately. Questions of methods of remuneration, the regulation of working time and the adequate provision of leisure, the provision of means of using leisure, housing conditions, and provision for sickness and unemployment, are the immediate problems in which he is interested. Some of these problems are problems for the industry to handle, some of them are social and political, but all of them are problems which are more likely to be solved by organised action. We have enough experience to show that the method of collective bargaining can be applied to the industry, whether on questions of wages or working conditions. My own view is that the field which offers most hope to economic research today is in work studies and methods of labour organisation, but if effective use is to be made of such research it will require the cooperation of the wage-earners if changes in the traditional methods are to be made. The wage-earner, individually, will be just as tenacious in sticking to old methods as the farmers have been individually on other matters and the only way to make progress is to associate them with the work and rely upon the collective body responding to leadership.

There is a place for the organisation of the wage-earner in the ndustry. The day has passed when he can be treated as a "second :lass citizen" content to accept any place which may be allotted to ıim. If the industry cannot find a place for the worker who wants o retain his self-respect and who has some voice in the shaping of his destiny, then such workers will leave the industry, or if hey cannot escape themselves, will rear their children to do so. That is what is happening today and no attempt is being made

to measure the loss to the industry and to the community because this is happening. Probably it is impossible to measure the loss, but that does not mean the loss is not there. There are causes which we may not be able to prevent, but we can at least give the wage-earner his status in the industry, and history shows that the only way to secure his status is by organisation.

It will be observed that I have made no reference to the position in America. I am aware that a distinct class of wage-earners has not yet appeared in agriculture in the United States and Canada, but I would suggest that it would be a profound mistake if agricultural economists in these countries were to assume that such a class is not likely to arise. I have had some opportunity of seeing the development in farming in the Middle West and I have listened to the discussions of agricultural problems at this Conference. I have been struck with the frequency with which the remark has been made that in America the close of the pioneer stage has been reached. We have heard a great deal about the mechanisation of farming operations and of the problems created by the abandonment of submarginal lands. At such a conference it is natural to expect that the economic adjustment necessary to meet such developments should claim most attention, but the social developments likely to follow ought not to be neglected. I think there is another development which has not received so much attention but which is of even greater importance—the fact that on much of the land it is now necessary to resort to liming and the use of fertilisers to maintain fertility.

If we have reached the close of the pioneer period and we are likely to be faced with the problem of keeping marginal land in cultivation, that points to the necessity of farmers possessing more capital for the purpose of carrying on more intensive farming. The day will have passed when a wage-earner could hope by the exercise of rigid thrift to scrape together enough to enable him to furnish the meagre equipment necessary to enable him to exploit the natural fertility of virginal soil. As long as there was room to widen the margin of cultivation by bringing in fresh land there were many opportunities for the wage-earners to join the class of farmers. But we seem now to have reached the stage when it is no longer possible to draw upon the bank of nature without first paying something into the account and that will mean a far reaching change in the status of the wage-earner.

For the future, capital will be a much more important factor in

farming than labour. The progress of mechanisation and the growing intensification of farming will raise the capital requirements of farming beyond the reach of the accumulated savings of the great mass of wage-earners. Whether the "family farm" persists or large-scale farms develop, both will be essentially capitalist enterprises, even if the "family farmer" continues to be a working farmer. The wage-earners may form a relatively small class judged by European standards, but that such a class will develop seems certain.

In Europe, we have been faced with this problem for three generations; America, I believe, has still to face the problem. The rate of development in America both in industry and agriculture has been so rapid, the changes following each other so swiftly, that it has been assumed in many quarters that America would escape the social problems with which Europe has had to wrestle. In the pioneer stage social classes do not form with well defined boundaries, but when development changes from extensive to intensive, boundaries become more fixed.

In Europe we have been struggling painfully to bring into being social institutions which will modify the effects of economic forces. The effort has been marked by strife and conflict, but in different degrees and in different countries we have reached a stage where the social conscience is demanding some means by which the standard of life of the people can be safeguarded. Sometimes that has taken the form of legislative enactment; sometimes it has been by the creation of organisations to defend the interests of groups. We cannot expect to educate our children to become first class citizens and then expect they will be content to be located as "second class citizens" socially and economically. The mechanisation of industry and agriculture which has developed so marvelously in America is not the last word in civilisation. It has brought an astounding increase in productive resources, but it brought with it problems of social adjustment which have yet to be solved and I am not so pessimistic as to believe that it is to be solved by making the human being the slave of the machine.

THE COMPREHENSIVE FARMING SURVEY

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THE WRITER'S outlook and opinions are naturally coloured by his experience. Unfortunately except for a brief interlude on arable farmland—a sort of sugar beet pastorale—he has been mostly concerned with animals. His several interests in the last few years have been human dietetics, methods of beef production in England, the efficiency of pig production in Europe including the United Kingdom, and the Empire possibilities of what in England is known as grass cake, whilst at the present time he is engaged on an economic survey of animal husbandry in the British Empire. If his instances, arguments and analogies seem to depend too much on animal industry, the reader is asked, therefore, to complete or destroy the picture with cases drawn from wider fields —from crop husbandry and pure economics. On the other hand in his drift from dietetics to agricultural economics the writer has dwelt temporarily in several more or less isolated camps and this wandering has, he believes, enabled him to see agricultural research as a cross section rather than as the single cell on which, if he had been a specialist, his attention might have been concentrated.

The bee hive has a good organisation and what appears to us to be a mediocre ideal; agricultural research as a world force has a mediocre organisation but a great ideal. The latter is but one hive in a gigantic apiary, yet it is a hive with a great purpose and, rightly used, of enormous leavening power to the rural population of the world, that is, to about two-thirds of humanity. Nevertheless, the writer contends, it lacks coordination and, in particular, horizontal organisation. Correct these faults and agricultural research would more than double its efficiency and utility; it would square it.

So much by way of preamble. Now let us examine the matter in greater detail but on a scale that will allow us to survey our subject as a whole. First, let us define our ideal; second, pass rapidly over the present system and its organisation; third, put forward our suggestions for improvement; fourth, examine the advantages and disadvantages of our proposals; and lastly, define our conclusions.

IDEAL SYSTEM

Our ideal is our problem. How to increase the purchasing power of the rural population? In a perfect state how should we attack it? First, the writer suggests, by surveying farming as a whole and attempting to measure the economic significance of each factor that limits rural prosperity. Second, having ascertained the absolute and relative weight of each problem, to hand it over to the specialist investigator. Third, when the specialist supplies the answer from his laboratory, to find out how his solution will merge into the farming fabric to determine whether the cure is economically worse than the disease. Fourth, to hand the answer over to the farmer and see that he adopts it. This last step, as we all know, is the most difficult of all.

Thus, we want a coordinated, cooperative research machine that measures the problems, solves them and weaves the solution into farming practice. The motto of agricultural research should be: "Veni, Vidi, Vici"—I came, I saw, I conquered. I came on the land; I saw, the problems and the man who fought them; I conquered, not only the problems, but, by winning his confidence, the innate caution of the farmer himself.

CRITICISM OF THE PRESENT SYSTEM

Our main criticism of agricultural research is that its organisation has a vertical instead of a horizontal bias. Vertical organisation may be easy of administration but, as in industry, it is not synonymous with efficiency. Take practically any agricultural research institute. There will be an economic department carrying out, say, farm management surveys and one or two special investigations. There will be a number of field workers collecting information from and advising farmers on crops and stock. They will be badly handicapped, however, by lack of quantitative data with which to substantiate their arguments or to compare one farmer's methods with another. There will be a number of laboratory workers probing a host of problems of more or less practical significance.

Each department will have its own head and there will be a director or professor or president in charge of the whole. A typical vertical organisation. True, some of the workers will be working in consultation and may even cooperate for given pieces

of work, or may be in more or less close contact with other workers in similar fields elsewhere. But even among laboratory workers effective horizontal coordination is generally absent. How much more so does this apply to field workers and economists with no exact scientific standards? The survey method of measuring and sometimes solving farming problems is everywhere coming into more general use; the scientist is realising that the statistical analysis of farm data may not only confirm his small scale work, but will reveal fresh fields to conquer and new problems to solve. What is the result? Vertical organization rushes into the field. Workers hurry about the countryside on a variety of surveys, different workers often visiting the same farmers in the same week. Such a plethora of survey workers not only means a duplication of effort, a duplication of routes and high travelling expenses and operating costs, but in time upsets the farmer. The writer is acquainted with one large agricultural research centre serving an important English province where at one and the same time the following quantitative surveys were in operation: (1) costings of a limited number of farms, (2) a special economic sugar beet survey, (3) a cereal variety yield survey, (4) a soil survey, (5) a survey covering the causes of wastage in dairy herds, (6) a pig recording scheme, (7) a survey of stallion fertility and (8) a herd testing of cows. There were possibly others.

Owing to vertical organization, effective coordination is often absent among laboratory and experimental farm workers. This deficiency is aggravated among survey workers, who may see each other only at long intervals. How much more necessary, therefore, is horizontal survey organisation in order (a) to save operating costs per unit of information obtained, (b) to keep the farmer "sweet" and (c) to ensure that workers are brought frequently into contact. The immense potentialities of the survey method in every branch of agricultural science have been or are being recognized, but if we are to flood the countryside with survey workers, let us make sure that the man collecting data on the correlation between red and white stripes and prolificacy in pigs—in his haste to get on with the job—does not crash at a cross roads into an investigator in another field; let us say "the influence of the time wasted in garrulity on the cost of wheat production." Why should not one and the same man *collect* this information?

CLASSES OF SURVEYS

The writer assumes the concurrence of the reader and now passes to the consideration of the principal thesis of this paper, which is the use of the comprehensive farm survey—the setting up of an ubiquitous farm survey organisation for collecting, analysing and crystallising the information required by the farmer, the research worker, and the State. Before discussing this suggestion and its concomitants, let us delay for a moment to consider the classes of information required. We are to attempt to satisfy the requirements of the farmer, all types of research workers, and the State, and measure the efficiency of land utilization and rural problems on a large scale. The following general classes suggest themselves:

1. Cash efficiency.
2. Mechanical efficiency.
3. Natural efficiency.

Exact definitions of the class limits is of course impossible; there will be many inter-grade subjects, and the groups will merge the one into the other. Nevertheless this classification will, it is hoped, suffice to illustrate the arguments.

NATURAL EFFICIENCY

Natural efficiency is the province of the scientist—the man who works in grammes. The sun determines climate. And climate has not only made but has largely determined the varying natures and distribution of soils. In addition it is closely correlated with the natural vegetation, the type of farming, prosperity, and the history of humanity, and, in fact, with everything that we call Life. What use do we make of the sun, that is, of the climate? An academic concept perhaps, yet, after all, it is the basic measure and is therefore directly or indirectly the province of the scientist. The scientist is the man who seeks maximum not optimum production and efficiency, and his outlook, unconsciously perhaps, is coloured by the conception of increasing natural efficiency. He may only be determining the digestibility of a foodstuff by a particular strain of, say, poultry. But he finds that the food or the strain under examination is less or more efficient than others, and if his results were not to be applied by a material world, the

academic man would wish us to use the most theoretically efficient methods he could find. In other words he wants to obtain the maximum natural efficiency. If we are to help him in his work we must therefore make sure that fundamental data on these natural factors are available. It is not enough for us to say—the soil is loamy clay, the vegetation is temperate grassland, the annual rainfall is about 30 inches. He wants to know, for instance, the size of the clay particles, the species distribution of the grassland, the monthly distribution and annual variation of the rainfall, and a host of other facts. In our comprehensive surveys therefore we must expect to be asked to obtain for the scientist a certain amount of fundamental data to supplement that which is already avaliable. We may be asked to collect information of which we cannot see the immediate significance.

MECHANICAL EFFICIENCY

Mechanical efficiency is the province of the fieldman, the crop and animal husbandman—the man who works in pounds, gallons and bushels. Here we might also include applied biologists—the entomologists, plant pathologists and the veterinarians.

The fieldman occupies the centre span of the three-arched bridge of natural, mechanical and cash efficiency that leads to agricultural prosperity. He is interested in the efficiency of the machinery, the acre of land, the dairy cow and the labourer. He wants to increase the bushels per acre and the foot-pounds of work comfortably done by the man on the land. His ideal, shall we say, lies somewhere between the desires of the scientist for maximum natural efficiency and of the economist for optimum cash efficiency. If maximum efficiency is too abstract an ideal, and optimum efficiency too material, then the fieldman seeks something intermediate which we might call max-optimum efficiency. The scientist as conceived in this paper is not interested in the law of diminishing returns; the economist is governed by it, and if he does not maintain mental touch with the scientist is apt to become obsessed by it. The fieldman is aware of its existence, but in general he does not let it perturb him.

What will the fieldman demand from our comprehensive surveys? He is not, we think, generally satisfied with the data provided by farm management surveys. It is not enough to tell him

that the average yield per acre was 20 bushels, that the production per cow was 400 gallons, that the number of pigs sold per sow per annum was 12, or that 4 men were employed per 100 acres. He will want to know the variety, the manuring and the cultivation history of the crops; the feeding, the breed, the dates of calving and the wastage of the dairy herd; the management, the strain, the weight at slaughter of, and the incidence of disease amongst the pigs; the hours of work, the number of rest periods, the race of the employees and the workers' methods of using tools. So with the fieldman, as with the scientist, we must expect to be asked to collect a quota of information of which the economic significance may seem ill defined.

CASH EFFICIENCY

Cash efficiency is the province of the economist—the man who works in pounds sterling, dollars, horse days, and sheep units.

Let us for the purposes of this paper assume that the economist is interested only in subjects that have a direct financial bearing on agriculture. He wants to measure and increase the cash efficiency of the human capital and currency capital invested in the land. He desires to ascertain under which system and what conditions in any one area the optimum return per acre of land is obtained for each £100 or $500 of capital and for each individual human invested on the land. But like the fieldman and the scientist, superficial economic data will not satisfy him. The price and amount of raw materials consumed, and the total sales of each commodity is not enough. He must know the system and acreage of tenure, the head of stock carried, the price of labour, the methods and time of marketing, the cost of transport, and the nature of the legislation affecting agricultural production and a host of other details. Thus the economist, like the fieldman and the scientist, requires detailed information which to the latter might appear irrelevant.[1]

The reader will gather from the foregoing remarks that with an ideal comprehensive farm survey the amount of detail required to meet the requirements of the economist, the fieldman and the scientist in our efforts to measure and improve cash, mechanical and natural efficiency is nothing less than colossal. To cover even

[1] A fourth measure might be added, that of human efficiency—the province of the psychologist or the eugenist—the man who works with humanity.

a small sample of the land and the farming population on this basis, a very large expenditure, a complex and intricate organisation and a farmer with more than human patience must be postulated. In sketching out our ideal survey system therefore we must attempt to simplify and reduce our requirements considerably. It

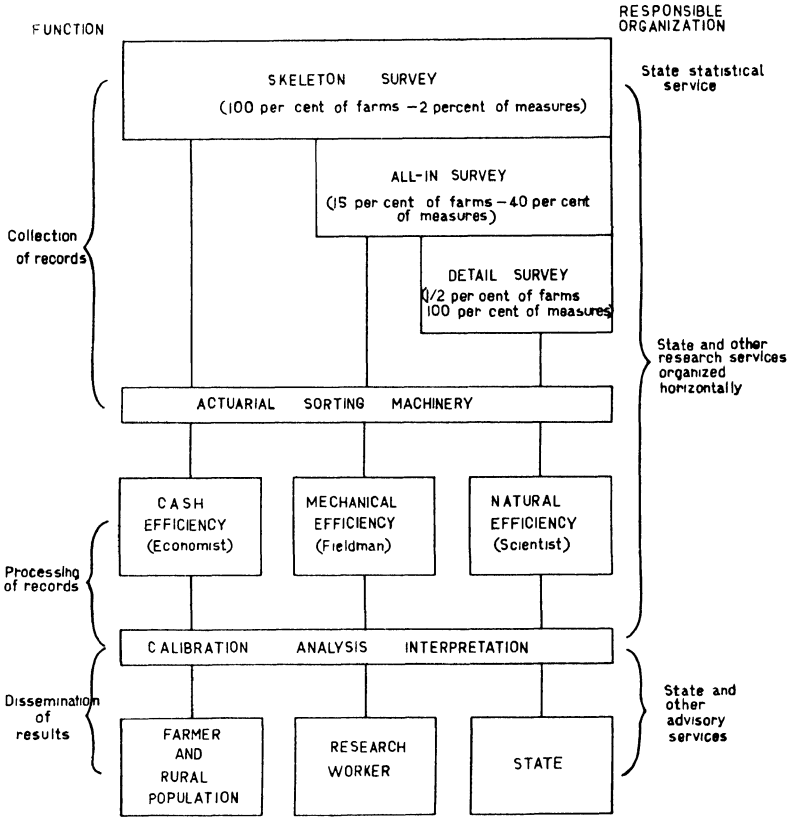

FIGURE 1. THE COMPREHENSIVE FARMING SURVEY

is hoped, however, that the proposals elaborated below will at least indicate possible methods of overcoming these difficulties.

OUTLINES OF A COMPREHENSIVE FARM SURVEY METHOD

In broad outline our proposal is this: to collect the maximum of data on the cash, mechanical and natural efficiency of the land and its workers with the minimum of expense and trouble. Or, to put it another way, to satisfy the economist, the fieldman, and the

scientist, without incurring the opposition of the State treasury and the farmer.

It is suggested that this could be done by having a graduated survey system, which would be detailed on a minority and broad on the majority of the farms surveyed. On say 1 per cent of the farms full details of every aspect of farming, theoretical and applied, would be secured. A skeleton survey would be applied to 100 per cent of the farms. Data collected on the detailed surveys would be used to interpret and calibrate the measures obtained by the general survey. The information yielded by the latter, would be used in the same way to interpret and calibrate the simpler measures collected by the skeleton survey. The complete system would include methods that look at farming through instruments varying from microscopes to inverted telescopes. Our comprehensive survey would range from the barest facts to the most detailed and accurate measurements. The larger the sample, the smaller the number of measurements; the smaller the sample the greater the intensity and detail of accurate observation. In short —we would have a graduated and calibrated comprehensive survey system

THE SKELETON SURVEY

In nearly all countries the obvious organisation to handle the skeleton survey already exists. That organisation is of course the government department or departments responsible for the collection of agricultural statistics. It is surprising how some agricultural statistics approximate to general or specialised economic surveys. The trouble in general is, we think, that the statistics as published deal too often in totals and means and do not give us sufficient statistical or geographical measures of dispersion. Let us for instance consider sheep and wool production in Australia, the greatest wool producer in the world. For the Commonwealth, and for each State, we have data of sheep population which, considered in relation to available information as to size of holdings and size of flocks, enable us to form a fairly adequate picture not only of the geographical distribution of the sheep but also of carrying capacity and methods of sheep raising. Yet the addition of one question to the statistical returns: "Did you supplement the natural grazing on your sheep station by any other kind of feed during any part of the last year for any of your sheep"? would be of im-

mense value in enabling us to obtain a better and more accurate picture of Australian conditions. In the same way, in Australia, data are available on the yield and production of wool and the number of ewes mated and lambs born each year. In one State (Queensland) this information on mechanical efficiency is supplemented by data on the causes of sheep mortality—drought, accident, lambing, disease and so forth. In fact in Australia as far as sheep are concerned, the addition of one or two simple questions to the agricultural return would provide all we required for our skeleton survey. Similar instances could be multiplied almost indefinitely.

It may be said that in many cases the requirements of our skeleton survey would be met by slight modifications and the greater availability of existing statistics. In those countries where the value and quantity of agricultural output is not obtained yearly, it might be necessary to take steps to get this. Probably rather less information than that required by the world agricultural census now in progress would be demanded, with the possible addition of some rough data regarding rent, capital invested and total wages paid, amount of machinery used and so forth.[2] The information thus supplied by the annual farming statistics supplemented by data from other government departments on say land-tenure, meteorology, the output of wheat, butter, wheat flour from factories and so forth, would constitute our skeleton survey. But to be effective it would necessitate the cooperation in most countries of several government departments and here as in the case of research work, horizontal organisation is required.

THE GENERAL SURVEY

The skeleton survey, we have suggested, should be operated by the relevant government department. The data for the general or all-in survey would either be collected by the agricultural economics divisions of universities and colleges as in the United Kingdom and the United States or by the government agricultural department as, for instance, in New Zealand, Kenya and elsewhere. We have tentatively postulated in our scheme that the all-in survey would be applied to 15 per cent of farms each year. This figure is probably much too high when probable cash resources

[2] The data would be gathered either by the filling in of a single form or by one visit from one official.

are considered—10 per cent would probably suffice. But here we come to a difficult point. Are we to take the same 15 per cent every year and thus obtain the great advantage of continuity of records, or are we to take a fresh sample every twelve months in order to cover wider ground? Could we not compromise? Let 3 per cent of the farms be permanently covered by the general survey, and take a fresh 12 per cent sample each year. In this way, if such an ideal were realised, all the farms would be covered in less than a decade, whilst the influence of price and other trends could be gauged on the 3 per cent sample.

What measurements are we to take, what questions are we to ask, on the general survey? How are we to arrive at that discreet balance that will satisfy the three parties to research without plaguing the farmer? For each farm we shall, of course, have our skeleton survey data. To these we may add the type of information already collected for farm management and other economic surveys, possibly simplified, and the minimum requirements of the fieldman and the scientist. In discussing the three classes of efficiency we indicated above the range of these desiderata. The crop husbandman will want to know cultivation and manuring history, and the variety of cereals; the animal husbandman, will want to know the breed of animals and the form of the lactation curve, the weight and age of the beef animals at disposal, and the total consumption of feedstuffs. The scientist will probably not be so easy to satisfy as the fieldman, so we must ask him to devote his attention more to the detailed survey farms.

It would be advisable if possible to extend our horizontal organisation under the general survey to include herd testing and milk recording and other similar methods of measuring mechanical efficiency. The farmer would be required to keep a number of simple records; the recorder or collector would call, say, at monthly intervals, and in addition to collecting records of sales and purchases, would note the production records of the dairy cows, pigs, and so forth.

A difficulty that must be faced here is that some farmers would want to participate only in one part of the general survey, say the herd-testing or the manurial history of the wheat crop. This would be the case particularly with the more progressive farmers who had previously made use of such instruments of progress or who wished

to continue these measurements after their survey year. In other words, based on the skeleton survey, arrangements would have to be made for a certain fluidity in the make up of the general survey. It would have to be constructed as a series of independent units which, in combination, would complete the picture.

THE DETAIL SURVEY

On a very small percentage of farms, say one in 200 to 400, we would carry out a detailed survey. The economist would obtain full costings data week by week for each field and group of animals, and almost as much other information as he wanted. The fieldman would be able to study the variations in yield occurring in each field, or accurate information on the feeding of the class or group of pigs or the number of pasture-days yielded by, and the carrying capacity of, each field. The scientist would be able to analyse the soil, to record the length of oestrus at different times of the year, to measure the length of the awn in certain "sports" occurring in the wheat fields, and generally to obtain commercial farming data under the most favourable circumstances.

Naturally, to collect from such farms the amount of information which we visualise would be a considerable labour and even if farmers could be found willing to submit their farms to such a joint miscroscopic examination, they would not be prepared to bear the cost of the additional clerical and recording work necessary for this detailed survey. On each such farm, or at least one in two, it would probably be found desirable to have a whole time man, a combination of clerk-recorder and observer. But as such a man could not be expected to have the necessary observational and measuring technique of the specialist, periodic visits by fieldmen and scientists would be made to collect the more accurate and difficult measurements.

This group of farms, which would of course also be recorded under the skeleton and general surveys, might well include the standard and demonstration farms of various agricultural colleges and departments such as, for instance, the Dominion Experimental Farms System in Canada or the Duthie Experimental Stock Farm at Aberdeen, Scotland.

This small, accurately recorded, group of farms would provide

records with which to standardise and calibrate the results of the general survey. The costings and the farm management survey methods, at present too often considered as opposing but in reality complementary, would be conjoined for the general good and, so conjoined, this would more than double their utility. In the same way, to draw an example from a method of measuring mechanical efficiency of which the writer has had experience, that is, pig recording, the pig testing station and the survey method of pig control could be brought together. Until about 1928, the well known pig testing station system of Denmark and the survey pig recording system of Sweden, East Prussia, and England were regarded as two different and opposing methods of measuring pig keeping efficiency. One measures intensively, the other extensively. They have been shown to be complementary. It should be the same, we suggest, with costings and survey methods. One is intensive, the other extensive but they are essentially complementary if methods of collecting and analysing data are coordinated.

INTERPRETATION AND ANALYSIS OF RESULTS

Let it be assumed for the moment that the samples of farms covered by the general and detail surveys are essentially and sufficiently representative.

We shall be faced with a considerable mass of paper. We must digest the data. But we shall have a large smooth organisation run on actuarial lines and with adequate automatic sorting machinery to deal with the pooled records. The primary sorting accomplished, the information will be fed into the channels which measure cash, mechanical, and natural efficiency respectively, for analysis and interpretation. The net results will be broadcast to agricultural research workers dealing with specific problems, as well as to the farmer and the State (see figure 1). Considered as a whole the results will enable us to see farming in a clearer and balanced light; considered in detail we shall be able as specialists to obtain the information we require.

ADVANTAGES OF THE COMPREHENSIVE SURVEY

For the purpose of exploring the advantages of our proposals we take this assumption as agreed, *viz,* that any progress which materially benefits the entrepreneur ultimately reacts favourably

on both labour and capital; that the increased income of the farmer ultimately raises also the purchasing power of the agricultural labourer and the rural landlord. We need therefore only consider the advantages of the comprehensive survey as they affect the farmer, the research worker and the State.

TO THE FARMER

What would this scheme offer the farmer? First, herd testing, pig recording and other services which he now enjoys. Second, an economic service that measured the efficiency of his use of capital invested in labour, raw materials, land and dead stock; third, it would be of little use, if it were not supported by an adequate advisory service.

The two last points depend on the efficiency of the advisory service. If simplicity is to be the key note in collecting the data—the minimum of clerical work must devolve on the farmer—personal contact should be the rule to guide those charged with interpretation. Personal visits may be expensive but they are undoubtedly a more effective educational agent than correspondence, bulletins or the press—if the visit is made by the right man.

But who is this advisor to be? Ought he to be the man who collects the records? Should he be the county agricultural agent or organiser or his counterpart, or should he be the expert? If the man who collected the records were to be the advisor, it would add to the general expenses considerably; in any case it may be doubted whether such a procedure would be advisable. The results for each individual farm might be sent to the county organiser with notes on the salient points of the results, to assist in his explanations to the farmer. An increase in the number and the functions of the county organisers might be the cheapest way of getting the results and the changes they suggest, across to the farmer, but in the writer's opinion the specialist is the man. In his experience the expert is the man best qualified to help and the man to whom the farmer will effectively listen.

We may, however, suggest a compromise. The county or local agricultural agent would call on the farmer, and, on the basis of the latter's results, would discuss with him the whole position. From the quantitative pool of farming experience which the survey would yield, the local advisor could point out where the farmer

failed and why, how he could economically improve his methods of production and marketing, and how he could increase his income. There will probably be some project on which the farmer is failing badly or where he uses unsuitable methods. In such cases the expert would be called in either by the local agricultural agent or by the farmer or on the instructions of the district survey organisation. To a dairy husbandman, to the marketing specialist, to the agronomist or the plant pathologist, the farmer will listen, and subsequently act on advice given, if the expert in question can talk in terms of cash, particularly when his arguments are based on the farmer's results. Such expert advisors, it will be noted, may be either economists, fieldmen or scientists.

TO THE RESEARCH WORKER

How would the scheme benefit the research worker? First, it will show him the problems of most economic significance. Second, the data on natural efficiency will help to obtain large scale confirmation or contradiction of his small scale laboratory results. Third, and pre-eminently important, it would bring him into real contact with the farmer, and enable him to understand the latter's outlook. At the same time, it would be a powerful instrument of educational progress. Fourth, analysis of the data would throw light on and solve certain problems.

Let us consider the first of these postulated advantages. It will be generally admitted that, nowadays, even taking due cognisance of the immense importance of fundamental scientific research, the agricultural scientist may spend years investigating a problem of negligible economic significance and of doubtful value even as a contribution to the sum total of knowledge or for the side-lights it casts on other aspects of science. At the same time, because there is in existence no effective machinery for measuring the weight of the farmers' several problems, money may be spent on a difficulty which can have no effect on the ultimate rural prosperity even of a small group of people. But neither the scientist nor the farmer can collectively be blamed if we have no adequate method of ascertaining the relative importance of a problem. The comprehensive survey should go a long way to overcome this difficulty.

To illustrate the second point—the large scale confirmation or contradiction of laboratory or small scale results—the writer may

perhaps be permitted once more to draw on his own experience. Experimental work by a colleague had shown the effect of protein deficient diets in pigs on the onset of oestrus after weaning. Field records of the writer confirmed this work. The same could be said of other work on the effect of feeding on conformation, and no doubt the instances could be multiplied almost indefinitely from other branches of agricultural science. Thus, work at Cambridge on the value of young grass is confirmed by the methods of husbandry adopted in Friesland, Holland.

The third point, contact of research with the farmer, needs no elaboration. At present the isolation of these two parties is one of the tragedies of agricultural research. Between the farmer and the scientist, as between nation and nation, isolation breeds mutual dislike and distrust.

One instance will suffice to illustrate the fourth point—the statistical solution of scientific problems. The work of Gowen, Sanders and others on milk yields has cleared up many points regarding the physiology of reproduction and milk production in the dairy cow. One could point to many similar cases taken from the field of animal husbandry (Examples: Jesse-Sanders on variety of feeds and milk yields, Larsson, Duckham, and others on sex-ratios and differential sex mortality in pigs.)

TO THE STATE

How would the comprehensive survey profit the State? First, it would be a barometer of the financial state of agriculture. Second, it would enable the governments to frame sound policies. Third, it would show them where restrictive or other legislation was necessary, or could be removed. Fourth, the balanced application of the information yielded by the above three points should increase rural purchasing power and thus benefit the secondary producer. Fifth, by eliminating useless competition, by cutting out over-lapping, and by horizontal organisation, it would, in fact, lead to the rationalisation of agricultural research and advisory services. If the scheme as a whole did not reduce the cost of these services, it would at least ensure that the State's financial contribution was better spent.

There are few countries in the world where the agricultural statistical and economic services are sufficiently coordinated or

elaborate to give the executive governmental machine an adequate picture either of the state of agriculture, or of its many and various problems. In the absence of quantitative data, the State is forced to listen to qualitative opinions which it is not in a position either to confirm or dispute. Groups that squeal loudest and most persistently are heard best and appear to succeed, because no one has the facts and figures with which to check their statements or accurately examine the real purport of the proposals they put forward. Some agricultural policies, especially in States where the bulk of the agricultural output is consumed internally, are under these circumstances difficult to formulate. Legislation tends to become haphazard and designed only to meet immediate needs. Irksome restrictions are directly or indirectly placed on some forms of production, while in other cases disease or malpractices may be allowed to run free simply because no yardsticks exist.

It is probable that on the fifth of the above points—the better expenditure of the State's contribution to agricultural services—the method could justify itself on its merits. There is no need to elaborate the existence of over-lapping, competition, and lack of coordination—in one way or another it is only too apparent in most countries. Lastly, the survey results would show the State where financial and other assistance was most needed and why.

DISADVANTAGES AND DIFFICULTIES

The disadvantages, and more particularly the difficulties presented by the scheme proposed are, of course, enormous. Further, if such a scheme were ever put into operation, even the greatest prescience could not prevent a crop of unforseen difficulties. The scheme may be characterised as too bold, too fanciful or too ideal in conception; but such criticism is in itself not an argument against its adoption. Let us examine a few of the principal difficulties and probable criticisms. The writer admits that his list is by no means exhaustive and that he has probably overlooked several other difficulties.

USE OF EXISTING SERVICES

A criticism that at first sight would seem justifiable is that such comprehensive surveys would necessitate the formation of new organisations and machinery, but on closer examination it will be

observed that the proposals are largely based on the use of existing machinery—the State statistical services, the research and advisory services provided by State, university, college and other educational and research centres, and the county or local agent or organiser. The only new machinery essential to the scheme would be a coordinating body to effect this horizontal rationalisation.

EXCESSIVE CENTRALISATION

This is a possible danger, which could, however, largely be avoided by the use of existing local or provincial machinery which in most countries is semi-automatic. Centralised machinery might be used for sorting but for interpretation and analysis the records would be returned to the local research and advisory organisations.

EXCESSIVE RIGIDITY

This is another possible danger to which consideration must be given. It has already been suggested that in building up the all-in survey which is to be applied to 15 per cent of the farms, the principle of independent units should be used. The all-in survey might be compared to a chess board design completely or partially covered by removable pawns. It would not be necessary to use all the pawns at any one time to obtain valuable information, and an unsuitable or badly fitting pawn could be removed altogether, or replaced by one of more suitable design. Such an organisation would retain considerable flexibility of operation and could largely obviate the difficulty of rigidity. Imagine each local survey service as such a chess board. In every area certain squares would be covered by certain ordinary types of pawns. Part or all of the remaining squares could be covered with types designed to meet local conditions. Further, if such an organisation could be adopted, it could not be pleaded that the plan did not allow of progressive experimentation.

It is obvious, however, that a considerable amount of forethought and close thinking based on experience would have to be done if the survey is to be effectively designed on such chess board lines, and if drastic changes are to be avoided. Frivolous or constant changes of the pawn type would not only render nugatory the continuity of results and thus handicap the possibilities of studying trends, but would also disgruntle the farmer. The same principles,

which admittedly would be difficult to apply, could be used in designing detail surveys.

But, whereas with the all-in and detail surveys preliminary runs on sample areas could be made to test the efficiency of the chess board design, with the skeleton survey, involving as it might, changes in the method of collecting agricultural statistics, such a procedure would not be possible. Very great care would be necessary in drawing up the proposed statistical changes. The difficulties caused by variations in the classification of agricultural statistics of various countries are only too well known.

SAMPLING

The difficulties of obtaining adequate and representative samples would be great. It could hardly be expected to find that the farms covered by the detailed survey were representative—only the more advanced type of farmer would be likely to consent to the additional labour and inconvenience they would inevitably create. As regards the general survey farms, we should experience, no doubt, the same trouble—only the more progressive type of farmer would be prepared to cooperate and to understand that the primary objective of the survey was to increase and not to decrease his income. The problem, however, would be less acute than with the detailed costings farms and the samples available whether obtained by random or selective methods would probably be found to be nearer the mean of all farms when compared with the figures of the skeleton survey.

COOPERATION

The difficulties of obtaining farmers' participation would not, however, be the only problem to be surmounted. Effective coordination would necessarily mean that a certain proportion of research centres, farmers, herd testing associations, and individuals, would have to sink their identity for the common weal. Great diplomacy and convincing arguments would be required to overcome the love of autonomy, and the petty jealousies involved in human relationships.

COST

This matter would perhaps prove the greatest stumbling block of all. Estimates are of course dangerous things, and essentially

unscientific but it is felt that at least an estimate, however wild or rough, must be made to illustrate at least the possible order of expenditure. Costs would obviously vary considerably not only between areas of intensive and extensive farming and between districts of small and large holdings but also with the amount of information and the number of measurements recorded. To some extent the large number of holdings in intensive areas would offset the greater distances to be travelled in areas of extensive farming and large holdings, but this would of course largely depend on the geographical concentration of the sample.

As a concrete instance let us imagine that the scheme is in operation in an area of fairly intensive farming where the holdings average from 100 to 150 acres, the wheat yield from 20 to 25 bushels per acre, and the milk yields from 300 to 350 gallons per cow. First, there will be the cost of the skeleton survey—the State statistical service. This may be put arbitrarily at 15 shillings per holding or £75 per 100 farms. Second, assuming that the full sample of 15 per cent of all farms is being recorded, there is the cost of the all-in survey. Allowing £350 to £400 a year to keep a recorder in the field and for his share of the central sorting and analytic and advisory expenses, and assuming a working year of 300 days and a visiting rate of one farm per day once a month throughout the year, the cost per all-in survey farm would be £15 per annum. Third, assume that the cost of maintaining a full time recorder and his share of the overhead would be £400 per annum for each detailed costing survey farm, the rate per 100 farms covered under the whole comprehensive survey will be as follows:

Skeleton survey	100 farms at 15 shillings	£ 75
All-in survey	15 farms at £15	£225
Detailed costings survey	½ farm at £400	£200
Total		£500
Cost per farm		£ 5

For English conditions these estimates would probably be on the high side, but it is obvious that if the whole comprehensive scheme were applied, say to 100,000 holdings the gross cost would be considerable—roughly £500,000. Against this gross cost however must be set the money that is already being spent by the State on statis-

tical, economic, herd-testing and other services. Further, certain services such as herd-testing, whilst not self-supporting are at least to some extent revenue producing. To what extent these considerations would reduce the cost per holding it is difficult to say. In any case it must be emphasised once more that this estimate is only put forward to indicate the *order* of expenditure. More accurate estimates could be made by those better qualified and more experienced in these matters than the writer. But if £5 per farm can directly increase the farm income by £10, disregarding the other indirect advantages to the research worker and the State, such a scheme, it is submitted, would be justified.

SUMMARY

The object of agricultural research is to increase the purchasing power of the farming population. This should be achieved by measuring the problems which limit rural prosperity, solving them and blending the solution into farming practice. The motto of agricultural research should be "Veni, Vidi, Vici," I came on the land; I saw, the problems and the man who fought them; I conquered, not only his problems, but, by winning his confidence, the innate caution of the farmer himself. Under present conditions this ideal is far from being realised, largely, the writer thinks (a) because the organisation of agricultural research is too vertical and lacks horizontal coordination—in fact, it needs rationalising and (b) because sufficient quantitative data about farming problems and conditions is not available. It is suggested that comprehensive surveys, involving the setting up of an ubiquitous farm survey organisation for collecting, analysing, and interpreting the information required by the farmer, the research worker and the State, would largely overcome these difficulties. Under this rationalised scheme, information as to financial, mechanical and natural efficiency to satisfy the requirements of the economist, the fieldman, and the scientist respectively, would be collected and utilised on the following lines: A skeleton survey operated by the state statistical and census services would supplement the present agricultural statistics by a few additional questions and measures on *all farms*. A general survey on the lines of the present day farm management surveys, but obtaining some additional information for the fieldman and the scientist, would be operated on from

10 to 20 per cent of the farms. A detailed survey would be applied to one-half of one per cent of the farms and would obtain full costings data and other detailed information for the benefit of the economist, the fieldman, and the scientist. The general and detailed surveys would be operated by the State and for other existing research services. The results of all three types of survey would be pooled and the records of the detailed survey would be used to interpret and calibrate those of the general survey whilst the records of the latter would, in their turn, be utilized for the interpretation and calibration of the skeleton survey. The comprehensive farm survey would absorb existing farm management surveys, costings schemes, demonstration farms, milk recording, and herd testing services, and weld them into a coordinated and complementary whole, capable of measuring profits, problems, and progress. Such a scheme would more than double the value of existing services to the farmer, the research worker and the State. Backed by a suitable advisory and interpretative service it would show the farmer from his own records where and how he could improve his methods and enhance his profits. It would show the research worker the problems that most deserve his attention, provide data to confirm his laboratory work, bring him into contact with the farmer, and statistical analysis of the records would throw light on many scientific problems. It would offer the State better value for the money it spends on agricultural research and advisory services, it would help to frame sound policies, it would show where legislation or financial assistance was necessary, and it would provide a financial barometer of the state of agriculture. Aided by a coordinating body, existing services would be utilised for the comprehensive survey. By constructing the survey as far as possible as a series of independent units which, in combination, would provide a complete picture, flexibility of design and operation would be obtained thus allowing local conditions to be met and at the same time permitting progressive experimentation and limited individualism. Considerable care and forethought would be necessary in designing such comprehensive surveys but the difficulties of obtaining representative samples and the problem of cost would appear to be amongst the chief limiting factors to the adoption of this method but there is no outstanding reason why they should not be overcome.

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THEORY OF PROBABILITY AND ECONOMIC RESEARCH*

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ACCORDING to a report in the June number of the Journal of the American Statistical Association, Professor Warren M. Persons made the following statement at a dinner meeting of the American Statistical Association, held at the Aldine Club, New York City, February 13, 1930:

"Statisticians may be divided into two broad classes. The first class, consisting of men like Oscar Anderson and Arne Fisher, are fundamentalists. The fundamentalists believe in a trinity: mathematics, probability, correlation. They are more interested in nice mathematical processes than in an examination of premises. They believe in absolutes. Their point of view is mechanistic. The second class, consisting of such men as Bowley, Keynes, Allyn Young, and E. B. Wilson, are skeptics. The skeptics include among their number many of the greatest mathematical statisticians. They conceive mathematical statistics to be similar to mathematical physics in which, to obtain realistic results, premises must be subjected to the closest scrutiny. They value mathematics as an instrument, but they are not hypnotized by mathematical symbols and they do not stand in awe of the tool they use. They do not believe in iron clad laws or mechanistic interpretations in economics. They suspect, for instance, the validity of correlation coefficients derived from economic data by involved processes."[1]

I must confess I am not a little surprised to find myself placed by Professor Persons in the same row with the "fundamentalists" —if they really exist. I have examined the premises of the statistical methods used by Professor Persons, and have called attention in my writings to what I believe to be weaknesses in certain of these premises. Furthermore, it is possible that Dr. Persons himself might be accused of being a fundamentalist with his trinity: the method of least squares, link relatives, and the elimination of the trend.

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* This paper was translated from the original German manuscript by Oswalt Vopelius, and O. B. Noltenius of Cornell University. The translation was subsequently checked by Professor Anderson, and returned with the request that someone read the paper and make such further corrections as appeared to be necessary. This was done by S J. Pretorius and F. F. Hill of Cornell University . Unfortunately, time did not permit of sending the corrected manuscript to Professor Anderson for a second reading. It is sincerely hoped that no serious errors have been introduced.

[1] Journal of the American Statistical Association, Vol. XXV, New Series, No. 170, June, 1930, page 208.

However that may be, Professor Persons' remarks as reported in the Journal of the American Statistical Association, lead me to explain in greater detail the viewpoint of the so-called "Stochastic School" with reference to the question of the relation of the theory of probability to economic research. As this question is also of importance in the field of theoretical research in agricultural economics, I think it is entitled to some of the time of this Conference.

As is generally recognized, economics is the only science in which there is open conflict between the adherents of the mathematical and of the non-mathematical points of view, and in which those who are not blessed with mathematical ability, or at least those who have not had the opportunity to learn mathematics, put their ignorance on a pedestal and publicly boast of it. Instead of choosing a field of study in which a knowledge of mathematics is unnecessary, they deny the application of mathematical methods in the field of economic research, even though admitting they know nothing of such methods, and declare all writings on economic subjects which contain mathematical symbols to be not worth reading. While the above statements do not apply to all European countries (Germany in particular must be excepted), they certainly apply in a large measure to America.

There should be no more conflict between mathematical and non-mathematical groups in the field of economic research than there is conflict between "microscopists" and "non-microscopists" in the field of natural science. Mathematics is only an instrument of research, a method of thinking, which is applied when other logical processes of thinking fail. If a "skeptic" is defined as a person who uses mathematics as a tool in economic research, then I am willing to be called a skeptic.

I should like to emphasize that in at least one respect I am more of a skeptic than Dr. Persons himself, for I do not believe that mathematical statistics, with its descriptive and analytical methods, can ever be substituted for economic theory. For example, the refined methods of mathematical statistics such as the decomposition of series into separate components, the calculation of coefficients of correlation, and even the computation of means and standard deviations, rely upon premises and hypotheses which still remain to be proved. I believe that in every instance it is essential to determine whether or not such statistical methods are

applicable to economic phenomena. If such methods are employed without first determining whether or not they are strictly applicable to the particular problem under consideration it frequently happens that daring, if not even false assumptions are smuggled in, although the investigator may pretend to be truly statistically descriptive. You may for example eliminate the trend. But what is the trend? The answer is that it is something I have determined upon; some X in a time series which, diagrammatically, we express as a straight line or a parabola of a lower order. Please excuse my saying so, but this is a geometrical definition, rather than an economic one. Furthermore, a question may be raised as to whether excluding this X does not introduce certain audacious assumptions as to the behavior of various economic phenomena.

The relation of statistics to theoretical economics is, I believe, analogous to the relation of experimental physics to theoretical physics. The physicist builds up his hypothesis, either (1) on the basis of deductions, dependent upon his knowledge of the properties of the object under consideration, (2) on the basis of inductive reasoning as in the case of Newton's Law, and Ohm's Law, or (3) on the basis of systematic experiments in a determined direction. In every case, however, the hypothesis is carefully tested to determine if it is in agreement with all of the known facts.

In the field of social science, it is very seldom possible to experiment; in fact scientifically exact experiments are really out of the question. We content ourselves, therefore, with such substitutes as the statistical method provides: we determine ratios and averages, construct correlation tables, resolve series into their component parts, calculate coefficients of correlation, coefficients of variation, standard deviations, and so forth. However, as previously stated, the use of such methods does not of itself provide a substitute for theoretical economics. Statistical methods should only be used for verifying or checking theoretical conclusions. If, therefore, Dr. Persons does away with the distinction between theoretical economics and statistics, and believes that "the various theories of business fluctuation are of little use in the practical problem of business forcasting," I must say that I cannot agree with him.

I do not wish to imply, of course, that I regard all theories as providing equally fertile hypotheses. In this connection Altschul

aptly points out that "In such an opinion (namely, that all economic theories do provide equally fertile hypotheses) one can, and not unjustly, find confirmation of the view frequently held in Germany that the empirical statistical school of American economists would mean, fundamentally, a revival of the school of Schmoller, with the only difference that statistical analysis in the guise of mathematics would have taken the place of historical description."[2]

The irony of Professor Persons is probably directed toward those mathematical statisticians who wish to apply the theory of probability in economic research, or, to be more exact, who wish to verify economic theory by means of the theory of probability. There is no doubt that at the present time there is a sharp difference of opinion between the school of thought which Dr. Person represents, and the "stochastic" school of thought. The latter group, as for example the followers of the late Professor Tschuprow of Russia, is now beginning to center around the Frankfurter Society for Konjunktur Research. The differences of opinion between the two schools is, to a certain extent, based upon misunderstanding. I intend to point out in this paper that the use of the theory of probability in economic research cannot be regarded merely as a "caprice" of those who "stand in awe of mathematical symbols," but that its use is a matter of logical necessity. In the following discussion I shall have to present certain of the material from my recently published book "Die Korrelationsrechnung in der Konjunkturforschung."[3]

The statistical data which we are forced to use in practice are seldom absolutely accurate. Such data, for the most part, contain errors of varying degrees of magnitude. The true figure in which we are interested, as for example, the population of Bulgaria at 12:00 P.M., December 31, 1926 (which in this case we shall designate as A) is seldom available. Instead, the Census reports a somewhat different figure which we shall designate as A'. If we assume the difference between A' and A, $(A' - A)$, to be represented by e, then e is the error of our determination, and we

[2] Altschul, E., Die Mathematik in der Wirtschaftsdynamik, grundsätzliche Bemerkungen; Archiv fur Sozialwissenschaft und Sozialpolitik, Band 63, Heft 3, 1930, page 524.

[3] Oskar Anderson, "Die Korrelationsrechnung in der Konjunkturforschung. Ein Beitrag zur Analyse von Zeitreihen." Bonn, 1929. (Veröffentlichungen der Frankfurter Gesellschaft fur Konjunkturforschung, herausgegeben von Dr. E Altschul, Heft 4)

may write, $A' = A + e$. These "errors of observation" occur in all sciences in which observations are made. In order to cope with the problems arising out of errors of observation, a special science known as the Theory of Errors has been built up. As is well known, it is based upon the theory of probability.

The theory of errors, at least up to the present time, has been developed primarily to meet the needs of astronomers and physicists. The physicists are usually in the fortunate position of being able to set up their experiments in such a way that the errors represented by e are relatively small as compared with A, and can therefore be eliminated by the use of relatively simple means. Such small errors rarely occur, unfortunately, in the "observations" of social phenomena. If the statistics or "observations" are well organized and *complete,* as is more or less the case with population statistics and statistics of births and deaths, the errors are, of course, much smaller. Statistics of business and trade are much less accurate than population statistics, and it may be said that the majority of economic statistics (including those relating to agriculture) contain many sources of error. Unfortunately, this fact is absolutely ignored by most theoretical economists. The sources of error, for the most part, differ from those in the fields of physics or even biology, and the entire subject is much more complicated. The methods of the theory of errors, which, as stated above, are based upon the theory of probability, must be adjusted, modified, and added to, before they can be used. In most cases the single "elementary errors" which combine to make up the "total error" occur less frequently here than in the field of natural science, but their magnitude is greater, and their "laws of distribution" are frequently such that they admit only of the application of Tchebycheff's inequality. The development of a satisfactory application of the theory of probability to the problems of economic research, is one of the first problems which mathematical statisticians have to solve.

Let us assume that during k moments of time the prices of a certain good were registered in the market as follows:

$$A'_1,\ A'_2,\ A'_3\ \ldots\ldots\ldots A'_k$$

As previously pointed out, these prices can also be represented as follows:

$$A_1 + e_1,\ A_2 + e_2,\ A_3 + e_3, \ldots\ldots\ldots\ldots A_k + e_k.$$

If $A_1, A_2, A_3, \ldots\ldots A_k$ are equal to one and the same quantity A, the arithmetic mean results from the k actually observed quantities, $A'_1, A'_2, A'_3, \ldots\ldots A'_k$ as

$$A + \frac{e_1+e_2+e_3+ \ \ldots \ \ldots \ \ldots e_k}{k}$$

This value, which, under certain circumstances, results in a considerable error in the determination of A, cannot be used unconditionally until certain hypotheses relative to the size and distribution of the errors $e_1, e_2, e_3, \ldots\ldots e_k$ are introduced—hypotheses which must be based upon the theory of probability. In the classical theory of errors it is usually assumed that the errors are independent of one another and that they are as likely to be positive as negative. If this assumption is correct the expression

$$\frac{e_1+e_2+e_3+ \qquad e_k}{k}$$

becomes small as compared with A, and the arithmetic mean of the k "observations" closely approaches the true value, A. But the foregoing assumption relative to the behavior of single errors of "observation" is only a hypothesis, and it cannot be assumed to be unquestionable in the field of economic phenomena, as some people apparently believe. There are not a few cases when positive and negative errors fail to balance, and when, as a matter of fact, the errors are actually correlated. Furthermore each $A_1, A_2, A_3, \ldots\ldots A_k$, cannot be considered to be equal. This leads to the difficult problems of the so called "smoothing" theory. If other hypotheses are not introduced relating to the expected character of the errors of observation, hypotheses which have to be subjected to the closest scrutiny with respect to whether they are justifiable or not, the limits of error of the computed averages will be considerably greater. The more such averages are combined and recombined in making a further analysis, the greater are the errors carried along through the computation, and the more distorted are the results. Such errors can easily occur in making determinations of demand curves.

It is characteristic of the mathematicians of the Lausanne school of political economy, probably blinded by their differential equa-

tions, that they usually do not apply the theory of probability when they want to find certain approximations to their theorems. The justification for such approximations is based on the actual material; however, the material may include large errors.

The theory of probability might also be applied with advantage in the field of economic research to the problem of sampling. There was a time when Georg v. Mayr, for instance, defined statistics as "complete" mass observation. However, developments during the past four decades have demanded so much from the science of statistics, and the whole field has become enlarged and complicated to such a degree, that one is obliged, at least in so far as economic statistics are concerned, to depend upon those incomplete "substitutes" for the statistical observations which a Laplace once imagined, and which have been used, in part at least, by the political "arithmeticians."

One of the most important of these "substitutes" is the process of sampling. As is well known, sampling may be done in either one of two ways; (1) in the conscious choice of a certain number of typical representatives from a statistical universe which is to be described or (2) in the "random" choice of such representatives. The method of random sampling is entirely dependent upon the applications of the theory of probability, and the great advantage of this method lies in the fact that one can compute in advance the unit within which the errors of observation lie. It may also be said that Bowley and Jensen have introduced the theory of probability in the process of sampling by the first method mentioned above.

In support of the practice of using the sampling process in making statistical analyses, it may be argued that:

1. In certain instances it is, in the very nature of the case, impossible to obtain data covering all of a large number of cases It is impossible for all practical purposes, for example, to secure a complete census of *all* family budgets.

2. There are many cases where absolute accuracy is not essential, and where all that is necessary is to make certain that the errors of observation do not exceed a certain limit. A chemist's balance is certainly much more accurate than a common scale, but a load of hay purchased on the market, is never weighed on the former.

3. It is very seldom that the results of even so-called complete

statistical observations are exact. They contain, as has been previously pointed out, errors which may run as high as 20 per cent. A census of real estate in countries which do not have a regular land register, as for instance in Bulgaria and Russia, is a case in point.

4. Even if a census is absolutely accurate as of the day it was taken, it cannot be considered as entirely correct on the day of its publication, since changes are certain to have occurred in the meantime. In order to estimate the amount of such changes we have to use the rather unsatisfactory method of *extrapolation.*

It is probably safe to say that, at the present time, the major part of the material used in economic statistics (including agricultural statistics) is incomplete, and at its best made up of "representative" observations. Crop statistics and crop forecasts in which the actual or even estimated yields on *all* farms are never obtained are cases in point. Index numbers of prices are never based on all prices of all goods in all localities.[4] Investigations of farm incomes, economic enquêtes, and unemployment statistics are likewise never based upon complete data. It is probable that in the future the proportion of all investigations in the field of economics, which will be based upon more or less complete data, will be even smaller than it is today.

Results based upon samples can but be considered as approximations to the characteristics of the complete body of data, the actual characteristics of which remain unknown to us. The foregoing statement is especially true of price indices if they have any economic significance at all. In general the problem is more or less as follows: A certain economic field is given in which during a certain period in the past which we shall designate as T, N different items of goods were sold at different prices. We are interested in a certain function F of these prices and amounts of goods which we shall call the true index number. From all of the N items of goods we select a certain number n and taking these, together with their prices (which prices have really been

[4] I cannot understand how the theory of index numbers could exist without the theory of sampling. However there are theorists enough who believe there is no use for it. One of the new editions of the "Zeitschrift fur Nationalokonomie", Vienna, will contain an article which I have written on the question, "Is it possible to prove the quantity theory by the use of statistical methods?" In this same article I also point out the sampling character of the wholesale index in the well known equation of Irving Fisher.

paid during the period T for the items chosen), we construct a function f and consider it as an empirical approach to the function F, which, as previously stated, remains unknown to us. It is quite evident that in this way our problem can be reduced so that the conditions are quite similar to those involved in the classic experiment of sampling ballots from boxes. It makes no great difference whether or not we select our group of items at random. It must be recognized that in general in applying the method of random sampling, one can simply resort to the corresponding box schemata of the theory of probability. In brief, if we are dealing with results based upon data selected by a process of sampling, we must always take into consideration the limits of the errors of sampling, and in doing this we are in the field of the theory of probability. Failing to recognize this, we are, consciously or unconsciously, playing hide and seek with the theory of probability, which, of course, does not do much toward advancing our science.

Use is made or should be made of the theory of probability in making forecasts, such as crop forecasts, price forecasts and so forth. It is my opinion that such forecasts should be expressed as follows: Forecasted price, for example, $1.00 per bushel; possible margin of error $\pm$ 60 cents (sometimes more, sometimes less). The margin of error depends of course on the accuracy of the determination and on the number of elements taken into account in making the forecast. It is recognized more and more that the theory of probability must be applied in making such forecasts. It is a real pleasure, in this respect, to turn over the leaves of the more recent issues of the Journal of the American Statistical Association, and to note the shaded areas which represent the probable limits of error of the extrapolated curve.[5] I believe that if similar methods were used in forecasting business cycles, many disappointments would be avoided.

Many more cases could be cited where the application of the theory of probability would seem to be necessary, but the examples already given make clear that in most economic research where statistical data are being used to verify a theoretical hypothesis, the theory of probability should be applied. Most statistical data

[5] See for example, "The Standard Error of Forecast from a Curve," Henry Schultz, Journal of the American Statistical Association, Vol. XXV, New Series, 170, June, 1930, page 139.

contain errors and can be considered only as empirical approaches or approximations to the true figures in which we are interested, which figures are not available. The true figures in which we are interested may, from the standpoint of the theory of probability, be called *a priori* values.

However, it would be a great mistake, unfortunately often committed, simply to transfer to the field of economic research the methods of applying the theory of probability which have been worked out in other fields; especially in the field of biometrical mathematical statistics. In time series, where successive observations may be closely related, the situation is entirely different from that usually found in the field of biometry. The situation can be successfully dealt with only if the assumptions upon which biometrical methods are based are carefully examined and only if, in certain instances, those methods are adjusted to meet the new situation, or new methods developed to meet it.

The stochastic school believes that it would be of considerable advantage to start from a system of conceptions of theoretical probability most of which has been developed by a few prominent Russian mathematicians and statisticians. Under this system the "algorithm" of the "method of mathematical expectations" can be usefully applied.[6] Here we have the conception of the *random variable.* Everything statistically comprehensible—amount, total value, average, ratio and so forth—is expressed in terms of values which change, or at least can change, with time. For example, the population of a country increases, the death rate decreases, prices rise and fall and so forth. The statistical figure related to a certain object represents, if considered in time, a variable figure or briefly a *variable* as we usually call such figures in mathematics. As has been pointed out several times, such statistical figures are seldom perfectly exact. They are, for the most part, influenced by major or minor errors. To cite

[6] The Russian School has always been very exact in their definitions and in establishing premises which are required for making theoretical deductions. In my own work, I have tried, as far as possible, to continue this practice, although it has, upon occasions, left me open to attack by my critics (Lorenz, Tinbergen and others). It is much easier to attack hypotheses and premises which are openly presented than to point out errors in the premises and hypotheses of applied methods which have not been carefully and systematically put forward. One sees the thorn in the eye of one's neighbor but overlooks the wood in one's own eye. Nevertheless I do not envy the laurels which can be won—for a short time, at least—by working out new statistical methods, the theoretical bases of which have not been carefully examined.

an example already used, the population of Bulgaria as of January 1, 1927, as reported by the Census, was 5,483,125. It can certainly be assumed that the actual population within the boundaries of Bulgaria at 12:00 P.M., December 31, 1926, was somewhat different from the figure reported. Just what the difference between the *true* figure and the figure reported amounted to we do not know. We can only guess at the difference, which means that we must establish a hypothesis. We can, for example, assume that a negative error was more probable than a positive error, that is to say, that the population of Bulgaria was somewhat greater than 5,483,125 at 12:00 P.M., December 31, 1926. We may assume further that the error was not large or that a large error was less probable than a small one, and so on. In other words, it would be possible to write down a series of figures, one of which would certainly be the correct population figure at 12:00 P.M., December 31, 1926. This figure might be 5,483,125, 5,483,126, 5,483,127, *et cetera.* We could assign to each of these figures a certain mathematical probability that it represents the true population figure as of the above date, as for example 1/100, 1/150, . . . 1/1,000, and so forth. If we were to write down all the population figures that are possible according to the given conditions, together with the probabilities assigned them, then, if we had estimated correctly, the sum of the probabilities would be equal to unity, since one and only one of the estimates of the population is certain to be correct. By this process, however, we have assigned to the population figure the property not only of a variable but of a random variable for "a quantity which have K different values with definite probabilities is called a random *variable of the order* K" (Tschuprow). All of the possible values together with their corresponding probabilities constitute the so-called "distribution law of the variable." In the above sense, almost all statistical quantities may be considered as random variables, for most of them are subject to errors of observation. Certain ranges may be assumed, or at least thought of, within which their true values must lie, and a certain probable error may be thought of for each of the possible values within the range. In general, such probabilities are only *thought* of as existing. The concept of a random variable is equally valid whether the variable actually exists or not. The concept of the "random variable" is logically and mathematically refined, and, of course, represents an abstraction or transformation

of the observed facts, just as a geometrical figure represents an abstraction of actually existing figures. The same applies to nearly every scientific concept.

We can distinguish different kinds of random variables. There are random variables which result from errors of observation in measuring a constant. Again there are variables, where the measured value itself is a random variable. Furthermore, there are variables which correspond to something which actually exists, and other variables which may be regarded as statistical abstractions, such as averages, ratios, and so forth.[7]

Certain of the random variables which appear as statistical ratios, have the characteristics of empirical frequencies, as for example, the percentage of the farms in Bulgaria with an area of 0-1 hectares. This percentage amounted to 11.78 per cent, or 1,178/10,000 of the 80,565 farm census cards which were selected from the 734,769 cards correctly filled out in the agricultural census of December 31, 1926—January 1, 1927, and was "representatively" worked out under my supervision.

The concept of empirical frequencies may be illustrated by the use of a closed urn containing a certain number of ballots or balls exactly alike in all respects except as to color. Let us take, for example, an urn containing 100 white and 200 black balls which are exactly alike in all other respects. If the balls are drawn from the urn one at a time, the mathematical probability of obtaining a white ball in the first drawing is, of course, expressed by the ratio $100/(100 + 200) = 1/3$. If in 100 drawings we get 35 white balls and 65 black balls, then 35/100 or 7/20 is the empirical relative frequency with which white balls were drawn. We know further that according to the "law of large numbers" the empirical relative frequency will approach the mathematical probability (in our case the fraction 1/3) the greater the number of drawings which are made. Thus the mathematical probability may be regarded as a limit to the empirical relative frequency (Mises). In the example used above, the limit of the percentage of small farms in Bulgaria was 11.76, which means that this represents the

[7] See my "Korrelationsrechnung," pages 15-17. I cannot agree, however, with the statement of Lorenz (Jahrbuchern fur Nationalokonomie und Statistik, III, F., 78 Band, 1 Heft, July, 1930, pages 148-151) that a random variable, in the real meaning of the word, is the same as a random variable taken as meaning the result of chance. With such statements one could totally destroy in a moment the whole of the theory of errors when once the proof has been worked out.

percentage of the total 734,769 farms reported to the census, which contained one or less than one hectare. The difference, *e*, between this value (11.76 per cent) and the "representative approximation" (11.78 per cent) is, therefore, only 0.02 per cent or 2/10,000.

The limit under consideration must not be confused with the limit of a mathematical series, for the latter has nothing whatever to do with the idea of probability. The approach to the limit in our case is not regular, but rather it occurs through irregular zig-zag jumps. The empirical relative frequency is itself a random variable. It may amount to exactly 1/3 after only three drawings, in which case greater accuracy could not be secured after a billion drawings (a billion is not divisible by 3, and an empirical relative frequency with a billion in the denominator can therefore never reduce to precisely 1/3). Consequently a special term has to be introduced for the limit of a random variable. This limit value differs, as previously noted, from the usual use of the term through being associated with the theory of probability. Following the proposal of Slutsky we shall call it the "stochastic limit" and designate it by the symbol $\lim_B$ (Bernoullianus limes). A complication, which is important from the standpoint of practice, arises if the stochastic limit, to which our empirically given quantity tends, is itself a variable which changes directly with the number of observations In this case we do not use the term stochastic limit but the term "stochastic asymptote" (as $_B$= Bernoulliana asymptota).[8]

In statistical practice we have to deal much more frequently with arithmetic averages than with empirical frequencies. They also have a stochastic limit (limes or asymptotes). This limit appears as their mathematical expectation. The concept of mathematical expectation is, as has been mentioned above, the basis of an entire method and is very often applied by Russian mathematical statisticans. In spite of the German works of Bortkiewicz and Tschuprow, the use of the term in the above sense is not generally known to English and German statisticians. The French, however, seem to be more familiar with it (see G. Darmois: Statistique Mathématique, Paris, 1928). Furthermore, as its use in the field of economic statistics has brought forth criticism from various quarters it is necessary to discuss the subject in some detail in order to make its meaning entirely clear.[9]

[8] Anderson, Oskar, "Korrelationsrechnung," pages 18-20.

[9] See the article of Dr. P. Lorenz, "Der Begriff der Mathematischen Erwartung

A mathematical expectation of a random variable (if we remember that in economic statistics most figures may be considered as random variables within the meaning of the theory of errors) denotes the sum of the products formed by multiplying all values of the variable by their respective probabilities, or in other words, the weighted arithmetic mean of all values of the variable when each value of the variable is weighted by its probability (the sum of these probabilities is always equal to 1. Therefore the denominator in the expression of the weighted average disappears.) The mathematical expectation is usually designated by the symbol E. The mathematical expectation of the square of x is therefore expressed as $E\,x^2$.

The concept of mathematical expectation may be looked at from another point of view. Let X be a random variable which can have only k different values, $x_1, x_2, x_3, \ldots x_k$. Suppose that N experiments have been made and that the value of x_1 has been observed n_1 times, that the value x_2 has been observed n_2 times, the value x_3, n_3 times, and so on. Consequently, $n_1 + n_2 + n_3 + \ldots = N$ The usual weighted arithmetic average of the N experiments is equal to

$$\frac{1}{N}(n_1x_1+n_2x_2+n_3x_3+\qquad\qquad)=\frac{n_1}{N}x_1+\frac{n_2}{N}x_2+\frac{n_3}{N}x_3+$$

The quotients $\frac{n_1}{N}, \frac{n_2}{N}, \frac{n_3}{N}$

are here the empirical relative frequencies of the single values of the variable X. If we replace these relative frequencies by the corresponding mathematical probabilities, $p_1, p_2, p_3, \ldots\ldots$, associated with the corresponding values of X we arrive at the

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in Statistik und Konjunkturforschung" in den "Jahrbüchern für Nationalökonomie und Statistik," III F, 77 Band, 6 Heft, June, 1930, pages 832-843, and his above mentioned review of my book. Lorenz is collaborator at the "Institut für Konjunkturforschung" (Professor Wagemann) and appears to be a very good mathematician. But the works of the so-called Stochastic School, except my own two monographs are apparently unknown to him, especially the works of Tschuprow. It is interesting to note that his criticism might very properly be directed against the theories of Professor Wagemann himself, as the latter deals with "stochastic connections" and so on (see for example his "Einführung in die Konjunkturlehre," Leipzig, 1929, page 42 et. seq.). I hope that both Lorenz and Wagemann are unconscious of this disagreement.

following expression for the mathematical expectation of the variable X:

$Ex = p_1x_1 + p_2x_2 + p_3x_3 + \ldots\ldots\ldots + p_kx_k$. Let us illustrate this by a concrete example. Suppose we have to determine the average yield of corn per hectare in Bulgaria during the year 1930. This quantity, which we shall call A, can obviously be defined as the quotient of the total number of quintals of corn harvested divided by the total number of hectares in corn. Actually, the figures as to yield and the area in corn are unknown, and we are bound to compute a figure A' which is only an approximation to A. We do this by selecting a small number of fields in different parts of the country the yields of which were b_1, b_2, b_3 ..... quintals per hectare. We multiply the yields by the number of hectares in the respective fields $(a'_1, a'_2, a'_3 \ldots\ldots\ldots)$ and divide the sum of the products by the total number of hectares in the fields selected. The mathematical formula is expressed as follows:

$$A' = \frac{\Sigma a'_i b_i}{\Sigma a'_i}$$

or if we write $\Sigma a'_i = a'$

$$\text{then, } A' = \frac{a'_1}{a'} b_1 + \frac{a'_2}{a'} b_2 + \frac{a'_3}{a'} b_3 + \ldots$$

The quotients $\frac{a'_1}{a'}, \frac{a'_2}{a'}, \frac{a'_3}{a'}$, have the character of empirical relative frequencies. For instance $\frac{a_i'}{a'}$ represents the relative frequency of occurrence of a certain yield per hectare, b_i, among all yields per hectare, actually observed, or measured, in 1930. To simplify the problem we have assumed that all of the yields b_1, b_2, b_3 ..... are different. If they are not all different, all yields per hectare occurring more than once, *i.e.*, all cases where the value of b is the same, may be grouped together, the corresponding area, of course, being represented by the sum of the areas of the individual fields.

It is possible according to the formula for A', to change also the formula for A. Assume that the actual yields per hectare are given by the series $b_1, b_2, b_3, b_4 \ldots\ldots$, where the yield b_1 was on a_1 hectares, the yield b_2 on a_2 hectares, and so on. Assuming further that, $\Sigma a_i = a$, then it follows at once, on the basis of the assumptions, that:

$$A = \frac{\Sigma\, a_i b_i}{\Sigma a_i} = \frac{a_1}{a} b_1 + \frac{a_2}{a} b_2 + \frac{a_3}{a} b_3$$

It is fairly obvious that the expressions, $\frac{a_1}{a}, \frac{a_2}{a}, \frac{a_3}{a}, \ldots$, play the part of mathematical probabilities with respect to the empirical relative frequencies, $\frac{a'_1}{a'}, \frac{a'_2}{a'}, \frac{a'_3}{a'}, \ldots$.

For instance $\frac{a_1}{a}$ represents the probability that one of the selected fields yielded b_1 quintals per hectare while the empirical relative frequency $\frac{a'_1}{a'}$ is only an empirical approximation to this quantity and may also be considered as its stochastic limit. Therefore, the required quantity A, according to the above definition, is equal to the mathematical expectation of A'. This is due to the fact that in the expression of the weighted arithmetic average of A', mathematical probabilities are substituted for all corresponding empirical relative frequencies.[10]

The conception of "mathematical expectation" is of considerable importance in all statistical theory and it should be applied as far as possible, in practice. It is apparently not well known to most statisticians, and its name, while historically justified is not well chosen. But similarly, the differential coefficient $\frac{dy}{dx}$ appears

[10] If a field of a certain size does not occur in our sample, though we have made provision for it in our formula, then its empirical frequency in A is obviously to be taken equal to zero.

as a somewhat artificial form to many beginners in the study of higher mathematics, and it is only during the course of their studies that its whole meaning becomes clear to them.[11]

As stated above, the arithmetic average is related to its mathematical expectation as to its *ideal* or *stochastic limit,* just as the empirical relative frequency is related to its corresponding mathematical probability. One can always proceed from mathematical expectation to mathematical probability by simply assuming that the happening of a given event could have but one of two values, namely, 0 or 1; its mathematical expectation will then be equal to its mathematical probability. Furthermore, from a certain point of view every mathematical probability may be looked upon and treated as the mathematical expectation of the empirical relative frequency corresponding to it. The system of theorems on mathematical expectations comprises also *in nuce* the entire system of the corresponding theorems on mathematical probabilities. In the majority of cases in actual practice, only the mathematical expectation will occur as the stochastic limit of any random variable. The introduction of the conception of mathematical expectation is further favored by the fact that the technique required for its use is usually quite easy to handle. Some very general, and at the same time, very simple theorems of the mathematical expectation enable us to treat it, not as the sum of a large number of products of unknown quantities, but as a symbolic operator; something similar to the sign of the integral, etc. Quite generally, for example, the mathematical expectation of a sum of constant or variable quantities equals the sum of the mathematical expectations of the separate items; the mathematical expectation of the products of variables, "stochastically independent" of one another, equals the product of the mathematical expectations of the separate variables, and so on.[12] A calculation involving mathematical expectations requires therefore a special procedure, or as mathematicians sometimes say, a special algorithm.[13]

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[11] Those who are acquainted with the work of the biometrical school of Karl Pearson, will readily recognize that in the example used above, the mathematical expectation is identical with the so-called weighted mean for the whole population. However, the mathematical expectation, and the weighted mean for the whole population need not always be the same.

[12] Two random variables are said to be "stochastically independent" of each other if, after fixing a value for one variable, the law of distribution of the other variable is not changed in any respect.

[13] Anderson, Oskar, Korrelationsrechnung, pages 20-21 and 101-103.

Lorenz, whose criticism on the whole is well grounded and to the point (in spite of the many exclamation marks) finds the conception of the mathematical expectation of a single variable, at least in the case of a time series, "rather nebulous."[14] However, I can not quite understand this objection. If A, the *true* average yield of a hectare of corn, equals the mathematical expectation of its empirical approximation A', it is entirely irrelevant whether this A' does or does not repeatedly appear in the series in question. If there is any sense at all in regarding a statistical figure X' as an empirical approximation of a figure X upon which it is based, but whose exact value we do not know, then $e = X' - X$ is the error of our calculation and we may write:

$$X' = X + e$$

On the supposition *rebus sic stantibus* (something like the known "statics" of the Lausannians), it may be assumed that the "error e" which is under the influence of different causes has a certain "law of distribution," that is, it might have different values with different probabilities—always under the assumption *rebus sic stantibus*. Not only the Gaussian law of errors, but also most of the other symmetric or moderately asymmetric laws of distribution have the property that the mathematical expectation of the error e equals 0, and therefore we have:

$$EX' = E(X + e) = EX + Ee = EX = X$$

because, as we assumed, X itself is a random variable. And even if Ee does not equal 0 but a constant magnitude c, the c will also disappear with the calculation of the standard deviation, the correlation coefficient, and similar coefficients where deviations from the arithmetic mean are taken.

It is true that the value of X cannot be obtained from a single observation X', but if a number of observations arranged in a time series are available where the mathematical expectations of each observation may differ, then on the basis of certain assumptions a series of approximations to the value of X which are better than

[14] I found in Lorenz' review only one assertion which is really wrong, namely the statement that in my second example "upon the relation of wheat prices in Berlin and in New York (Korrelationsrechnung, pages 91-96) there is an unintelligible, *and in the text, unexplained,* coefficient of correlation of -0.4" (see pages 150-151 of the review). A very detailed explanation of this coefficient is given in my book on pages 94-95.

the original values of X', may be obtained. This process is involved in the so-called smoothing of series.[15]

The conception of mathematical expectation may find another and greater application in the field of economic research. This application is the object of a great deal of criticism and probably will continue to be for some time—until it has been proved to be either correct or scientifically sterile.

From an urn containing M white and N black balls, m white and n black balls are drawn and put aside. From the $m + n$ balls thus obtained m' white and n' black ones are withdrawn. Here $\frac{m'}{m'+n'}$ is the empirical relative frequency of drawing a white ball in the second experiment and may be regarded as an empirical approximation to the probability $\frac{m}{m+n}$ underlying it. This probability, however, is only an empirical relative frequency with respect to the probability $\frac{M}{M+N}$. Thus $\frac{m}{m+n}$ appears here in two forms: (1) as an empirical relative frequency and (2) as an *a priori* probability, and $\frac{m'}{m'+n'}$ may be considered as an approximation to $\frac{m}{m+n}$ as well as an approximation to $\frac{M}{M+N}$. Furthermore, unless all the facts are known to us, we shall not be able to differentiate the one case from the other.

May not X itself in our equation $EX' = X$ be a random variable and possess a mathematical expectation EX? Might we not reason as follows in connection with our previously given calculation of the yield of corn in 1930. The method of sampling which we applied gives us a yield A' as the empirical approximation to

[15] Anderson, Oskar, "Korrelationsrechnung," pages 72-80 and 117-122.

the *true* yield *A?* This latter is itself influenced by two groups of factors:

1. Year to year changes such as changes in rural population and in the cultural status of the rural population, changes in the system of crop rotation, increases in acreage, improved technical processes and so forth, resulting in a tendency (I do not want to say "trend") toward a certain steady development of the progressing series of *A's.*

2. There are a number of more or less sudden, irregularly appearing influences, which result in more or less accidental fluctuations. Climatic conditions, shifts in acreage due to the development of changing price relationships and other similar factors fall into this group.

Considered in this light, it would be possible to discern in the magnitude *A,* for each year, the elements *r* and *n,* so that,

$$A = r + n$$

If the law of the distribution of *n* is such that $En = 0$, then $EA = r$. It is left to the investigator to decide when and in what sense his *A'* may be taken as an approximation to *A* and when as an approximation to *r.* I certainly do not wish to infer that such an extension of the conception of mathematical expectation is always justified. This is a question of economic theory where the statistician is forced to stay in the background.

It is a fact which is more and more being recognized that one cannot reach a knowledge of the "mass phenomena of price formation on the market" by using the methods of the Lausanne School of economics (Lexis).[16] The many millions of equations which are necessary for characterizing every formation of price on the market are absolutely impossible to solve in practice. The American economists (as Henry Moore and his school) admit quite rightly that if the changes of the single variables can no longer be recognized, then the examination of the average relations of the variables is the only way out. In all sciences, the change from the functional to the stochastic mode of thinking is unavoidable if the phenomena to be examined have to be summarized on account of the impossibility of grasping the individual relationships. By determining the correlation coefficient for the average dependency of the single factors, the problem is solved. The characteristic average relationship is substituted for the sys-

[16] See the very convincing paper of Altschul "Die Mathematik in der Wirtschaftsdynamik," cited above, pages 523-538.

tem of simultaneous equations which were supposed to express the existing interrelations. Relationships with different meanings, comprehensible only through the average, or as we now say, stochastic relationships, replaced the functional relationships having a single meaning. Logically, therefore, the calculation of probability had to replace the differential calculation (of the Lausannians).[17] It is a pity that in transferring the correlation method from the field of biometry to the field of economic research, certain facts have been overlooked, as for example, the fact that most economic series are ordered in time. There is much work yet to be done in adapting the correlation method to the problems of economic research, and in devising new methods of approach to such problems. As I tried to show in my book, the many problems can be solved only by introducing the conception of mathematical expectation.

I should like to deal more fully with this subject, but time will not permit. Suffice it to say that my investigations have led to the conclusion that the empirical correlation coefficient of two time series is really a function of three heterogeneous correlation coefficients:

1. The correlation coefficient of the deviations of the individual items of each series from their mathematical expectations
2. The correlation coefficients of the arithmetic means of these deviations.
3. The correlation coefficients of the mathematical expectations of the individual items themselves.

To my mind this fact explains most of the "nonsense" correlations frequently worked out in economic investigations. Nonsense correlations can easily be avoided through a more careful and clean-cut analysis of the theoretical problems involved prior to making the determination. In every instance the greatest precaution should be taken in applying correlation methods in the field of economic research.

I should like to introduce, briefly, the question of the relation between correlation and causation. This question should be of interest to every student of economic theory. This relationship in Yule's method of deriving the correlation coefficient, which is the method generally presented in most text-books, has been rather neglected. In this connection the derivation of the correlation coefficient which starts from the coefficient of total determination

[17] Altschul, *ibid.*, 528.

seems to me to be more adequately treated.[18] This idea, with the reconstructions necessary for its translation into the language of "stochastic statistics," is as follows:

When studying the causal relation between two observed phenomena, as for example, the relation between air pressure and the temperature at which a certain liquid boils, we may discern in the numerical expressions x and y of our observations, two different elements; (1) those which are really causally connected with each other (which we shall designate as ξ and ψ), and (2) those which may be regarded as "accidental disturbances" or errors of observation (designated as e and ϵ). We may say, therefore, that:

$$x = \xi + e$$
$$y = \psi + \epsilon$$

We assume that the relation between ξ and ψ cannot be changed and that it is fixed in form. From the standpoint of mathematical analysis, therefore, the relation may be treated as functional and presented in the well known form $\psi = f(\xi)$, or $\xi = f(\psi)$. It is therefore quite reasonable to assume that e is stochastically independent of ξ or ψ and ϵ of ψ or ξ. We could go even further and postulate the mutual independence of e and ϵ.

The physicist, who has the experimental method at his command, is usually able to carry out his experiment in such a way that the errors e and ϵ are very small and consequently do not overshadow the relation between ξ and ψ, and may, therefore, almost be neglected. Consequently he concentrates his attention on the search for the law of the relation between ξ and ψ, that is on the form and constants of the function $\psi = f(\xi)$. The economist, the biologist, and the meterologist are, as we know, not so fortunate as the physicist since on the one hand they are not free to experiment, and on the other they are dealing with those phenomena where the relative values of e and ϵ are very considerable and furthermore cannot be eliminated, so that outwardly there appears to be little relation between x and y. As an example might be cited the relation between the harvest in northern Bulgaria and wheat exports from Varna Harbor, where, in the first place, the world

[18] Wright, Sewall, "Correlation and Causation," Journal of Agricultural Research, 20, 557-585, 1921. I cite this reference from the paper of Ralph F. Watkins, "The Use of Coefficients of Net Determination in Testing the Economic Validity of Correlation Results," Journal of the American Statistical Association, Vol. XXV, New Series, No. 170, June, 1930, pages 191-197.

price situation appears as a "disturbance." This leads to two problems; (1) not only to find the form of the function $\psi = f(\xi)$ but also (2) to estimate or measure how far this functional (and causal) relation between ξ and ψ is really manifested, and how far it is overshadowed by the disturbances e and ϵ, or in other words to determine the real degree of association between x and y.

To construct a rational measure of the degree of association between x and y, we shall first consider the most simple case where, with a single pair of observations, the component e is missing altogether, so that $x = \xi$ and $y = \psi + \epsilon$. It is evident that here the degree of association may very well be expressed by the quotient,

$$\frac{\psi}{y} = \frac{\psi}{\psi+\epsilon} = 1 - \frac{\epsilon}{y}.$$

If, however, the component e is contained in x, a single rational measure of the degree of association is found in the product,

$$\frac{\xi}{x} \times \frac{\psi}{y} = \frac{\xi}{\xi+e} \times \frac{\psi}{\psi+\epsilon} = \left(1 - \frac{e}{x}\right)\left(1 - \frac{\epsilon}{y}\right)$$

It is only necessary to insert the "errors" e and ϵ into the formula according to their absolute size (always with a plus sign). The maximum value of the product is *1*, and it will be obtained only when e and ϵ do not exist at all. The minimum value is *0*, which will be obtained only in case the component ξ or ψ or both are missing. Our measure however has a great defect, in that x and y can in no way be obtained from a single pair of observations, and we must therefore use series of such pairs of observations (the more so since a certain number of observations are always necessary in determining the constants of the function $\psi = f(\xi)$.)

Let two series be given, $x_1, x_2, x_3, \ldots\ldots x_n$ and $y_1, y_2, y_3, \ldots\ldots y_n$, which we assume to be composed as follows:

$$\begin{aligned} x_1 &= \xi_1 + e_1 & y_1 &= \psi_1 + \epsilon_1 \\ x_2 &= \xi_2 + e_2 & y_2 &= \psi_2 + \epsilon_2 \\ x_3 &= \xi_3 + e_3 & y_3 &= \psi_3 + \epsilon_3 \\ &\cdots & &\cdots \\ x_n &= \xi_n + e_n & y_n &= \psi_n + \epsilon_n \end{aligned}$$

Here again, as above, $\psi_i = f(\xi_i)$. The real values of the components ξ, e, ψ, and ε are of course unknown to us, and they cannot be obtained from the above system of equations since the number of the variables is exactly twice as large as the number of equations. The question is, how to measure the degree of association between x and y. In order to proceed we must make several assumptions which, so to speak, take the place of the missing equations. In the first place it is clear that the form and the constants of the function f which connect ξ_1 with ψ_1, ξ_2 with ψ_2, ξ_3 with ψ_3 and so on, must in every case remain the same, since otherwise the first problem, namely that of discovering the causal relation between ξ and ψ could not be solved, and the series x and y would have to be considered as not homogeneous. Furthermore, it is evident that since there is no connection between ξ_i and e_i and between ψ_i and ε_i, the single product $\frac{\xi_i}{x_i} \times \frac{\psi_i}{y_i}$ cannot remain constant for different values of i. In order to arrive at a constant, the individual items ξ_i, x_i, ψ_i, and y_i, must be replaced by such *a priori* characteristics as are common to all members of each series. This again is possible only by introducing additional assumptions. Several such assumptions might be possible. The two which are relatively most important are as follows: (a) It may be assumed that the series of ξ, of e, of ψ, and of ε, are homogeneous; that is to say that the "moments" of the single members of each series (mathematical expectation, standard deviation, and so forth) remain constant. This would represent a simple case, and the one most easily treated mathematically. (b) It may be assumed that the component ξ_i coincides with the mathematical expectation of x_i, and similarly that ψ_i corresponds with the mathematical expectation of y_i. The mathematical expectations of the single items in each series, in this case, need not be constant. It is just here that the further application of the conception of mathematical expectation in economic research offers interesting possibilities.

The export of corn from Varna Harbor, previously referred to, may be used by way of illustrating the second assumption. There is evidently a close relation between the corn crop of northern

Bulgaria and the quantities of corn exported from Varna Harbor. The exportable surplus A' is derived from the crop statistics by deducting the seed requirements, the amount required for home consumption and the reserves. The figure A' is, of course, subject to a considerable error e, inherent in estimates based upon representative selections. We can, therefore, write $A' = A + e$, where, as shown above, under certain conditions, A may be assumed as being equal to EA'.[19] There is a whole group of factors such as the relative distances of producers from Varna and from other export points in Bulgaria, trade organization, shipping conditions and so forth, which, if acting alone, would cause a certain percentage p of the exportable surplus to be exported *via* Varna. There is a second group of factors such as the world price situation, climatic influences, experience resulting from the liquidation of last year's crop, crop prospects for the coming year, and so forth which appear as disturbances of the percentage p and modify the actual amount exported. By designating the amount actually exported during a given year as B' and the disturbances as ε, we get the following time series:

$$\begin{aligned} A'_1 &= EA'_1 + e_1 & B'_1 &= p\,EA'_1 + \varepsilon_1 \\ A'_2 &= EA'_2 + e_2 & B'_2 &= p\,EA'_2 + \varepsilon_2 \\ A'_3 &= EA'_3 + e_3 & B'_3 &= p\,EA'_3 + \varepsilon_3 \\ &\cdots\cdots & &\cdots\cdots\cdots\cdots \\ &\cdots\cdots & &\cdots\cdots\cdots\cdots \\ &\cdots\cdots & &\cdots\cdots\cdots\cdots \\ &\cdots\cdots & &\cdots\cdots\cdots\cdots \end{aligned}$$

It is also evident that by assuming the series ε to possess a certain law of distribution such as to result in the equation $E\varepsilon = 0$, we would also have:

$$EB'_i = bEA'_i$$

Thus a very interesting case follows from our assumption that a stochastic relationship exists between A' and B', namely, that a functional or causal relationship exists between their mathematical expectations. This can, however, also easily be analyzed on the

[19] Strictly $EA' = A + Ee$, but as can be easily shown, Ee will vanish in the calculation of the standard deviation, correlation coefficient, etc., if the deviations are taken from the arithmetic mean

basis of the procedure worked out in my book with the help of the calculus of mathematical expectations.[20] In order to avoid a misunderstanding, however, I must emphasize that the case (b) represents only one of the different possible hypotheses, the validity of which has to be proved in every individual case. Moreover, I agree with Lorenz that the fertility of the hypothesis ought to be shown by several examples.

We now return to our measure of the degree of association between the two series. It would not be a rational procedure simply to replace the quantities in the product $\frac{\xi_i}{x_i} \times \frac{\psi_i}{y_i}$ by their mathematical expectations, since irrespective of this we would always obtain the maximum value, $+1$, when the mathematical expectations of e or ε equal 0, although this represents the approximately normal case and although each e_i or ε_i, according to their absolute size, considerably exceeds even the values ξ_i and ψ_i. The simplest *a priori* characteristic of our series which takes into consideration also the variability of the series, appears, therefore, to be the standard deviation.[21]

Suppose that σ_ξ, σ_e, σ_ψ, and σ_ε, represent the standard deviations of ξ, e, ψ, and ε respectively. Thus our measure of the degree of association between x and y assumes the following form:

$$H = \frac{\sigma_\xi}{\sigma_x} \times \frac{\sigma_\psi}{\sigma_y}$$

If we write $$q_1 = \frac{\sigma_\xi}{\sigma_x} \text{ and } q_2 = \frac{\sigma_\psi}{\sigma_y}$$

then, $$H = q_1 \times q_2$$

This coefficient, as it relates to the theory of probability, is an *a priori* one, and the question arises as to how to find an empirical

[20] Anderson, Oskar, Korrelationsrechnung, Chap. IV.

[21] The standard deviation translated into the language of mathematical expectations is:

$$\sigma_x^2 = E(x - Ex)^2$$

Within the meaning of the theory of probability σ_x^2 is therefore an *a priori* quantity.

approximation to it. We regard here as the empirical approximation or assumed value, that function of the empirically given series $x_1, x_2, x_3 \ldots\ldots\ldots$ and $y_1, y_2, y_3 \ldots\ldots\ldots$, the mathematical expectation of which (or at least the stochastic asymptote of which) gives the value of $q_1 q_2$. With the aid of the method of mathematical expectations it can easily be proved that such an approximation to H is the product of the two empirical correlation ratios of Karl Pearson:

$$\eta'_{X/Y} \times \eta_{/X}$$

Unfortunately these almost always give the marginal value $+1$ for time series, and are therefore of little use to us. There are, however, other methods which we do not have time to discuss.

A very interesting case arises if (on the basis of experience or theoretical considerations) we are justified in assuming, as in our example with the export of corn, that the functional relation between ξ_i and ψ_i is linear, so that $\psi_i = a + b\,\xi_i$, where i may have any value. It is then easily proved that the absolute value of the empirical correlation coefficient r'_{xy} is the assumed value of H, namely,

$$(As_B\, Er^1{}_{xy}) = H = q_1 q_2$$

This simple relation is valid, however, only when the functional relation between ξ and ψ is a linear one, and only if all the other assumptions made in our procedure prove to be correct. I believe that this theoretical construction may be of great practical importance in the future insofar as economic prognosis is concerned. Assume, for example, the possibility of proving that the correlation coefficient between the quantity of money in circulation in Bulgaria, and the index of wholesale prices two months later is 0.87. If here, $q_1 = q_2$, it would mean that a linear function of $\sqrt{0\ 87}$ or 93 per cent exists. If q_1 or q_2 equals *1*, a functional relation of 87 per cent would still exist. And, on the basis of the determination of the amount of money in circulation, one could, with a certain margin of error, which is easily calculated, estimate the wholesale index of prices two months later. The "coefficient of total determination" can also be easily generalized in the case of the so-called multiple correlation.

In conclusion I should like to emphasize that in economic research based on economic statistics, the theory of probability, now

neglected in America and in Germany, should be introduced or rather reintroduced. Thereby the limits of probable error could be estimated and many disillusions avoided. This would also lead to more caution being exercised, and to cleaner cut results. Americans are enthusiastic about producing on a large scale, even in statistics. They should recognize the very real danger of producing large errors.

AGRICULTURAL STATISTICS AS A BASIS FOR AGRICULTURAL ECONOMIC STUDIES

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IN THE British Isles an agricultural census has been taken annually for a very long period—in Ireland since 1847 and in Great Britain since 1866. Until 1907-08, however, this annual census was largely confined to a simple enumeration of the acreage under the different crops, and the numbers of live stock on farms supplemented by an estimate of the average crop yield per acre of the principal crops which, when applied to the total acreage grown, enabled an estimate of the gross aggregate production of these crops to be made. During the past quarter of a century, however, a very considerable development has taken place both in the amount of information collected through the census and in the subsequent utilization of these data. The impetus for this development came through the passage of the Census of Production Act of 1906. This measure provided for the taking of a periodical census of the output of industry. Agriculture was not included within the scope of the act, but arrangements were made for the collection of certain information additional to that obtained by the annual agricultural returns so that an estimate of the output of the agricultural industry might also be made.

The basic purpose of the industrial census is to arrive at the net output of the different trades covered by the enquiry. "Particulars relating to the output" of the trade or business carried on was prescribed in the act as one of the main questions regarding which information was required and it was also provided that "in order to enable the Board of Trade to compile, as far as practicable, statistics of the net value of production without duplication, the prescribed particulars as to output may include particulars as to the aggregate estimated value of the materials used and the total amount paid to contractors for work given out to them."

The normal data provided by the industrial Census of Production in respect of each trade has thus been as follows:

1. The selling value (at works) of the goods made by the firm supplying returns.
2. The cost of materials purchased.

3. The amount paid for work given out.
4. The net output of the trade, arrived at by deducting items 2 and 3 from item 1.
5. The number of persons engaged in the trade.
6. The motive power used in the trade.

The primary object of the industrial census is to arrive at "net output," which represents the value of the commodities which have been produced, or the work performed, by each industry, after the cost of the materials necessary for that production has been deducted. The net output thus constitutes the fund available for the remuneration of the various factors of production in the form of rents, wages, and profits while it is out of this fund also that rates and taxes are paid. The conception of net output is indeed essential from the point of view of the industrial census for only on the basis of net output is it possible to compare the productivity of different industries. Accordingly, in presenting the results of the industrial census it has been usual to show the value of the net output per man for each trade included within the scope of the enquiry.

In the agricultural censuses of 1908 and 1925 the departments of agriculture in Great Britain and Ireland adopted the conception of net output from the industrial census, and the additional statistics which have been collected in the census years have been largely directed to the compilation of data which will enable the net output of the agricultural industry to be arrived at.

The ordinary annual agricultural returns are mainly deficient in that they do not enable estimates to be made regarding the production of live stock and live stock products. The ascertainment of this information is therefore of prime importance in the census of production year. As regards the physical volume of agricultural production, therefore, the two basic groups of data relate to:

1. The production, in terms of produce, of the farm crops, including fruit, vegetables and nursery crops.
2. The production, in terms of produce, of live stock and live stock products.

There is, however, obvious duplication between these two figures, since a considerable proportion of the crops grown on farms and some part of the live stock produce also, is used for

further agricultural production (*i.e.,* crops fed to stock, or used as seed, milk fed to calves, and so forth).

Estimates are accordingly made regarding the proportions of each product (1) used for further agricultural production and (2) sold off farms or consumed in farm households. Only the latter portion, free from all duplication, is taken into account in arriving at the gross output of the agricultural industry. This gross output is then given a money value.

In order to arrive at "net output" it is necessary to deduct from the gross output the value of any materials, not produced on farms, which are used in producing the output sold off farms. The main items under this heading are, of course, imported feeding stuffs, seeds, and artificial manures. Sales of feeding stuffs or seeds from one farmer to another within the area of the census enquiry are not taken into account, but purchases of feeding stuffs for live stock not on farms (for example, for the feeding of horses in towns) are credited to the agricultural industry and contribute towards the gross output figure.

An agricultural census, as understood, in Great Britain and Ireland, thus involves the ascertainment of:

1. The gross output of the industry free from duplication, in terms of quantity and value.
2. The net output, in terms of value only.

So far as gross output is concerned, I do not think it can be seriously challenged that this is essential for a true census of agriculture.

In the world census of the present year it is intended that estimates shall be obtained by each country regarding the volume of production of both crops and live stock, although it is true that questions regarding live stock production are relegated as an appendix in the "standard-form," as it may not be possible for all countries to obtain this information direct from farmers. Provision for the determination of the proportions of each item of output used for further agricultural production is not made in the standard-form but statistics of gross output, unless free from duplication, are so misleading and indeed, useless, that it is to be hoped that as many countries as possible will publish their figures for gross output after deduction of that quantity of produce used for further agricultural production.

Turning from gross output to net output we enter a field which is, perhaps, more controversial. Even in Great Britain, where net output has been adopted officially as one of the principal objects of an agricultural census, this conception has been seriously challenged. Granted that net output is a legitimate object in the census of industry it is argued that net output is not necessarily a valid object of an agricultural census.

It may, I think, be at once admitted that net output as arrived at by the British agricultural census is not strictly comparable with the net output arrived at by the industrial census. In the industrial census the net output arrived at really comprises only profits, interest on capital, and wages. Rent is largely confined to the rent of the factory in which the goods are produced. It is not rent in the economic sense as the contribution of nature towards production This economic rent is really included in the cost of the raw materials brought to the factory and is thus included in external costs before the net output of the industry is arrived at. Only to a very limited extent is this true of agriculture, for whereas the cost of the materials purchased by the different trades included within the British industrial census of 1907 amounted to £1,028 million, and the net output of these firms came to £712 million, in the case of agriculture the cost of materials used amounted to only £45 million as compared with a net output of £108.6 million. This is, of course, because to a preponderating extent the materials for agricultural production are supplied by the industry itself and are made up of the items which have been deducted from the gross physical volume of production in order to obtain the gross output free from duplication. Net output in the case of agriculture thus includes rent in the economic sense. It is, in fact, the product of the three factors of production—land, labor, and capital.

Net output, therefore, is the basis from which all studies of distribution can most easily start. It represents the fund out of which all the factors contributing towards production are remunerated and, in the case of the agricultural industry, is on a sounder economic basis than in the case of industry, just because the "net output" arrived at by the British agricultural census does correspond with a recognized economic conception—the final product of industry resulting from the cooperation of all three factors.

I should like to quote from a recent publication of the League of Nations, issued in connection with the International Economic

Conference of 1927, and entitled "The Relation of Labor Cost to Total Costs of Production in Agriculture":

"Net output, or the reward from farming, is the most important conception which has to be stated in Farm Economics. A good definition is the Italian one, which states that net output is obtained 'by subtracting from the value of gross production all those values which have had to be used up in order to arrive at that gross production,' principally, of course, seeds, fertilizers, feed and other material of this kind, and also depreciation, inasmuch as depreciation is a used value. These materials had to be advanced by society before the processes of production could begin; they must therefore be subtracted from the final result before the remainder of gross production can be accounted as a value. When this has been done the 'net output' remains for society to spend or to accumulate, and the 'net output' is sometimes defined as the year's spending plus saving.

"But net output, besides being the reward from farming as received by society in general, may also be conceived of as the reward from farming as received by the farming industry. It is a narrower conception, but perhaps a more practical one, and the most commonly adopted. On this conception both taxes and rates and interest on outside loans, which are part of the reward of farming accruing to society in general, are excluded from net output; the community and non-agricultural banks have no share in net output or reward in this narrow sense."

Whether or not net output should include taxes and rates will depend upon conditions in different countries. I should emphasize, however, that under the British system both these items have to be defrayed out of net output. The importance of the distinction between net output as including the payment of rates and taxes, and net output after these items have been deducted really depends upon the nature of the taxation system in force. In Great Britain and Ireland rates are levied on agricultural land irrespective of the income derived from that land. Theoretically, of course, the valuation upon which the rates are levied, is supposed to be based upon the agricultural value of the land but the relation between valuation and income may obviously vary greatly. It is natural, therefore, to treat rates as a cost and they have to be deducted before the fund available for distribution between the factors of production is arrived at. Taxes on the other hand are levied on personal

income and—in agriculture at any rate—can in no sense be regarded as a cost and should not be deducted even if it were practicable to do so.

Having arrived at a figure representing the value of the net output of the agricultural industry, the question arises in what sense can this figure be regarded as the basis for subsequent economic studies regarding the position of the industry?

I am of the opinion that the figure for net output is probably the best measure of the prosperity or depression of the agricultural industry, treated in the widest sense. I do not wish to appear to minimize in any way the great value of farm management studies but I do wish to emphasize the fact that variations in the level of farmers' profits—or labor income or any other concept that we care to use in relation to the farm-occupier's income—do not necessarily give a true picture of the position of the industry as a whole, unless under very small scale conditions of agriculture where the farmer combines in his own person the functions of entrepreneur, laborer, and landowner. From a national point of view, from the point of view of the general agricultural economist, it is of the highest importance that data should be available showing the total net return obtained from the industry as a whole. I may take as an example the present situation in Great Britain where although the condition of arable farmers in the eastern counties is one of depression, agricultural laborers are probably enjoying higher real wages than at any time in recent history. This prosperity of the agricultural laborer has been brought about by the direct intervention of the State to influence the share of the total net output of the agricultural industry accruing to him. The machinery by which this result has been obtained was described to you by Mr. Dallas. I do not wish to enter into a discussion of this question beyond emphasizing the fact, that if the State is going to intervene in the determination of the share of the total net output of the agricultural industry which shall accrue to any one partner in the industry—whether the farm laborer or the farm landlord—then a wise decision upon the limits and extent of this governmental action can only be made upon the basis of a study of the total net return available for the industry as a whole. Obviously in a period when the net output of the industry is showing an increase, the effect of the State regulation of the share of labor in an upward direction will probably have less influence upon the

willingness of the farm-entrepreneur to extend his operations than in a period of depression when there is a fall in the net output.

Changes in the distribution of the net output can have, therefore, an extremely important place in determining whether the farm occupier—the entrepreneur of the farming industry—is operating under conditions of prosperity or depression.

Particulars are available regarding the value of the net output of the agricultural industry in Great Britain in two years—1908 and 1925. I should like to consider, in a very tentative fashion, the order of the changes in the distribution of this net output which occurred between these two census years.

In 1908, the value of the net output was about £108.6 million and in 1925 about £185.5 million—an increase of 70 per cent.

The increase in the rental value of agricultural land and building during this period can be determined fairly accurately on the basis of the returns under Schedule A of the income tax. In 1908, the annual value of farm land and buildings in Great Britain was £42.2 million and in 1925 it was increased to £47.9 million, or by 13.5 per cent. Deducting these sums from the net output the remainder was £66.4 million in 1908 and £137.6 million in 1925. After deducting rates and taxes which amounted to around £4 million in 1925, these sums were available for distribution in farm wages and farmers' profits and other earnings, including cost of maintenance of tenants' capital.

Now this increase from £66.4 million to £137.6 million represents an increase of 107 per cent. Since the rental value of lands increased by only 13.5 per cent and the value of the net output by 70 per cent it is obvious that between 1908 and 1925 there was a redistribution in the net output of agriculture in favor of the laborer and the farmer. As to which of these groups—the farmer or the farm laborer—benefited most from this redistribution it is more difficult to decide. Between 1914 and 1925, however, the English index number of agricultural wages increased by 72 per cent, but this does not take into account the greater amount of overtime which was paid for by farmers in the latter year. It is common to speak of wage charges having doubled since before the war, but against this it must be remembered that there has been a decline in the number of workers employed. The actual decrease in the number of hired workers cannot be stated but the total number of persons engaged in agriculture declined from 1,400,000 in

1908 to 1,280,000 in 1925 or by 8.6 per cent and the reduction in the number of hired laborers was probably even greater. On the whole, therefore, it appears improbable that between 1908 and 1925 the share of the farm worker increased by more than 107 per cent—the figure by which the total sum available for distribution between the farmer and farm-worker increased.

The increase in farmers' earnings and profits (subject to payment of rates and also an allowance for depreciation in tenants' capital) would therefore seem to have amounted to something over 100 per cent between 1908 and 1925.

In concusion there is one other aspect of the British agricultural output figures to which I wish to refer because it has some bearing upon the subject of the importance of monetary fluctuations in relation to agricultural depression—a subject which has received considerable attention at this Conference.

The main reason why industry and agriculture are seriously affected by falling prices is because under such circumstances the entrepreneur—whether in industry or agriculture—is confronted with two sets of price levels and his expenses tend to be incurred at a higher price level than prevails when he comes to sell his finished goods. On account of the prolonged "time lag" in agricultural production the agricultural industry is specially affected by such differential price levels. In addition to the question of this time lag, however, there is also the question as to the proportion of the outgoings involved in agricultural and industrial production which are affected in this way. Now the purchases of raw materials to be worked up by the agricultural industry are very small compared with similar purchases of materials in industry. As already stated, at the British census of production for 1907 the net output of all firms included in the industrial census came to £712 million, while the value of the materials used was £1,028 million or 144 per cent of the value of the net output. In agriculture, the net output was £108.6 million and the cost of the materials used £45 million. There can, I think, be no question that expenditures on the purchase of raw materials and on goods to be used in further production is very much less in agriculture than in industry. This self-sufficing character of agriculture should mean that it is less susceptible to the effects of monetary fluctuations than other trades.

In British agriculture, however, the two primary items of expenditure with which the farmer is confronted are rent of land and wages of labor. In comparison, expenditure on purchases of materials required for use in production—which in the non-extractive industries is of great importance—take a second place. In general, rent and labor charges are precisely those which are least tractable to revision in accordance with changes in the general price level. The importance of price changes upon British agriculture, therefore, arises not merely through the extended "time lag" but also on account of the character of the principal items comprising the expenses of agricultural production. At the same time, as regards the period 1908 to 1925 it is necessary to remember that the rise in rents has been appreciably less than the rise in prices and that in this direction the farmer has gained through the change in price level. As regards wages these have of course risen greatly as indicated earlier, but the rise in wages is perhaps not altogether so out of proportion to the rise in the share of the net output accruing to the farmer as is sometimes assumed.

Outside of Great Britain the importance of rent is much less, while in Ireland, and probably over the greater part of Europe, even wages of labor do not enter into the expenses of the farm to any appreciable extent. The unit of agricultural production is still very largely the small holding, frequently owned by the occupier. On many holdings of this character a monetary economy hardly exists. The land is the property of the farmer and is the source of supply of food for his family and his live stock, and of seed for his next year's crops, while it is cultivated by his own labor and that of his family. His surplus produce is sold off the holding, however, and the price obtained is governed by price movements on the world market. But in fact the circumstances are reminiscent of barter, for the very market town in which the peasant proprietor's produce is sold is the mart for the purchase of the manufactured goods he requires. The exchange character of the transaction is hardly obscured, although money is the medium by which it is effected. At hardly any point, however, in the economy of the peasant proprietor does money serve as a store of value, and it is to its weakness in this respect that adverse effects upon the agricultural industry are to be found. It is, therefore, rather important to examine the relative susceptibility to changes

in the general price level of items such as rent, wages, purchases of raw materials and so on; for the true measurement of the influence upon agriculture of a changing price level is to be found in the sum of the effects upon the industry caused by that changing price level operating upon these and other items which enter into the expenses of the farm entrepreneur.

RESEARCH IN COOPERATIVE MARKETING

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IN THE few minutes allotted to me I shall discuss some of the chief characteristics of research in cooperative marketing and a few outstanding developments of recent years. Time will not permit discussion of the organization of research or its development.

Research in cooperative marketing in the United States was brought to the front during the period of rising prices from 1906-13 when consumers and producers alike became greatly interested in narrowing the spread between farm and retail prices. This statement should not be misunderstood. Other motives doubtless actuated the research workers in this field during this early period, but the emphasis placed upon margins, costs of marketing, and marketing channels, clearly indicates the predominant influence of rising prices on cooperative marketing research in its early stages.

Many changes in the research programs of our public research agencies both in method and content have taken place during the twenty years that have passed, but the utilitarian objective of the first research workers has not changed substantially during the intervening years. The primary motive of research in cooperation, as shown by the recent surveys of the Social Science Research Council, is to improve the efficiency of cooperation and marketing organization. According to these surveys about 75 per cent of all research projects deal with problems that relate to the structure and operating problems of cooperative associations.[1] A major portion of research effort is devoted to making cooperative business units more successful. Costs, incomes, and prices are the chief pragmatic tests applied in measuring the efficacy of cooperative organization.

How long this practical point of view will predominate is difficult to say. The emphasis given to applied economics by American economists and the public character of the financial support of most research in cooperative marketing appear likely to continue the emphasis on the commercial aspects of the movement to the

[1] Preliminary Report of a Survey of Economic Research in Agriculture in the United States During the Year July, 1926, to June, 1927. Vol. IV, p. 2.

neglect of considerations of a theoretical and social nature. The surveys of the Social Science Research Council referred to above, show that only one project out of 44 reported in a recent year as being active at agricultural experiment stations dealt with the social aspects of cooperation, and that only two projects included these aspects by implication. Moreover, only three projects provide for historical studies of cooperation, valuable as this approach might be in explaining the genesis, objectives, and problems of cooperative organization. In this instance, there is no provision in the organization of the experiment stations for this type of research. This partially although not entirely explains the limited consideration of this aspect of research in the cooperative research program. Like the theoretical aspects, historical studies do not yield results that appear to have immediac value.

There can, of course, be no serious objection to emphasis on the practical aspects of research conducted by public agencies supported by state and federal revenues, but it is unfortunate that more consideration is not given to other features. Perhaps these will receive more attention as research in this field matures although none of the texts on the subject and little of the literature show evidence of such development. Students of consumers' cooperation have not overlooked the social features of the subject although thus far they do not appear to have a sufficiently comprehensive understanding of producers' cooperation to interpret agricultural cooperation in the light of national economic and social organization. Perhaps, we shall have to wait for the sociologists and economic historians to enter the field. An even better suggestion is the possible cooperation of agricultural economists with these two groups to develop research along theoretical lines of social and economic significance.

Another prominent characteristic of research in cooperative marketing is the emphasis placed on description. In the developmental stages of research in any field much information descriptive of structure and processes is necessary to orient the research worker, and to point out research problems. Cooperation is no exception to this rule. Indeed, the kaleidoscopic character of the cooperative movement, with the continuous rise and fall of cooperative associations in the various agricultural trades, together with the emphasis of research on commercial aspects of the movement probably necessitate the collection of more data of a descriptive nature than

in many other branches of agricultural economics and perhaps will continue to require much of this type of research method, at least until the cooperative movement becomes more stable.

It appears, however, that more attention might profitably be given to scientific analysis. Description of structure and processes can solve few problems. Too often the data fall short of the goal to improve a funtcion or to remedy a situation. They can not answer the questions relating to such specific problems as what is the best size plant, when to sell, or the proper relation of the member to his association. Sufficient descriptive data do of course permit some qualitative analysis, although often not trustworthy because the data are frequently not collected with any definite problem in mind, and they rarely allow any quantitative analysis of any consequence. Fortunately, there is a pronounced tendency in recent years toward more detailed analysis as descriptive materials become more abundant and research workers are better trained for scientific analysis.

A third feature of research in American cooperation that should be mentioned is the development of cooperation among the various research agencies and between research workers and private businesses. The fine leadership of the United States Bureau of Agricultural Economics, particularly through its Division of Cooperation so far as cooperative marketing is concerned, in developing certain lines of research and particularly in promoting a coordinated program of research among the agricultural experiment stations, needs no discussion with this audience.[2] That the various states are making progress in unifying their research where they have similar problems, is evidenced by the occasional research conferences that have been promoted by different groups of states and by at least two coordinated research programs that to my knowledge have been undertaken. Considering the different stages of research generally existing in different departments, the different interests of research workers, and their individualism, this represents satisfactory progress in a difficult undertaking. It is also a wholesome development which can reasonably be extended considerably further in the interest of economy and effectiveness of research without serious impairment of the freedom of action of research workers or research agencies.

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[2] This Division was transferred to the Federal Farm Board in 1929

Probably of equal significance to this coordination of research is the assistance which private business, both cooperative and non-cooperative, has rendered by making available for research, information relating to various business practices and commercial organizations. One rather expects the management of cooperative associations to provide data from their business both because the data will be used to aid them and because of the encouragement which cooperation has generally received from public agencies. But the situation is quite different from non-cooperative businesses. In their case, the information may be and frequently is used to aid cooperative as well as non-cooperative organizations. That they are willing to continue to furnish research data under these circumstances is remarkable, and a fine testimony to the public spirit of American business leaders. It is an attitude which research workers can afford to encourage.

No summary of research in cooperative marketing is complete without a statement of some of the developments in various lines of research. The outstanding achievement in recent years is the development of the analysis of the business set-up of cooperative marketing business units. The first study, undertaken by Professor J. D. Black and Professor E. S. Gutherie at the University of Minnesota in cooperation with the United States Bureau of Agricultural Economics, was a detailed analysis of the economic organization of 88 Minnesota creameries in which statistical measurement was made of the factors affecting the efficiency of creamery organization. Other students have adopted this method of approach to the analysis of business organization and to some extent have adapted it to other types of problems. It is not generally followed, however, as large amounts of detailed information of a comparable character are necessary if it is to be used successfully. This limitation automatically excludes types of organizations that are not numerous, as large-scale marketing units, or organizations from only a few of which satisfactory data can be obtained. Moreover, rapid extension of this type of research has been retarded by the fact that many research workers in agricultural economics have had insufficient training in economic principles and particularly in statistical method to carry on studies of this character. As the members of our research staffs become more familiar with these aspects of economics, however, this type of research in quantitative analysis will likely be adopted more generally as it not only con-

tributes to a better understanding of production economics but also provides an excellent basis for extension work with market business units.

This type of research, it should be pointed out, is not restricted to cooperative organization but can, and to some extent is being used in other branches of research. It is as applicable to non-cooperative as to cooperative business, and can be effectively employed in studies of organization problems of such businesses as credit, insurance and farming. It is mentioned in this paper because its greatest development has been in connection with research dealing with cooperative marketing associations.

Another development of more recent origin is an increase in the number of surveys of cooperative associations. Greater emphasis on cooperative organization in connection with the national agricultural program of the Federal Farm Board has stimulated interest in the present status of cooperation, and it seems likely that we shall have a better enumeration of cooperative associations within a year or two than we have ever had before. Perhaps we shall also have a better understanding of the problems of cooperative associations, if one can judge the results by the amount of data which some of the surveys propose to assemble, altho the data called for in the field schedules that have come to my attention fall short of those required for the solution of most cooperative marketing problems.

Two other lines of research that have been stimulated by Farm Board policy merit consideration. These are price policies and membership relations of cooperative associations. As a section of the program of this conference is reserved for discussions of price analysis, mention need be made here only of the membership phase of cooperative price policy, namely pooling and settlement methods. The principles of pooling and methods of paying members are pretty well understood at the present time. What we now need most are studies of the application of these principles to particular types of commodities. The University of California has studied the application to fruits and vegetables, and the University of Minnesota to livestock.[3] A real service would be ren-

[3] California Bull. 432. Some Economic Aspects Involved in the Pooling of Fruit, by H. E. Erdman and H. R. Wellman. Minnesota Bul. 201. Organization and Management of Local Livestock Shipping Associations in Minnesota, by E. W. Gaumnitz and J. D. Black.

dered to cooperative associations if similar studies were made for other agricultural products.

Research relating to the relation of farmers to cooperative organizations has also increased as a result of the greater amount of organization work among farmers during the past year, although probably it has not increased as rapidly as the importance of the subject warrants. Too many farm organizations have failed in the past because they were not suited to the wishes of farmers as well as the needs of the industry. Our agricultural economic research departments have a real responsibility in developing a better understanding of the place of farmers in cooperative marketing associations lest history may be repeated in this particular.

COOPERATIVE MARKETING IN FINLAND

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MODERN agriculture is, in general, developing along two lines. Primary production, that is, the production of crops, livestock and livestock products is for the most part taking place on the family-size farm. Such farms are managed by individual farm operators, either owners or tenants, who carry on their farming enterprises on the basis of free competition under the capitalistic system. Every farmer produces as he sees fit and his success or failure is largely dependent on his professional skill and managerial ability. Such a system demands efficient and well-educated farmers.

In other directions, agriculture is developing along the lines of big business. Certain functions such as the provision of agricultural credit and insurance, the purchase of farm and household supplies, the processing and transportation of certain agricultural products, and so forth, which the individual farmer cannot efficiently perform for himself for technological, economic, or social reasons, are more and more being performed by groups of farmers on a large-scale basis. For the most part, such developments are along cooperative lines. Such enterprises, owned and operated by the farmers themselves, are in direct competition with public and private enterprises of the same kind, and demand a high degree of business ability and business training on the part of the persons responsible for their management, if they are to be operated successfully. It is desirable, if not essential, that farmers be educated to deal with the problems presented by large-scale cooperative organizations. To the extent that farmers operate their businesses successfully, society benefits.

The individual farm may, of course, be done away with entirely —not by evolution but by revolution—as in Russia, and agricultural production organized on a large-scale basis along communistic lines. However, I wish to deal specifically with the development of agricultural cooperation in Finland rather than with the more general phases of the cooperative movement.

There are approximately 200,000 individual farms in Finland, four-fifths of which are family-size farms. The operators of these farms generally obtain a part of their living from forestry. Since

the land reform of 1918, nearly all farms are owned by their operators.

About three-fourths of the 3.5 billion crop units are converted into livestock products of which milk, pork, beef, hides, and eggs are the most important. Approximately three-fourths of the farm land is productive forest land, and the sale of forest products is an important source of income.

While primary production takes place, for the most part, on small, individual farms, the manufacturing and marketing of agricultural produce and the purchasing of farm supplies is more and more being handled through cooperative organizations. Cooperation had its real beginning in Finland in 1899 with the founding of the "Pallervo-Society" for encouraging and developing cooperation. The cooperative law was passed in 1901 and came into force the same year. Both the agricultural population and city consumers embraced the cooperative idea with enthusiasm.

COOPERATION IN THE DAIRY INDUSTRY

The most important organizations for the marketing of agricultural produce in Finland are the cooperative butter and cheese factories with their central organization the Voinvientiosuusliike Valio.[1] This is to be expected since dairying is the most important line of animal production in Finland, developing early as an export industry. There were 1.3 million milch cows in the country in 1928, and the total milk production for that year was 2.5 million tons.

At the end of the last century, all of the butter and cheese made in Finland was produced in private or joint-stock creameries and cheese factories, or on farms. The cooperative creamery movement began in 1901 after the cooperative law, previously referred to, came into force. In 1902 there were 28 cooperative creameries in the country. Within ten years of that date, cooperative organizations practically controlled the dairy produce trade of the country. In 1927, 83 per cent of all creameries were cooperative, while 94 per cent of the butter manufactured was produced in cooperative plants. In the same year, 68 per cent of the cheese produced was manufactured by cooperatives.

In 1928, the cooperative dairy factories numbered 676, with a

[1] The Central Cooperative Butter Export Association.

membership of 70,200 farmers. Sales approached 900 million Finnish marks.[2] There were 26 cheese factories, while 34 creameries produced cheese as well as butter, bringing the total number of cooperative dairy factories manufacturing cheese up to 60. Most of the dairy factories are in southwestern Finland.

Of the membership in cooperative dairy factories in 1927, 38 per cent were owners of from 1 to 3 cows, 55 per cent owned from 4 to 15 cows, while only 7 per cent of the total membership owned more than 15 cows. The average was 6 cows per member. In 1928, the production of 427,000 cows or 33 per cent of the total number of cows in the country, was being handled through cooperative dairy factories. The corresponding figure for 1920 was 26 per cent. It is evident that the possibilities for further development of the cooperative dairy factory movement are still great.

The cooperative dairy factories received 602 million kilograms of milk in 1928, or 1,462 kilograms per cow.[3] Butter and cheese manufactured, totaled 19.5 million kilograms and 2.4 million kilograms respectively. Of the total quantity of milk received in 1928, an average of 78 per cent was used in the manufacture of butter, 5 per cent in the manufacture of cheese, while 14 per cent was sold. Most of the butter and cheese was exported. In 1929, only about one-third of the butter produced in dairy factories was consumed in Finland. In 1927, exports of butter totaled 16.6 million kilograms, while exports of cheese amounted to 2.2 million kilograms. The total value of the exports of dairy products in 1929 amounted to over 700 million Finnish marks. The greater part of the butter exports go to Great Britain, while Germany is the principal customer for Finnish cheese. Gross returns per kilogram of butter manufactured amounted to 32.37 Finnish marks in 1928. Operating expenses were 10.9 per cent of gross returns, compared with a figure of 12.8 per cent in 1910.

Greater interest than ever before is being shown by the cooperative dairy factories in the quality of their products. Special efforts have been made to raise the standard of the butter produced. Dairy machinery has been renewed and brought into first-class condition; ever increasing stress has been placed on the training of the professional staff; competitions have been held to stimulate enthusiasm and in other ways premiums have been placed on quality.

[2] $1 = 39.70 Finnish marks.
[3] 1 kilogram = 2.2 pounds.

The result of these measures has been an ever increasing improvement in the quality of the butter, but it was not until serious measures were adopted to improve the quality of the milk used, that permanent improvement was assured. The most effective of the means used to improve the quality of the milk was the introduction of the system of payment by quality originated by Orla Jensen of Denmark, according to which the producer is paid for milk, not only on the basis of the fat content, but also on the basis of quality. Eighty-five per cent of the cooperative dairy factories are using this system of payment.

The quality of the milk received by the dairy factories has improved a great deal. While only 40 to 50 per cent of the milk could formerly be considered as first-class, investigations made during the period 1924-26 showed that 91 per cent of the milk used by the cooperative dairy factories was of good quality, while only 9 per cent was poor In the year 1928, 95 per cent of the export butter was of first class quality. In the degree that the milk received by the dairy factories has improved, the quality of the butter manufactured from it has improved.

Another factor that has made for better quality is the increasing use of pure cultures of bacteria for turning cream. These cultures are now procured for the dairies by the Cooperative Butter Export Association Valio.

Valio was founded in 1905 by the Finnish cooperative dairy factories for the purpose of controlling their butter sales, and of keeping the advantages arising out of such control, in their own hands. To start with, only 17 factories joined this association, although there were about two hundred cooperative dairy factories and at least five hundred joint-stock dairy factories in the country. In 1929, there were 513 factories which were members of Valio. Valio handled 333,000 casks of butter (50.8 kilograms per cask), 1.7 million kilograms of cheese, and 62 million litres of milk and cream. The butter was pooled weekly, while cheese was pooled monthly. In 1929, the total volume of sales amounted to 710 million Finnish marks.

Valio has practically a monopoly of the Finnish export butter market and it is also the largest firm in the home market. It controls well over 90 per cent of the butter export trade of Finland, and over 50 per cent of the export cheese trade. This is a very remarkable achievement indeed. In 1910, Valio controlled only 41

per cent of the butter exports. Valio has, among others, its own sales office in Hull and an agency in Glasgow. It has 6 branch offices in Finland, of which 4 are in the largest cities of the country with their own plants manufacturing and distributing dairy products, their own cold storages, and so forth.

In addition to its manufacturing and marketing operations, Valio has done very valuable work in raising the standard of quality of dairy products as well as to increase the output. In its technical department, Valio employs twelve advisers who collect statistics concerning the operations of the cooperative dairy factories, compile yearly records for the various establishments, take care of extension work, assist in projecting new dairies, and so forth. It has energetically gone about improving the cheese industry. To begin with, Valio founded an experimental plant for the making of cheese and then began to train skillful cheese makers. Furthermore, Valio placed its own paid adviser in each of the Finnish Dairy Leagues, 18 in number, to do extension work in modern butter making methods and to work for improvement in the quality of the milk brought to the creameries. It has trained over 100 dairy factory managers. To guide the extension work of these advisers or specialists, a special Extension Department was added to the Valio organization. Among other things, extension work is done in connection with such problems as the nutrition of cows, the planning and taking care of cultivated pastures, the growing and preservation of green fodder, and so forth. There is a research laboratory including chemical, physical, and bacteriological sections. In addition to its many other activities, Valio publishes two agricultural periodicals.[4]

Valio's wholesale costs of distribution have averaged between 1 and 1½ per cent of the wholesale price in the case of butter. The cost of retailing butter in the domestic market has averaged about 6 per cent. In wholesaling fluid milk, costs have averaged from 6 to 8 per cent, while retailing costs in the case of milk have averaged from 11 to 12 per cent.

The Swedish speaking districts of the province of Ostrobothnia have a separate cooperative butter export association, Centralandelslaget Enigheten. Its membership in 1927 consisted of 22 cooperative dairy factories, its turn-over was 42 million marks, and it exported 6 per cent of the total butter exports of Finland.

[4] "Karjontuote" or Cattle Produce and "Karjatalous" or Cattle Farming

The cooperative dairy movement in Finland has resulted in the development of the manufacturing and marketing of dairy produce on a modern, large-scale basis, with the use of up-to-date scientific methods. The quality of the product has been greatly improved so that Finnish dairy produce is able to compete successfully on the world's markets. The cooperative dairy organizations have each year added millions of marks to the income of Finnish dairy farmers.

COOPERATIVE LIVESTOCK MARKETING

A second type of agricultural cooperative marketing in Finland is the cooperative livestock marketing organization. Finland produces about 90 million kilograms of meat annually. Prior to 1909, the livestock trade was wholly in the hands of private butchers and dealers in livestock. In that year, the first cooperative livestock marketing societies were formed. The increased demand for meat for the Russian troops in Finland, during the first years of the World War, gave a great impetus to the formation of these societies. Later, a number of them consolidated so that by 1928 only 10 were in existence. During the war, some of the livestock cooperative societies developed into large concerns owning several slaughterhouses each; one even built a modern establishment for the manufacture of bacon.

The combined membership of the livestock societies numbered 5,000 in 1928, and their sales of meat totaled 5.5 million kilograms, valued at 112 million Finnish marks. Nearly all of the societies have one or more retail shops, one society having fifteen. For the most part, they have their own slaughterhouses, and every one has its own sausage factory. Some even have their own farms and swine houses as well.

In 1918, the cooperative livestock societies founded their own central organization, "The Finnish Livestock Central Cooperative Association." In 1929, it had 34 members of which part were local cooperative livestock societies, and part were dairy factories and distributive stores. The central organization has 2 export slaughterhouses, 3 wholesale centers, 3 sausage factories, and 26 sausage, provision and butchers' shops, all of which are fully modern. It has done a certain amount of foreign trade in the produce of its affiliated members. The farmers sell the meat at the prices ruling in the open market. In 1929, the amount of

meat sold amounted to 4.9 million kilograms valued at 107 million Finnish marks.

The success of the societies with their central organization is indicated by the fact that meat exports from Finland during the past few years have been considerably larger than imports. Formerly, the reverse was the case. The home market for meat is also steadier than formerly, and with the central organization in direct touch with the farmers selling cattle, distribution costs are relatively low. The central organization is using modern machinery and modern methods in converting meat so that consumers are getting high quality products. There is still, however, considerable opportunity for further development, as Finland, with her excellent pasture lands, is well adapted to cattle raising, and hogs can also be produced to advantage.

COOPERATIVE EGG MARKETING

Among the youngest of our agricultural cooperatives are the cooperative egg-selling societies. The exceptional conditions of war also gave an impetus to their development. When imports of eggs ceased, egg prices rose and egg production became very profitable. Naturally, the marketing of eggs became important. A large number of egg-selling societies was organized during the period 1919-22. At present there are 95 local egg-selling societies, the membership of which is about 7,000, and annual sales total 13 million Finnish marks. In 1921, the local societies founded a central organization, "The Central Cooperative Egg Export Association Muna".[5] Besides trading, this organization disseminates information relative to the poultry industry, and assists in the organization of local cooperative egg-selling societies. It may be said that in some instances, creameries are functioning as egg-selling agencies.

COOPERATIVE PURCHASING

Among the central concerns of the agricultural cooperative societies might also be mentioned the Hankkija, or Cooperative Agricultural Supply Society, founded in 1905.[6] It sells agricultural and dairy supplies, machinery for dairies, saw-mills and flour mills,

[5] "Muna" means egg.
[6] "Hankkija" means purveyor or supplier.

as well as electric equipment. It also sells agricultural products. Hankkija also owns and operates a large experimental station with research laboratories for plant breeding. The membership, which in 1929 numbered 1,217, is made up for the most part of cooperative stores, dairy factories and rural banks. In 1929, 261 cooperative stores which were members of Hankkija sold agricultural supplies in the amount of 337 million Finnish marks. In the same year, Hankkija had 9 branch stores and 6 local agencies.

COOPERATIVE MARKETING OF FOREST PRODUCTS

Finland, with her well-developed farm forests, provides abundant opportunity for the development of timber-selling cooperative societies. It is only recently, however, that such societies have been organized and the lack of sufficient capital continues to prove a serious handicap. The small societies which were originally organized found it difficult to secure a good price for their products due in part to the fact that they could not afford to buy the necessary modern machinery for carrying on their enterprises. In any case, they found themselves completely in the hands of the agents through whom they sold their products. To overcome some of these difficulties, the Central Association of Cooperative Forest Societies was founded in 1921. In 1929, there were 11 member societies with a combined membership of 4,200. Sales totaled approximately 35,000 standards, valued at 101 million Finnish marks. The products of the member societies are marketed by the central association which owns lumber yards in the more important timber export harbours of Finland.

OTHER TYPES OF COOPERATIVE ORGANIZATIONS

It may be mentioned that there are approximately 1,600 cooperative banks in Finland with a large central organization. There are about 500 cooperative stores with two central organizations. The combined turnover of ten central cooperative organizations in 1927 was 4.0 billion Finnish marks. The combined turnover of the locals in 1928 was 5.3 billion marks.

CONCLUSION

The general information given above concerning the agricultural cooperative marketing organizations of Finland shows that these

organizations have gained a firm foothold in the marketing of agricultural produce and supplies. The cooperative movement is scarcely thirty years old, yet it has completely revolutionized the whole agricultural marketing system of Finland. Within two decades the necessary organization has been created, working methods have been developed which are suited to the conditions peculiar to the country, and the professional skill, moral standards, and national well-being of the agricultural population have been greatly advanced. Through cooperative effort, farmers are securing for themselves something more nearly approaching their fair share of the national income, thereby enabling them to raise their standards of living and to develop a richer and fuller rural life.

COOPERATIVE MARKETING IN THE UNITED STATES[1]

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THE PAINTING of a picture of cooperative marketing in the United States in the few minutes at my disposal necessarily must call into play a broad brush and sweeping strokes. Details of the picture must be subordinated. It is a safe assumption that in a group of this kind the fundamentals of cooperation are so well understood that discussion of them may well be left out. I think, however, that a correct picture of organized marketing activities among farmers in the United States may not be obtained by our visitors from across the waters unless some little attention is given to the background of our developments.

When we discuss problems of production, of land ownership, tenancy arrangements and even of management practices, it is possible for us to draw upon the experiences of numbers of generations of the past. In the field of marketing and particularly in that of cooperative marketing, our experience is mostly of relatively recent date. It is true that we can find some traces of organized sales activity among farmers of earlier days but such instances are neither numerous nor particularly instructive to us in the solution of our present day problems.

The Rochdale pioneers, whose history is, of course, particularly well known to our British visitors, undertook their famous experiment less than a century ago. While that was the beginning of a consumers' purchasing movement and not an agricultural marketing development, the principles adopted by the flannel weavers in that humble enterprise of Toad Lane have been at the bottom of cooperative marketing developments. This has been true to such an extent that the term "Rochdale" has been used as a synonym for "cooperative" by many persons in describing agricultural cooperatives in America.

There were some developments among laborers in this country about the middle of the nineteenth century which gave encouragement to farmers. However, the first extensive stimulus to cooperative activity among farmers of the United States followed

[1] Acknowledgment is made to the Division of Cooperative Marketing for some of the statistics included.

in the wake of the Civil War in the late sixties and early seventies. A period of depressed prices for agricultural products resulted from post-war readjustments. Lands of the Middle West were being settled rapidly and production was expanding. An organization known as the Patrons of Husbandry, or more commonly as The Grange, was born during this period. Its originators, who consisted primarily of government workers in Washington under the leadership of Oliver H. Kelly, established what they conceived as a fraternal society for farmers, in 1867. Apparently, the tillers of the soil of that day were not greatly concerned with the possibilities of such a society. Their pressing problem was one of obtaining a sufficient margin between costs and selling prices to enable them to make ends meet. Growth of the Grange was by no means spectacular until organization emphasis was placed upon its economic possibilities. When farmers gained the impression that the Grange could serve them in marketing so as to get higher prices for their products and in purchasing and manufacturing so as to reduce their costs, then the movement spread like a prairie fire.

The Grange, not being established for business purposes, its leaders lacking in business experience, its organizers over-promising, its membership expecting the impossible, disintegrated about as rapidly as it had spread, so that by 1880 a large share of its business enterprises no longer were functioning. The order, however, continued to exist and for a long time has been one of the strong agricultural groups of the country. Its service since then has been as a general rather than as a marketing institution.

While the disastrous experiences of this period acted as a brake upon cooperative enthusiasm, they served a constructive purpose in that they inculcated in many minds a better appreciation of limitations and essentials. The growth during the years following was slow and consisted mainly in the development of isolated local units. Large numbers of such enterprises as farmers' grain elevator companies, cooperative creameries and other local enterprises have been established, mostly since the late eighties and particularly since the present century began. There were some scattered large-scale undertakings but they were the exception rather than the rule. More of the latter began to be in evidence about the war period. War conditions led to rapid and extensive organiza-

tion of market milk producers. As is well known to a group of agricultural economists, such as this, the period following the World War has been unfavorable to farm interests. As in the years following the Civil War, conditions in the early twenties were ripe for organization. Wheat pools, tobacco pools, cotton associations, potato exchanges, poultry associations and other activities were established on a large scale. Enthusiasm for cooperation was rampant. Its possibilities were thought to be unlimited. "Orderly marketing," "merchandising," "feeding the market," and other high-sounding terms were on the lips of organizers and enthusiasts. The intricacies of price-making forces were reduced to simple terms and control over these forces was assumed to be in the organized farmers' hands. Again, too much was expected. Again cooperation was oversold. Again it had to recede from some of its gains. However, plans were better than those of the period a half century earlier during the cooperative boom following the Civil War Experience was greater. Better management was available. So while the failures have been numerous and significant, not all of the growth has been of the mushroom variety.

The settling down process has enabled leaders to see problems more nearly in their proper perspective. They have been weaned away from blind faith in size and monoply control. They recognize that there may be a place for local ventures as well as for large central bodies. They recognize that it takes more than signatures to contracts to assure success.

Against this background, I believe I can best portray for you the present status of cooperative marketing by taking up for brief review the developments in the various groups of products such as grain, dairy, livestock, fruits and vegetables, cotton and so on.

Our statistical data of cooperative development are by no means complete, but surveys indicate the existence of about 12,000 purchasing and marketing associations. These associations are estimated to have a total membership of about three million and to carry on an annual volume of business of better than two billion dollars. The middle western states occupy a prominent place in cooperative marketing because of the large number of farmers' grain elevator organizations, cooperative creameries and cheese factories, and livestock shipping associations in that area. Thus in a survey made by the United States Department of Agriculture, over 5,000 associations doing a business of over 800 million dol-

lars were listed in the West North Central groups of states.[2] The East North Central group had over 3,000 associations handling over 500 million dollars. On the Pacific Coast, the volume of business handled is large because of the existence of a number of large associations. In this group of states 665 associations had a total volume of about 300 million dollars. The Southern, the New England, the Middle Atlantic and the Mountain areas do not have as extensive a development.

Naturally, in a country with such varying conditions and commodities as the United States, a wide range of organization forms are found. Classified on the basis of area, some are purely local while others are engaged in nation-wide distribution. On the basis of plan of organization, some are organized with capital stock so that membership is dependent upon the ownership of one or more shares of stock; others are non-stock or membership associations. Some adhere strictly to cooperative principles; others have little or nothing to distinguish them from the ordinary business company. Some purchase or take title to the products on delivery; others act merely as selling agents. Some pool the returns for the season, some for shorter periods and some practice no definite price pooling. Some aim to do business only with members; others accept products without regard to membership. Some place considerable reliance upon membership contracts binding members to deliver products; others impose no obligation of delivery. Of the larger organizations, we find two general classes. One is the federation which is made up of definite local organizations; the other is the centralized form in which locals, if any, are informal. In the former, the producer is a member of his local association and that, in turn, is a member of the overhead organization, or a district unit may intervene. In the centralized form of organization the producer holds membership directly in the central organization.

In order to give a better concept of developments in the United States, I shall summarize very briefly the situation with respect to some of the more important groups of commodities.

GRAIN

There were some farmers' grain elevators established during the seventies when the Grange had its rapid growth. However, the

[2] Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska and Kansas.

present development is for the most part of more recent date. During the latter part of the last century and the beginning of the present, competition among grain buyers at many local points was restricted to the extent that much dissatisfaction arose among farmers. Groups of farmers attempting to establish their own elevators to overcome the situation found the organized opposition too strong. Temporarily higher prices were employed by competitors to wean the producers away from their own organization. Boycotts in terminal markets made it difficult to sell grain. Cars for shipping the grain were sometimes difficult for farmers' groups to obtain. Such obstacles created a situation which appeared insurmountable but gradually, here and there, farmers' elevators managed to meet the situation. They were helped by the fact that one or two commission firms in the central market decided to defy the organized grain trade and cater to the farmers' elevator patronage. In order to expand their own volume these firms became active organizers of new groups and this gave added impetus to the movement.

Farmers' elevators are now well established. There probably are in the neighborhood of 4,000 of them in operation, mostly in the middle western states. A typical elevator company is a capital stock organization in which farmers are stockholders. With few exceptions, such a company restricts its activities to a single elevator serving a community around a given local shipping point. Farmers' elevators frequently have been criticized for their failure to adhere more closely to cooperative principles. The customary practice is for these elevators to buy for cash all grain offered to them without regard to membership of the seller. The ruling market price is paid. If profits result beyond the requirements for reserves, patronage dividends may be paid although this practice is by no means universal. The absence of suitable cooperative legislation in earlier days forced many of the original farmers' elevators to organize on the ordinary stock company plan. The custom of restricting voting power and limiting dividends on capital stock has become more common in later years. Where patronage dividends are paid, they frequently are paid only to stockholders. In many companies, considerable stock is owned by non-farmers and in some instances such concerns may find it difficult to resist the temptation to operate on a basis of paying sizeable dividends on the stock.

Attention may be called at this point to the difference in organization procedure in the United States and Canada. While the farmers in the United States first organized local companies, Canadian farmers entered the terminal market at the outset and as a result organized cooperative line elevator companies in the western provinces, each company owning and operating a chain of elevators. For the local farmers' elevators of the United States to play any part in the terminal market some form of overhead organization must be created. After local elevators were well established, the natural thing to do was to consider the next step—that of entering the terminal market. That has been attempted in various ways but without any very outstanding success up to the present. There are several farmers' commission companies selling grain in terminal markets. Eleven such agencies are reported to have handled somewhat less than 50 million bushels of grain during the 1928-29 season. The United States Grain Growers, launched about 10 years ago, had the end in view of becoming a national sales outlet but dissipated its strength before becoming an active operating unit. A subsequent movement known as the Grain Marketing Company failed to acquire the needed support and was abandoned. The Farmers' National Grain Corporation organized last fall under Federal Farm Board auspices is the latest enterprise.

The wave of interest in pooling movements following the war led to the organization of grain pools in a number of states. The earlier pool organizations formed in the Pacific Northwest have discontinued operations. Pools in the Middle West and Southwest have not acquired sufficient support to become very prominent in the market. They do not occupy a position comparable to that achieved by the pools of Western Canada.

DAIRY PRODUCTS

Local cooperative creameries are found at many points, particularly in Minnesota, Wisconsin and northern Iowa. Out of 856 creameries in Minnesota, 671 are cooperative. They made 186 million pounds of butter in 1928 out of a total production in the state of 273 million pounds. These creameries ordinarily are formed with capital stock. However, they adhere much more closely to such cooperative principles as one-man-one-vote, restricted dividends on capital stock, and the apportionment of bene-

fits on the basis of patronage, than do elevators. While some farmers' creameries pay farmers cash on delivery, the customary plan is for payment to be made once a month for butterfat delivered during the previous month. This plan makes it possible for creameries to operate more nearly on a cost basis and eliminates a good many of the speculative hazards.

Cooperative creameries have established some central selling organizations. Outstanding among these is the Land O'Lakes Creameries, Inc., an overhead organization consisting of over 400 creameries located chiefly in Minnesota and adjoining states. Last year this organization handled 93 million pounds of butter and also sold considerable quantities of sweet cream, milk powder, casein, eggs and poultry. It has rendered very valuable service in quality improvement, standardization, advertising, establishing new market contacts and in developing by-products.

A few central cooperative creameries have been established in areas where the cow population is not sufficiently dense to support local creameries.

Wisconsin is by far the leading cheese producing state and it numbers within its borders several hundred cooperative cheese factories. A number of these have developed a central selling organization known as the National Cheese Producers Federation to serve as the sales outlet for the product of member factories.

Market milk producers' organizations constitute a field of cooperative activity which, in the main, appears to be highly successful. Sporadic attempts at organization among producers of fluid milk for metropolitan centers go back to the seventies. However, the modern movement is largely the outgrowth of the situation which arose during the World War period. Milk distribution in our larger cities is mainly in the hands of large dealers. There is no semblance of equality of bargaining power between the individual small producer and the large distributor who buys his milk. Retail milk prices had remained unchanged in many cities for a long period prior to the war. Consumers had become accustomed to paying a certain price for milk just as they were accustomed to an unchanging price for street car rides, telephone calls and the like. Rising feed and labor costs made imperative an increase in price to the farmers for their milk. But dealers were loath to make a change which would involve raising the price to their customers. It was under circumstances such as these that

milk producers in many metropolitan areas held protest meetings leading to demands for increased prices backed up by threats to withhold milk if their demands were not granted. Milk "strikes" or boycotts resulted at several points and in many of them the producers emerged victorious. There was a period of uncertainty during which local authorities in some cities started the prosecution of leaders of milk producer groups under the anti-trust laws on the grounds that such boycotts were conspiracies to fix prices and restrain trade. The producers received favorable decisions in cases which reached the trial stage.

It became recognized that something more permanent than the initial rather loosely formed associations was necessary. At present we find well-established associations serving many of the larger metropolitan areas. Some of these restrict their activities largely to collective bargaining, not actually handling either the milk or the payments therefor. Surplus milk is handled by the distributors by special arrangements. Other groups are sales organizations which sell to distributors their requirements of fluid milk and take care of surplus milk themselves by manufacture or processing. In some cases, more commonly in smaller markets, the producers' organization has gone the entire route by establishing cooperative distributing plants delivering to the consumer

LIVESTOCK

Nearly all of the existing cooperative development in livestock marketing has come into existence during the past 15 or 20 years. There are several thousand cooperative shipping associations, most of which are rather informal enterprises. A simple association is formed, a board of directors elected, and a manager employed Shipping associations commonly serve farmers around a single shipping point In a few states, organizations are on a county basis rather than on a local community basis. Stock is shipped on certain days. The farmer delivers the stock to the local shipping yards. The association manager receives it, weighs it, grades it or places an identifying mark on the animals. He has charge of the loading and shipping to the terminal yards or to the packer. Payment is made after returns are received from the market, making any extensive operating capital unnecessary.

Cooperative commission associations have now been established in many of the terminal markets to handle the sale of stock in such

markets both for local cooperatives and individual farmers. These commission associations handle sales of livestock in the same way as private commission firms except that any excess left from the commissions charged after paying expenses and setting up reserves is refunded to the members. Some of these associations have become the leading agencies in their markets. The largest of these enterprises, the Central Cooperative Association at South St. Paul, Minnesota, handled nearly 37 million dollars worth of business last year which represented about 30 per cent of the receipts at that market. Twenty-eight commission associations located in 22 markets handled approximately 315 million dollars worth of business in 1929. Upwards of 13 million animals were handled by these associations.

Unlike some of the European countries, notably Denmark, the United States has not developed cooperative slaughtering or meat packing plants. Some years ago, several such enterprises were launched but for the most part they represented the activities of professional promoters who played on the farmers' prejudices towards the large meat packers in selling them stock in these ventures. Most of them were poorly conceived, inadequately financed and improperly directed. The natural outcome was failure.

COTTON

There have been various movements to organize cooperative cotton warehousing or marketing enterprises. However, the development of cooperative selling has not proceeded to the same extent as in grain. There is no development in cotton corresponding to the farmers' elevator movement for grain. The low cotton prices following the war led to a concerted organization movement among cotton growers, the organizations commonly being formed on the centralized plan with members signing contracts requiring them to deliver their cotton to the organization. Such associations were formed in the different cotton states, and in some cases where different types of cotton are grown, more than one organization was established in a state. During the season 1928-29, 16 associations handled 1,163,957 bales, or 8 per cent of the total crop. A central selling organization has been formed to act as a sales outlet for the various associations.

FRUITS AND VEGETABLES

Cooperative marketing developments for fruits and vegetables present a greater variety of organization than is true for most other classes of products. There is less standardization as to plan of organization or operation and they range in size from small local groups to large enterprises controlling the sale of a large proportion of the output of a given product and being engaged in national distribution. Among some of the outstanding illustrations, may be mentioned the California Fruit Growers Exchange which markets over 70 per cent of the sales of citrus fruits from California. This is a federation made up of about 11,000 growers who are grouped into approximately 200 local associations, which in turn are united into 20 district groups which make up the Exchange. For the past 25 years, this organization has been an important factor in marketing citrus fruits. It maintains an extensive sales organization with representatives in the leading markets. Careful attention is paid to quality and grade and demand is developed by consistent advertising. Other well known organizations include the American Cranberry Exchange, which markets about two-thirds of the cranberries produced in Massachusetts, New Jersey and Wisconsin; the Eastern Shore of Virginia Produce Exchange; the Michigan Potato Exchange; the Florida Citrus Exchange and the California Prune and Apricot growers.

The United States Department of Agriculture has estimated the volume of 1,269 fruit and vegetable associations for the year 1928 at 300 million dollars.

POULTRY AND EGGS

Poultry producers in the United States, may, in general, be classified into two groups, the farm flock producers and the commercial producers. The former maintain poultry as one of the enterprises in a general or diversified type of farming. Poultry tends to be a sideline on these farms in most cases. In the case of the commercial producers, poultry is the principal enterprise. Such producers are found most commonly near metropolitan markets or in areas, such as some sections of the Pacific Coast, where conditions are especially favorable.

While the bulk of the supply comes from farm flocks, it is in the commercial poultry areas that most progress has been made in

cooperative selling. It is difficult to organize the general farmers for the sale of a sideline product. Their volume of business is not sufficiently large to stimulate the care needed to obtain the highest quality. The largest associations are found on the Pacific Coast. Several of these associations have a central selling agency known as the Pacific Egg Producers with headquarters in New York City to sell the eggs shipped by these organizations to eastern markets.

Fifty-three associations reported handling a total of something over 4 million cases (30 dozen eggs to the case) in 1928, the sales totalling in the neighborhood of 40 million dollars.

WOOL

A number of wool associations have been established, ranging from the informal local pool which receives bids on the wool delivered by its members and sells it to the highest bidder with little or no grading, to the large association equipped with warehouses, and selling wool on the basis of commercial grades. Sixty-two associations reported nearly 16 million pounds of wool handled in 1928.

TOBACCO

The situation in tobacco markets following the war was such that tobacco growers organized extensively and rapidly for selling. Unfortunately, set backs have been unusually severe in this field with the consequence that all of the larger developments have been forced to discontinue operations. Tobacco cooperatives suffered from a variety of problems. Growers were led to expect too much. Prices held at unnatural levels stimulated over-production. In one or two cases, there were some outstanding illustrations of mismanagement. The concentrated outlets for most types of tobacco leaf is also a factor not without significance.

COOPERATIVE PURCHASING

Presumably, this discussion is intended to devote itself to marketing rather than to purchasing. However, a brief mention of buying activities may not be out of place. Some marketing associations also handle supplies. This is especially true of farmers'

elevators. Many of these deal in lumber, fuel, drain tile, cement and other bulky supplies needed by the farmer. There are a few outstanding associations devoted entirely to cooperative buying. One of these has its headquarters here at Ithaca, namely the G. L. F. Exchange The Eastern States Farmers' Exchange in Massachusetts is another illustration. Both of these associations are in areas where milk producers require large quantities of concentrated feeds for their herds. The Fruit Growers Supply Company is a purchasing association for members of the California Fruit Growers Exchange. There are some farmers' cooperative stores but these are not numerous. A recent development which has achieved considerable success has been the organization of a number of cooperative oil stations to handle gasoline, kerosene and lubricating oils for farmers' tractors and automobiles.

GENERAL ORGANIZATIONS

The farmers of the United States have several general organizations which take more or less interest in cooperative marketing. Such associations often foster the development of cooperative business organizations. At times, it appears unfortunate that there are several such groups in place of a single body. Friction between such groups may dissipate the enthusiasm of some farmers for organization. When it comes to presenting the farmers' side in legislative matters, a babble of voices is not conducive to securing the most effective presentation of the case.

As a concluding generalization, it might be said that cooperative marketing in the United States appears to have outgrown, in the main, the stage in which it was regarded as a panacea for all the economic ills of agriculture. The relationship of agricultural cooperation to price is understood much better than some years ago, although there is still room for improvement. Cooperative associations are being viewed more in their proper light as business ventures. It is becoming more commonly understood that cooperatives are service-rendering enterprises and that the success which they attain is dependent upon their ability to serve. The peculiarly important place occupied by the member is understood better than it was a decade ago and more consideration is being given to keeping members acquainted with the business of their organization. Membership relations constitute a field which still has many prob-

lems to be solved. There is need for more wide spread education in the fundamentals. There has been enough of propaganda urging organization; there is still room for much educational work. Our cooperative movement will grow and expand only as rapidly and to the extent that farmers are ready and willing to undertake and support these developments. On the whole, much progress has been made. The stage appears to be set for steady and conservative growth for the future.

RELATION OF THE FEDERAL FARM BOARD TO COOPERATIVE MARKETING

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Almost nine years of agitation for farm relief legislation culminated in the enactment of the Agricultural Marketing Act. This Act created a Federal Farm Board of eight members, with the Secretary of Agriculture a member ex-officio. The appropriation of a fund of $500,000,000 was authorized.

The Federal Farm Board has been given far-reaching powers and a tremendous responsibility. Congress gave it a mandate, "to promote the effective merchandising of agricultural commodities in interstate and foreign commerce so that the industry of agriculture will be placed on a basis of economic equality with other industries." This is probably the most difficult and intangible task ever placed before any federal board.

Encouragement of cooperative marketing is essentially the heart of the Agricultural Marketing Act. The word "cooperative," appears in practically every paragraph. The Board is directed to encourage "the organization of producers into effective associations or corporations under their own control * *," "to promote education in the principles and practices of cooperative marketing * *," and to make loans to cooperative associations from the revolving fund, and to stabilization corporations, owned and controlled by cooperative associations. Inevitably, the Board's work will have a profound influence on the development of farmers' cooperative organizations in the United States.

This paper deals only with the relation of the Federal Farm Board to cooperative marketing and the effect which its activities may have on the cooperative movement. The work of the Farm Board was discussed, I believe, earlier in this session. It is unnecessary, therefore, to consider the powers of the Board, the mechanics of its operations, or the work which it has done during the past year.

Financing of cooperative associations is an important feature of the Farm Board's program. In fact, by and large, the work incident to extending financial assistance to cooperative organizations makes up the greater part of the activities of the Board and its

staff. It is obvious, of course, that cooperative associations can be greatly aided by wise financing, and equally obvious that they may be retarded by unwise or unsound assistance. Furthermore, federal aid to cooperatives will be of little benefit unless it results in strengthening and extending the movement. The substitution of Farm Board funds at low rates of interest for money obtained by cooperatives from other sources will not be helpful unless it results in organizations which can serve the producers more effectively. The Farm Board consequently has agreed that it will not lend money to a cooperative association merely to enable that association to obtain the advantage of a lower interest rate. The money must be used specifically to further the development of cooperative organizations. The Board is not interested in helping groups which are content to stand still.

As a condition of its financial assistance, therefore, the Board requires that the association aided shall become a member of a national or regional cooperative organization, or if no national or regional cooperative association is then in existence, that the association will join such a regional or national agency whenever established. It is the purpose of this policy to centralize cooperative control, by commodities, and, whenever feasible, to make local and regional associations members of one large national marketing agency. One of the weaknesses of cooperative marketing in this country has been the existence of small competing groups, handling grain, livestock, or fruits and vegetables, without reference to the activities of similar groups handling the same product. Cooperative marketing has been lacking in unity. Sectional and organizational jealousies, local pride, and the pride of independent control, have been retarding factors. The assistance, financial and otherwise, which the Board is able to extend has served as a magnet to draw together many organizations formerly antagonistic.

It is not the policy of the Federal Farm Board merely to pass out money to cooperative associations. It does not intend to become a source of low-interest credit for cooperatives, but it is its purpose to use the funds which it has at its command as wisely and effectively as it can to strengthen and extend cooperation.

Its responsibility as a financial agency inevitably places the Board in an advisory relationship to the cooperative associations. Federal funds can not be disbursed without assurance of the safety of the loan, or without assurance that the money will be used to

further cooperative marketing. A preliminary investigation must be made before a loan is granted. Properties must be appraised, and the financial condition of the organization made clear by an audit. Furthermore, consideration must be given to the form of organization and business policies of the association, the relation of the association to its members, and its place in the field of marketing. After a loan is granted, a somewhat similar inspection or survey of each association indebted to the Board must be made at least once a year to assure the Board that the association is being operated efficiently and the loans used for proper purposes. The Board can not avoid assuming a greater or less degree of responsibility for the success of associations to which it has made loans. This relationship possesses obvious advantages from the point of view of improving the business methods of the associations. It also possesses certain disadvantages. Perhaps the extent to which the advantages outweigh disadvantages will determine the success of the Federal Farm Board's program.

First, let us consider the advantages. The watchful eye of the Federal Farm Board on the associations indebted to it will tend to encourage good business practices. It will serve as a check on loose accounting methods and unwise expenditure of funds. The advice of the Board's marketing specialists will be available to the associations. They will be brought into closer contact with marketing information compiled by the United States Department of Agriculture and the state colleges. There will be an insistence upon sound financial and merchandising policies.

Secondly, support by the Board of a cooperative association gives farmers and business men added confidence in the organization. This is true in particular instances and is true of the cooperative movement as a whole. The fact that the government, through its Federal Farm Board, is definitely supporting cooperation has created interest and confidence. There has been ample evidence of this development during the past few months.

Again, the Board's relationship to cooperative marketing will serve to protect the interests of the farmers in the large cooperative marketing organizations, wherever a tendency may develop to neglect the interests of the producers. It is not implied that cooperative associations are generally unmindful of the interest of their members. The contrary is true. But in some cases, large cooperative associations have been diverted from the primary purpose for

which they have been formed, and have been operated to serve the interests of small groups rather than those of all the members.

When farmers without previous experience in big business operations come together to form a large association, or federate their local organizations to form a large overhead agency, they are, to an unusual degree, dependent upon the ability and integrity of their management. Cases of actual fraud on the part of the management are, fortunately, rare in cooperative marketing. But there have been cases in which the interests of the members were not the exclusive concern of the management. Under such conditions, policies may be determined or colored by the selfish interests of certain officials. When these interests come into conflict with the welfare of the association, the right view may not prevail and the organization may be wrecked.

Tendencies of this kind have come to light sufficiently frequently to make me believe that the Board should scrutinize carefully the management of any association applying for financial aid. This danger, it is to be hoped, will be entirely removed by the development of understanding regarding cooperative principles and practices and the growth of leadership among the farmers themselves. Such understanding and leadership are to be found in many cooperative associations. There are many other groups, however, which require protection from the possible encroachment of selfish interests and from their own mistakes.

Let us consider now some disadvantages to cooperative marketing which may be by-products of the activities of the Federal Farm Board. There is the danger that the Board may be induced to support unsound cooperative enterprises. Associations promoted by individuals for their personal profit, or which are not designed to further the interests of the farmers may be presented to the Board so plausibly that it will be misled. The development of the Board's staff and the careful system of inspections inaugurated have largely removed this danger. But there is the further danger that cooperation may grow too rapidly, that the structure may become top-heavy and collapse because proper foundations have not been built. In many instances, well-meaning individuals exert tremendous pressure to persuade the Board to support doubtful cooperative plans. The only protection against these dangers is the quality of the Board. Fortunately, the present Board is made up

of men who have had first-hand experience in cooperative marketing and are able to withstand considerable pressure.

There is also a real danger that dependence on government aid may inhibit the initiative of the cooperative associations. It may encourage some officials of these organizations to depend on the Board for direction, and to place on the Board responsibility for mistakes which may be made. Carried to an extreme, this tendency might in a few years result in a government controlled system of marketing, rather than a cooperative system of marketing. The advantages which arise from self-help would be lost.

The Federal Farm Board is aware of these possibilities and the members are guided in their policies by a desire to preserve the independence and initiative of the cooperative associations. The chairman of the Board anticipated this danger at the time of his appointment. In his first address as a member of the Federal Farm Board, he stated that it was the purpose of the Board "to help the farmers to help themselves." It is evident that great care must be exercised in the extension of financial assistance by the Board. The appraisal of men is necessary, as well as appraisals of facilities and balance sheets. The Board does not propose to be the permanent, financial god-father of the cooperative organizations, and certainly will do everything in its power to encourage them to become independent of federal aid.

The work of the Federal Farm Board should stimulate research workers to give further attention to the problems of cooperative marketing. The growth of associations is making research more and more necessary. Cooperation is a different method of marketing and new questions are constantly arising. The Federal Farm Board will be in close touch with the problems of the associations and should be in a position to coordinate the activities of research agencies and centralize their objectives. Furthermore, the contacts of the Board will furnish a more extensive and more intensive source of fact material than has previously been available.

I should like to suggest the formation of a cooperative marketing research committee, made up of representatives from the state experiment stations, the Federal Department of Agriculture, and the Economics Division and Division of Cooperative Marketing of the Federal Farm Board. The need for more knowledge of the facts regarding cooperative marketing was never greater. Very

effective work is now being done. It should be extended and should be coordinated so as to meet the needs of regional and national associations. Cooperative marketing has grown away from the local. Its interests and problems are now nation-wide or world-wide. In our research work, although we may be dealing with local problems, it is essential that we should have at least a national point of view and be working toward a central objective

OBSERVATIONS ON THE COOPERATIVE MARKETING OF GRAIN BY FARMERS' ASSOCIATIONS IN CANADA AND THE UNITED STATES

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IN CANADA the cooperative grain marketing movement of the past quarter of a century has been characterized by the creation and successful operation of a group of large-scale centralized associations. These organizations link hundreds of local elevators with groups of large terminal elevators and with sales agencies in all of the important domestic markets and in several of the principal foreign markets. By this means an integration of services under unified control has been attained and the volume of products marketed by farmer-owned associations has been increased to approximately sixty per cent of the total.

In the United States, on the contrary, farmers' grain marketing efforts have until recently been directed mainly toward the establishment of individual local elevators without any substantial degree of coordination in the movement or sale of grain. These local associations, several thousand in number, have, however, handled about 35 per cent of the grain marketed and in addition have performed other valuable services. It is not my desire to minimize the efforts made by groups of individuals here and there to effect a more complete system of marketing—efforts which in a number of instances have resulted in successful organizations. However the volume of grain handled by farmers' associations of more than local character never reached 10 per cent of the total prior to the advent of the movement stimulated by the Federal Farm Board. One should therefore be subject to little criticism in suggesting that the movement in the United States has been characterized by extensive efforts directed toward the creation of independent local farmer-owned associations.

The observations which I wish to make on the developments in these two countries might be grouped into two divisions, first those of a general nature dealing with the developments and reasons for the differences that exist, which will include references to economic and other conditions affecting grain marketing and cooperation in general, and second some comparisons of actual operations.

EARLY MOVEMENT SIMILAR

The early developments in both countries were of the local type. Local elevator associations similar to those developed in the United States during the Granger days were formed in Western Canada between 1890 and 1905. In Canada, however, these associations gave way to large centralized organizations a few years later, whereas in the United States the local association continued to dominate the field.

In explaining the reasons for this contrast in development during the last quarter century many comparisons have been made. It has been urged by some for example, that the local association of the middle western states is more democratic than the large centralized associations of Canada and therefore appeals more to the patriotism of producers in the former region than would large centralized associations. One can dispose of this by observing that if this be true, the grain producers of the United States are more richly endowed with patriotic impulses and have a different conception of democracy than their fellow producers of citrus fruits in California, or of dairy products in Minnesota or New York, where large percentages of the total product are controlled by single organizations under plans similar to those followed by the Canadian grain cooperatives.

It has also been stated that Canadians are inherently more "co-operatively minded" and will therefore work together with greater trust of one another thus encouraging the development of larger associations. This too is a questionable assertion. Western Canadians are of pretty much the same racial stock as their neighbors south of the international boundary. There is probably a little higher percentage of Anglo Saxon stock in Canada but it might be difficult to prove that this guarantees greater inherent cooperative tendencies. If one urges that the difference between sixty per cent control in Western Canada and thirty-five per cent in the western grain states represents the difference in cooperative tendencies, then one must likewise admit that the citrus producers of California, who market a still larger percentage of their total product cooperatively than either the Canadian or American grain producers, are inherently more cooperatively minded than either. As a matter of fact there are probably no greater inherent coopera-

tive tendencies in farmers of either Canada or California than in those of Kansas or North Dakota.

The differences that have existed in the establishment of co-operative grain marketing organizations in the two countries are partly the result of different economic, climatic, and geographic conditions and partly the result of circumstances which might almost be considered accidental in nature.

ECONOMIC DIFFERENCES

Certain differences which might be classed as economic are evident when one considers the grain area of the two countries. Perhaps it would be more correct to say that climatic and geographic conditions have given rise to a little different set of economic conditions. The United States' surplus grain producing area is subdivided into four or five major producing districts. Each of these produces different classes and varieties of grain due largely to climatic differences. Each markets in a little different way. Grain moves in many directions both for domestic and export sale. Only about one quarter, and frequently less, of the total is sent abroad. Much of the grain is sold, ground and consumed within a few miles of where it is produced. Grain production, transportation and marketing problems are thus more varied in the United States than in Canada, where a single class of wheat predominates, where producing and marketing conditions are more uniform, and where roughly three-quarters of the crop must find a market in other countries. This has suggested to some that there was less need for large associations in the United States than in Canada. This point is appreciated, but on the other hand in almost every other line of business in the United States similar conditions have impelled operators to consolidate their interests and peculiarly enough a large part of the private grain business in the United States is carried on in a manner similar to the course followed by the farmers' companies in Canada.

Differences in production and marketing in the two countries do not entirely account for the difference in cooperative development. This is particularly the case in regions like the southwestern and northwestern areas where conditions of production and marketing are very similar to those found in Canada. Up to about

1902, as already stated, farmers' marketing activities had gone along identical lines in the formation of local organizations, but in both countries the individual local elevator was in a bad way due to the competition and boycotts of country and terminal grain companies. However about 1902 certain terminal agencies in Chicago realized the possibilities of linking up with the local farmers' associations and in spite of organized protests, encouraged this business and helped organize local elevator companies. Within a few years terminal marketing agencies all over the grain states were "tumbling over one another" to encourage the formation of local elevators which they in turn frequently financed, and for which they acted as sales representatives.

No such assistance was obtained in Canada. The end of the local farmers' elevator was in sight by 1906. Relentless competition by well organized and highly diversified private companies forced the independent farmers' unit out of business. This however, did not quench the enthusiasm for cooperative action. Producers reorganized, and this time on a basis similar to their private competitors, thus creating cooperative agencies which have since engaged in all phases of the grain business and which have become highly successful organizations. It is not improbable that the competitive conditions prevailing during the first few years of the present century determined the course which developments have since taken. One cannot help wondering whether the assistance given the local elevator movement in the United States by certain grain interests was in the long run a good thing for farmers. True it came at a critical time in the life of the elevator movement and opened the way for great developments. Had no such help been rendered, however, the trend of events in the western grain states might have been similar to that of Western Canada since 1906, in spite of the somewhat different economic conditions already mentioned.

Canadian governments, provincial and federal, have always been most sympathetic toward cooperation and particularly toward grain marketing cooperatives. They have passed special acts to create large associations, they have financed the physical assets of such associations, and for a time even operated country elevators as public utilities. They have assisted with organization even to the extent of making loans and grants and in guaranteeing the credit of farmers' organizations. No small part of the success of

the Canadian associations is due to the sympathetic support of legislatures. The Saskatchewan legislature loaned well over $4,000,000 over a period of fifteen years to the cooperative elevator company carrying the name of that province, and every dollar was returned or is provided for, with interest. Support of this kind has unquestionably been a great stimulus to large scale development in Canada, but one might question whether this is the cause or the effect of such development. The question will be dismissed with the observation that large associations representing a considerable body of public opinion have a way of making their demands known and appreciated by legislators.

COOPERATION GENERALLY NOT DIFFERENT

Although an impartial student of grain marketing would probably be more favorably impressed by the size, solidarity, and effectiveness of the Canadian farmer-controlled grain marketing organizations, than by those of the United States, he would find little difference in the methods followed or in the success attained by associations in other fields of agricultural endeavor. Similarly he would find as much difference in the organization set-up, business policies, and success of associations in different provinces or states, or in different parts of these political units, as he would find by comparing the organizations in the two countries. In the attitude of the people toward cooperation, as in many other matters, one finds greater differences going from east to west in either country, than in going directly north or south across the border. Farmers in both countries have made remarkable progress in cooperative development, and in general there is a great similarity in methods of organization and success attained. If my comparison appears to favor the Canadian development in grain marketing, it need only be said that your committee might have selected another commodity where a different verdict would have been necessary.

GREATER INTEREST

Students of grain marketing have observed that the success of Canadian grain marketing cooperatives appears to have aroused a greater enthusiasm among members than have the local associations of the grain states, and that they have inspired greater confidence and more pride of accomplishment. The Canadian institu-

tions have perhaps done a little more to educate their members in grain marketing. The Candaian producer knows more about what becomes of his grain after it is dumped into the pit of the local elevator than does his American cousin. He is probably a little better informed on both domestic and world grain conditions than his neighbor. This is due in a large measure to the extensive educational efforts of his own large associations, but it should be observed that his greater dependence on the returns from a single crop and especially upon foreign markets impel a greater interest in supply and demand, and in their functioning mechanism.

GREATER USE OF CONTRACTS

The Canadian grain producer has adopted the contract with greater favor than have farmers on this side of the boundary. The contract between grower and association has become an important feature of recent cooperative developments in Canada although there are many successful associations that do not use contracts. Among these might be mentioned the United Grain Growers Limited with 35,000 shareholders and a volume of business in years of good crops exceeding 40,000,000 bushels. However, the tendency at present is toward greater use of contracts. There has been relatively little contract breaking in Canada, and comparatively few cases involving breach of contract have been taken to court.

A FORM OF LIVING

The cooperative grain marketing association in both the United States and Canada has in the main been regarded only as a business organization. This is probably characteristic of the general attitude toward all farmers' cooperative organizations on this continent. There has been little tendency to regard the association as anything more that a "dollars and cents" organization. True the associations have contributed much educationally, as well as socially, and in a measure politically, but we have not regarded the cooperative movement as representative of a mode of living. We support the institution because of its direct monetary value—not because it represents a principle. The result is that when the association meets with reverses and fails (though perhaps only temporarily) to do as well for us as its private competitor might have done, we desert it almost as readily as we shift our business

from one chain store to another. This attitude would seem strange to the cooperators of many lands. Until the last few years an observer would have detected little if any difference in the attitude of producers in our respective countries on this question. Within the last decade however there has perhaps been a little more attention given in Canada, particularly in the West, to this other side of cooperation than has been evident in the western states. The effect of this is evident in the present loyalty toward the Pool. It is doubtful if any other large body of producers anywhere on this continent has given such whole hearted support to an association under similar conditions. One wonders if the associations in both countries might not profitably give greater consideration to the principle involved than to the financial results attained. It might stand them in good stead when low prices or financial reverses strike them. We have probably put too much emphasis on the price appeal.

So much for general comparisons. Let us now turn to one or two comparisons having to do with the results of operations. First, let me say that it was assumed in preparing this paper that the papers which are to precede it would deal in some detail with the methods of operation.

CANNOT COMPARE PRICES

Attempts have been made to compare the efficiency of farmers' grain marketing associations in the two countries by referring either to market price quotations or returns to farmers. Such comparisons have little if any merit. The quality of grain produced, the different ratios of domestic to export trade, and the tariff policy of the United States affect the price more than do the differences in cooperative development.

It is possible however to compare the operating expenses incurred by farmers' associations in the two countries since the physical handling of grain, up to the terminal market at least, is practically the same. Elevators in the spring wheat area of the United States have been selected for comparison with the Canadian association to further insure comparability. Labor costs will average a little higher in the United States than in Canada, but supplies cost more, and there is a higher investment cost on equipment in Canada if only grain handling facilities are compared. Differences, if any, as far as farmers organizations are concerned can

be narrowed down mainly to differences in organization and operating policies.

In table 1, the operating costs of a group of elevators in the spring wheat states are given. Variations in costs which range from 3.57 cents per bushel to 5.68 cents are caused almost entirely by variations in volume due to varying crop yields. The elevators analyzed the first year appear in the group for succeeding years. These costs include only grain handling costs except in the first year when the expense of handling sidelines was not separated. They of course include only the cost of receiving, storing, cleaning, and shipping grain by the local elevator. Patronage dividends

Table 1. Average Expenses Incurred in the Operation of Farmer Owned Country Elevators in the Spring Wheat Area of the United States*

Crop year	*Number of elevators included*	*Average volume handled*	*Average expense*
		(bushels)	(cents)
1924–25	40	216,604	3.57
1925–26	54	161,039	4.46(1)
1926–27.	63	110,833	5 68(1)

* Preliminary reports on a study of farmers' elevators in the spring wheat area, made by W J Kuhrt, and published by the Division of Cooperative Marketing, Bureau of Agricultural Economics, United States Department of Agriculture, Washington, D C

(1) Includes only grain handling expense

though not available would probably reduce the net cost to the producer somewhat.

In tables 2 to 6 costs of operating wheat pool elevators in Manitoba and Saskatchewan are given.[1] In the first table of this group four years results for Manitoba are given, and the striking thing about this is that the costs when compared with those for farmers' elevators in the spring wheat area of the United States are not greatly different, if the comparison is made between years when the volume of grain handled per elevator, was approximately the same in each area. Averaging the years under consideration we find a remarkable similarity.

[1] These data were prepared for a revision of Bulletin No. 63, "Cooperative Marketing of Grain in Western Canada" by J. F. Booth, Division of Cooperative Marketing, Bureau of Agricultural Economics, Washington, D.C. and are presented by courtesy of A. W. McKay, Chief of the Division, which is now a part of the Federal Farm Board.

Table 2. Operating Expenses of Manitoba Pool Elevators for the Crop Years 1925-26 to 1928-29 Inclusive (1)

Crop year	*Number of elevators*	*Average volume*	*Average expense per elevator (2)*	*Average expense per bushel (3)*
		(bushels)		(cents)
1925–26	8	179,155	$6,418 94	3 58
1926–27	30	192,772	7,400.62	3.84
1927–28	58	119,226	7,170 70	6.01
1928–29	143	181,931	$7,774 71	4 27

(1) Includes both local and head office expenses.
(2) Includes interest on investment at 7 per cent
(3) The net expenses per bushel after crediting local earnings and terminal elevator surpluses were as follows: 1925–26, 0 16 cents, 1926–27, 1.07 cents; 1927–28, 2.48 cents Data for 1928–29 are incomplete

Table 3. Operating Expenses of Manitoba Pool Elevators for the Season, 1926-27 (1)
(Based on data for 30 elevators)

Item	*Total expense*	*Expense per elevator*	*Expense per bushel*
			(cents)
Local elevator expenses:			
Agent's salary and station expense	$85,892 52	$2,863 08	1.485
Interest, insurance and taxes on elevator and equipment (2)	49,196.17	1,639.87	.851
Depreciation at 5 per cent per annum	21,597 72	719 92	.373
Head office expenses:			
Salary, interest, exchange, printing, stationery, rent, etc., and superintendence	59,682.22	1,989.41	1.032
Reserved for contingencies	5,650.00	188 33	.098
Total	$222,018.63	$7,400.62	3.839(3)

(1) Average volume per elevator, 192,772 bushels.
(2) Includes rental on 8 elevators at an average cost of 1 44 cents per bushel.
(3) The net expesne per bushel after crediting local earnings and terminal elevator surpluses was 1 07 cents.

Table 4. Operating Expenses of Manitoba Pool Elevators for the Season, 1927-28
(Based on data for 58 elevators)

Item	*Total expense*	*Expense per elevator*	*Expense per bushel*
			(cents)
Capital expense:			
Interest on capital investment (1)	$75,517 83	$1,302 03	1 092
Depreciation on building and equipment at 5 per cent per annum	50,867 73	877 03	.736
Insurance	9,653 03	166.43	.140
Taxes	9,988 35	172 21	.144
Bonds	2,890 50	49 84	.042
Total	$148,917 44	$2,567.54	2 154
Station expenses paid locally:			
Agent's salary	$95,874 45	$1,653 01	1 386
Helper's salary	10,761.31	185 54	156
Repairs and renewals	6,205 29	106.98	.090
Fuel	2,950.90	50 88	.043
Gasoline and oil	10,453 18	180 23	.151
Postages, telegrams and telephones	5,029 61	86.72	.073
Miscellaneous	13,521 14	233.12	.195
Total	$144,795 88	$2,496 48	2 094
Station expenses paid from head office:			
Grain insurance	$5,109 18	$88.09	.074
Workmens' compensation insurance	1,403 21	24.19	.020
Printing and stationery	8,147 87	140.48	118
Interest on grain loans	23,136.15	398.90	.335
Exchange and excise	6,566.81	113 22	.095
Legal	726.61	12 53	.010
Audit	4,590.45	79 15	.066
Preliminary expenses written off	1,537.77	26.51	.022
Reserved for contingencies	2,824.72	48.70	.041
Total	$54,042.77	$931.77	.781
Head office expenses:			
Salaries—Winnipeg office, and superintendence	$43,826.15	$755.62	.634
Traveling expense	8,138.95	140.33	.118
Insurance, bonds, and taxes—Winnipeg	1,118.69	20.49	.017
Office rent and light	5,571.94	96.07	.080
Telegrams and telephones	1,461.97	25.21	.021
Postage	1,726.23	29.76	.025
Depreciation on furniture and fixtures	1,685.83	29.07	.024
Miscellaneous	4,545.01	78.36	.066
Total	$68,144.77	$1,174.91	.985
Grand total	$415,900.86	$7,170.70	6 01(2)

(1) Includes rental on 8 elevators at an average cost of 1.61 cents per bushel.
(2) The net expense per bushel after crediting local earnings and terminal elevator surpluses was 2.48 cents

Table 5. Relation of Expense to Volume of Grain Handled by Manitoba Pool Elevators, 1927-28

Range in volume of grain handled	*Number of elevators*	*Average volume*	*Average total expense per elevator*	*Average cost per bushel*
(thousands of bushels)		(bushels)		(cents)
50 or under . .	3	27,023	$3,065.90	11.34
51–100 .	16	77,674	6,064.46	7 81
101–150	27	121,848	7,448.42	6.11
151–200	10	175,865	8,701.98	4 95
201–250	0			
251–300	2	271,242	10,772.37	3.97
Total	58			
Average		119,226	$7,170 70	6.01(1)

(1) The net expense per bushel after crediting local earnings and terminal elevator surpluses was 2 48 cents.

Table 6. Operating Expenses of Saskatchewan Pool Elevators for the Season, 1927-28 (1)
(Based on data for 727 elevators)

Item	*Total expense*	*Expense per elevator*	*Expense per bushel (2)*
			(cents)
General expense:			
Salaries and wages	$408,892 86	$562.44	.408
Administration expenses	334.909.65	460.67	.334
Taxes, licenses, and so forth	159,415.84	219.28	.159
Insurance and bonds .	163,376 30	224 73	.163
Interest on current operations	220,353 31	303.10	.220
Depreciation at 5 per cent per annum . .	431,035.65	592 90	.430
Expenses of elevator operations.			
Superintendence and inspection	222,202.74	305.64	.222
Local elevator expenses. .	2,227,801.87	3,064.38	2.223
Total .	$4,167,988 22	$5,733.13	4.159(3)

(1) Total volume of grain handled, 100,210,581 bushels, or 137,841 bushels per elevator.
(2) Exclusive of interest on investment which if computed at 7 per cent would add approximately two-thirds of a cent per bushel.
(3) The net expense per bushel after crediting local earnings and terminal elevator surpluses was 1.98 cents.

In the case of the Canadian associations the costs of head office supervision and administration are included but terminal elevator and selling costs are not. However the refund from the surplus earnings of the sales agency and from the terminal elevator division of each pool was sufficient each year to reduce local net costs to about one third of the amounts actually incurred in local elevator operation.

In table 7, the average costs incurred over a period of 15 years by the Saskatchewan Cooperative Elevator Company are given. In

Table 7. Relation of Volume of Business to Cost of Handling Grain, Saskatchewan Cooperative Elevator Co., Limited

Crop year	Number of elevators operating	Average number of bushels handled per elevator	Central overhead expense	Fixed expense	Operating expense	Total
		(thousands of) bushels)	(cents)	(cents)	(cents)	(cents)
1911–12	44	74	0 90	0 65	1.26	2.81
1912–13	137	94	.66	75	1 32	2.73
1913–14	192	102	69	75	1 18	2.62
1914–15	208	66	1.00	1 01	1 54	3.55
1915–16	230	170	.55	53	98	2 06
1916–17	258	125	84	83	1.37	3.04
1917–18	298	87	1 13	.66	1.80	3.59
1918–19	306	68	1 50	1.06	2 11	4.67
1919–20	296	66	1 79	1 21	2 58	5.58
1920–21	319	82	1 38	1.05	2 50	4 93
1921–22	331	105	1 02	.76	2 00	3.78
1922–23	351	116	.84	1 01	1.83	3.68
1923–24	381	127	75	75	1 70	3 20
1924–25	433	64	1 38	2 03	2 71	6.12
1925–26	451	116	85	1.31	1 86	4.02

this case the number of elevators varied from 44 in the first year to 451 the last year. The surplus earnings on the local and terminal elevator operations of this company averaged about one cent per bushel.

This comparison, if of any value, indicates that there is little difference in the cost of handling grain by farmers' agencies at local points in Canada and in the United States spring wheat area, if we leave terminal operations out of the picture. If, however, we apply surplus terminal earnings to local elevators in proportion to their contribution, as is possible in Canada where the local and terminal facilities are combined under centralized management, the net cost to the grower appears to favor the Canadian

system, unless—and this may or may not be important—we assume that these terminal surpluses known as profits in private business, which accrue to private grain handling agencies, permit them to pay better prices to local associations and farmers for grain than is the case under the Canadian pool system where the surplus earnings are shown as patronage refunds. This, of course, takes us back to a comparison of prices where we are forced to abandon the discussion.

CONCLUSIONS

In the foregoing discussion I have endeavored to analyze the reasons for the differences in grain marketing developments in these two countries which previous speakers have referred to. It was suggested that different economic conditions have had some effect on developments but that these did not account for all the difference. Events, more accidental than economic, shaped the trend of development in the two countries after 1900. Partly as a result of this, and partly due to differences in social and national development, individuals and governments of these two countries have taken different attitudes toward cooperation. This has had some bearing on cooperative grain marketing institutions.

In conclusion it might be said that under present economic conditions the linking of country and terminal facilities with sales agencies under a unified system of centralized control such as is found in Canada has certain marked advantages. This is said too, with a fair appreciation of the differences that exist between the marketing of grain and that of most other farm commodities. The weaknesses of the farmers' elevator movement in the United States which is characterized by independent local associations are not nearly so important as many critics in the United States assert, but there is much to be said in favor of the present program which aims at a degree of coordination similar to that obtaining in Canada. In this connection one should not over-estimate the importance of contracts, orderly marketing, or pooling, as features of the Canadian development. These are important and have contributed to the significant development of the last six years but back of the associations employing these features is the established principle of coordination already referred to and which over a period of 25 years has made the greatest contribution to the success of the Canadian movement.

WHEAT MARKETING IN THE UNITED STATES

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AS ALL the members of this Conference know, the United States is a very large country with diverse interests. To attempt to thoroughly discuss the subject of wheat marketing in the United States in the time allotted to me is obviously impossible. I have, therefore, selected certain topics from the field which appeared to be of some general interest particularly to our foreign visitors.

The wheat crop of the United States is divided into five important classes, each a more or less distinct commodity from the marketing standpoint. These different classes represent adaptations to the varying conditions of soil and climate under which our wheat is produced.

The relative importance of these different classes of wheat is shown in table 1.

Hard red winter wheat, the most important type, making up about 40 per cent of the total crop, is grown from Texas north to Nebraska, and east to Illinois. It is a staple bread wheat and our most important export class. For the crop years, 1925 to 1929, an average of about 48 million bushels were inspected for export; in addition large quantities were exported in the form of flour.[1] The production of this class of wheat has increased rapidly in recent years with the introduction of the new types of machinery and new methods of production, particularly along the western edge of the wheat belt.

Soft winter wheat, the next most important type, comprising 22 per cent of the total, is grown to the east of the hard winter wheat belt, the area of production extending from Texas and Kansas, east to the Atlanic Seaboard States. The more important states include Missouri, Illinois, Indiana, and Ohio in the Southwestern Corn Belt, and Pennsylvania on the Atlantic Seaboard. This type of wheat is used largely in the domestic market. For the crop years, 1925 to 1929, exports of it averaged only about 11 million bushels and these were made chiefly in 1926, a year when there was a very large crop of this class of wheat. This wheat is starchy

[1] These and similar export figures are based on "Wheat Facts," issued by the United States Department of Agriculture, July, 1930.

and low in protein, is used for pastry and biscuit flours and finds a large market in our southern states. It typically sells at a small premium over the lower protein hard wheat, chiefly, I think, because of a better balance between its production and domestic consumption.

White wheat, which makes up about one-tenth of the national crop, is grown in the Pacific Coast States and also in some of the northeastern states such as Michigan and New York. Exports of this class are quite large in comparison to production, averaging about 22 million bushels or about 25 per cent of the total production for the crop years 1925 to 1929.

Table 1. Average Annual Production of Various Classes of Wheat in the United States, 1925-29*

Class of wheat	*Average production*	*Per cent total*
	(millions of bushels)	
Hard red winter	321.7	39 3
Soft red winter	181.8	22 1
White	82 6	10 0
Hard red spring	164 5	20 0
Durum .	71.0	8 6
Total	821 6	100 0

* Calculated from data in 1930 Yearbook of United States Department of Agriculture, page 609.

Hard red spring wheat, our third most important class, makes up about one-fifth of the total crop, and is grown in a region extending from the northern edge of the Corn Belt northwestward through the Dakotas into Montana. This is a bread wheat and comparatively little is exported, exports averaging only about 3 million bushels in the crop years, 1925 to 1929. Most of this class of wheat is milled in this country because of its quality and the location of its area of production with reference to consuming centers and to transportation routes. In recent years mills in the spring wheat territory have found it necessary to supplement their supplies of spring wheat with hard winter wheats.

The fifth class, durum, is a Mediterranean type of wheat grown in our spring wheat section, making up a little less than 10 per cent of the total. Over a third of our crop is exported; direct exports averaged about 27 million bushels for the crop years 1925

to 1929. This wheat is used in the manufacture of macaroni and similar foods and also for blending with the other hard wheats.

This brief summary suggests one reason for the complexity of the wheat situation in the United States. The marketing mechanism must be organized to work these various classes of wheat into the proper channels and to maintain the proper price relationship between the different classes so as to maintain a balance between the production and demand for each. Although each of these wheats has a distinct market, there is more or less substitution and interchangeability between the different classes. If soft red winter goes to a premium above the ordinary grades of hard red winter, as it frequently does, it creates an opportunity to substitute flours from the hard wheat either in blends or in the consumer's market. Hence all classes tend to sell within a fairly definite range. The situation is something like that of the vegetable oils, the prices of which, Phillip Wright of the Institute of Economics so aptly described as being held together by an elastic band which permitted considerable variation between the prices of different varieties but which kept the variation within definite limits.

The changes in the consumption of wheat per capita in this country have previously been discussed by Dr. Baker. I wish, however, to repeat some of the material he presented because it has an important bearing on our present market situation.

For the five-year period, 1925-29, the wheat crops of the United States averaged about 130 million bushels larger than crops of the 1909-13 period. The increase amounted to about 20 per cent. Between these periods our population increased by about 26 per cent. In spite of the fact that production increased less than did population, our net exports increased, averaging about 100 million bushels annually in the pre-war period and about 150 million bushels in the 1925-29 period. The increased exports reflected the decline in per capita consumption in this country.

Hence the problem of finding a market for our national surplus of wheat looms large in all discussions of wheat marketing. In recent years, as is well known, we have found increasing difficulties in moving this surplus into the foreign markets. The data for individual years illustrate the situation (table 2).

It was during the marketing of the 1928 crop that our exports fell off and surpluses began to pile up to an alarming degree. Developments in that year paved the way for the serious market

situation that has come to light in the United States in the past year. Our 1928 crop was the largest we had harvested since 1919 when acreages had been expanded by the war time efforts.

Why did our exports fall off in spite of this large crop? Bear in mind that this was a full year before the Farm Board was created and that, directly, no government money was available to finance a storage campaign. Partly it reflected the very large world crop which reduced the demand and increased the competition from foreign countries, but to me it seems also that it was a part of the process of domestic inflation that has occurred in many lines in this country since 1920. With enormous gold resources and un-

Table 2. Production, Exports, and Carryover of Wheat in the United States, Crop Years 1926-29*
(Millions of bushels)

Crop year (beginning July 1)	*Production*	*Carryover at beginning of year*	*Exports*	*Carryover at end of year*
1926	831 0	109 0	219 0	132.0
1927	878 0	132 0	206 0	137 0
1928	915 0	137 0	164 0	259.0
1929	806 0	259 0	150 0	290.0**

* Includes flour reduced to a wheat basis Based on data of the United States Department of Agriculture.

** Estimated from 3 available items.

limited credit we established a level of prices above that of the world for many sorts of goods and services which were sheltered in any way, either by tariffs or by their inherent nature. During the year in question we attempted to extend this process to a commodity where it was obviously impossible to accomplish it, namely wheat. The mechanism for doing so was simple. Through the liberal use of credit, farmers and speculators simply held wheat and bid the price to a point where it could not move freely in world trade. The incentive was the opinion that wheat would go higher in price, an opinion not difficult to create in the America that immediately preceded the panic and deflation period that came in the fall of 1929.

Putting it in American slang, "we held the sack" in the marketing of the 1928 crop. Part of the success of the Canadian pool in selling Canada's 1928 crop can be attributed to the fact that we

held our grain out of the way for them. Let us look at the statistics in this connection (table 3).

In the 1928 crop season the 4 leading export countries exported 152 million bushels more than in the previous year and Canada 117 million bushels more. The United States exported 42 millions less. If we had pushed sales of our wheat that year, the world and the United States price levels would have been lower, greater non-food and perhaps greater food use would have been encouraged, acreages would have been reduced somewhat in the following year and a healthier situation would have existed in the United States markets during the marketing of the 1929 crop. The world-wide

Table 3. World Production of Wheat Together with the Exports of Important Exporting Countries, 1926-29
(Millions of bushels)

Year	World production[1]	Exports of four leading export countries[2]	Canadian exports	United States exports
1926	3,426	759	305	219
1927	3,661	763	306	206
1928	3,943	915	423	164
1929	3,415	(3)	(3)	150

(1) Excluding Russia and China. Figures represent estimates of the U S. D. A.
(2) United States, Canada, Argentina, Australia.
(3) Data not available.

slump in wheat values would not, of course, have been eliminated but its effects on the United States wheat situation would have been somewhat moderated.

What will become of the enormous surplus of wheat that has piled up in this country as the result of the large 1928 crop and our slow exports of the last two years? In the first place, I think that our holding period is at least temporarily over and that we will be offering our wheat on a basis that will meet competition. The lower prices will reduce production. I look to see the period of expansion in the newer regions at least temporarily checked and considerable reduction in the older higher cost areas. There is no visible margin of profit in wheat production at prices that have prevailed this season in the territory east of the Mississippi River and some individuals will be led to substitute other crops, chiefly feed crops, for a part of their wheat acreage. There will

be also a heavy feeding of wheat to animals so long as these low prices continue. This tendency has been accelerated this season by the short corn (maize) crop caused by the prolonged drought in the American Corn Belt. Our share of the export trade, a reduced acreage, and an increased feed use, all the direct result of the low prices, will eventually whittle down our storage holdings to a reasonable figure. Wheat prices have always moved through irregular fluctuations which may be designated as cycles. Judging by the past we should move into the higher priced phase of the current cycle within a year or two, whatever the long-time trend of wheat prices may be.

SOME CHARACTERISTICS OF THE UNITED STATES GRAIN TRADE

As I pointed out earlier, there are 5 principal classes of wheat in this country, each of which has a more or less distinct market. There are, however, certain general characteristics which run thru all of our grain handling. East of the Rockies grain is typically handled in bulk in the principal grain sections. The wheat moves into elevators at country stations, is dumped and moved mechanically through the elevators to cars or to storage bins. After it is delivered to the local elevators the identity of the wheat is usually lost.

The grain trade is conducted on a cash basis. The farmer is paid on delivery or when he calls for it. The local elevator, when it ships grain to market, ordinarily draws a sight draft on the receiver for a large proportion of the value of the grain for which it receives immediate credit with its local bank.

A good deal of wheat is stored in local elevators by farmers. In some states, notably in the spring wheat states, the law requires that local elevators store grain for farmers at stated maximum charges. This is not true in Illinois nor in the Corn Belt States generally. However, a good deal of wheat is stored by elevators for short and sometimes for rather long periods. In such transactions the local elevator becomes a sort of local bank. There are some difficult technical problems connected with such storage operations that time does not permit me to discuss.

The movement of grain is quite flexible. With year to year shifting in the size of crops in various sections and in the strength of demands from various quarters, the direction of the movement changes considerably from time to time. In Illinois we have made

a considerable study of this matter and found considerable shifting particularly in large areas that might be designated as marginal territory.[2] Each market is constantly fighting to keep its share of the grain moving in its direction. Freight rates have a great deal to do with the actual pattern of the movement.

A constant stream of market information is moving in the principal grain states. This is assembled and distributed chiefly through the large terminal markets. The heavy grain shipping sections of the Corn Belt in particular, are covered with a network of grain offices that relay information to groups of elevators in the sections that surround them. The strictly wheat sections are not so well supplied with these, although there has been a tendency in recent years for these markets to have more representatives in direct contact with the local elevators in those sections. The development of the radio has greatly broadened the area which can be supplied with market news. I can get from a radio station in a little town about twenty miles from my home in eastern Illinois at eight o'clock in the morning a complete résumé of the overnight news as it relates to grain marketing, the Liverpool cables, international weather forecasts, and the late crop news. This is continued at intervals of one hour throughout the morning. At 12:15 noon, a complete report of the day's grain news is given, covering prices, weather reports, crop summaries, exports, primary receipts.

Most of our local elevators are equipped with radios and get this information as it is broadcasted. Also farmers may and do keep in touch with it.

Another characteristic of American grain markets is the wide use of the futures markets. The American grain trade is built up around the use of the futures market. This does not mean that every bushel of wheat purchased by every grain merchant is hedged. This is far from the truth, but it may be safely said that as now organized, the American grain trade could not be conducted a day without the use of the futures market. These futures markets furnish the mechanism which make it possible for firms with relatively small capital to maintain a constant cash market for grain.

COOPERATIVE DEVELOPMENTS

Until recently the chief cooperative development in wheat marketing in the United States has been in connection with local

[2] See Illinois Agricultural Experiment Station Bulletin 315.

elevators. Many of the local elevators are owned by groups of local farmers and business men. The Federal Department of Agriculture reported that there were approximately 4,000 of these so-called farmer elevator companies in the United States in 1929. Active organization has practically ceased since 1920 and the number of companies has been declining somewhat. These companies have had varying degrees of success but generally speaking they have demonstrated that farmers can successfully operate this element of the grain business.

These elevators are practically all local unit, independent corporations, both as to ownership and management. The situation is in distinct contrast to that in Canada where, before the formation of the pools, the line elevator type of cooperative organization dominated. We have a few small cooperative "lines" but they are the exception rather than the rule. Many of our local elevators in addition to handling grain, handle considerable quantities of supplies of various kinds. Independent local action must be said to be the dominant note in the country end of cooperative grain marketing down to a very recent date.

In recent years a number of cooperatively owned commission companies have developed. The Federal Department of Agriculture reported that 8 of these handled 36,000,000 bushels of grain in 1927-1928 and that about 12 were operating in 1929. Typically, these are owned by groups of local farmers' elevators and represent these elevators in the terminal markets. This may be looked upon as a sound but elementary step beyond the local elevator.

Another type of cooperative that the American wheat farmer has experimented with, is the pool, somewhat similar to that discussed in Mr. Cairns' paper. These have been organized in practically all of the leading wheat states and in 1929 there were eight which were active. This type of organization has never made much headway in this country. One reason is the bitter opposition of the organized grain trade, both private and cooperative. Another has been the difficulty of operating without physical facilities as, generally speaking, the pools in this country have endeavored to do. Perhaps more important is the fact that the American farmer has not been convinced that this plan is his way to economic salvation. Preoccupation of the farm leadership with farm relief legislation is perhaps an important reason for this view, but in general,

I think, the lack of interest represents the current judgment of our farmers.

The volume of wheat handled by the pools has tended to decline. The volume handled as reported by the United States Department of Agriculture is given in table 4 for the crop years 1924 to 1928 inclusive.

We may summarize cooperative developments in connection with grain marketing down to the formation of the Farm Board by saying that there had been a widespread development of independent local farmer-owned elevators at country points that had,

Table 4. Bushels of Wheat Handled by Grain Pools in the United States, Crop Years 1924-28*

Crop year	*Millions of bushels handled*
1924–25 . .	25
1925–26	16
1926–27	17
1927–28	12
1928–29	18**

* Based on reports of the United States Department of Agriculture.
** Estimated by Dr. J. F. Booth.

first, narrowed handling margins or improved buying practices at many points, second, given some farmers a sense of proprietorship in their marketing facilities, and third, educated a large number of farmers in some of the elementary principles of grain marketing. Also considerable experimentation and development had taken place in connection with carrying cooperative ownership beyond country points with the tendency for the cooperative commission companies to expand and the pools to recede.

THE FEDERAL FARM BOARD AND WHEAT MARKETING

The Agricultural Marketing Act of 1929 and the establishment of the Federal Farm Board to carry out its provisions, entirely alter the situation with respect to cooperative marketing of wheat in this country. The act definitely puts our federal government behind a campaign to extend cooperative marketing, including the marketing of wheat, and makes large sums of money available that can be used solely through cooperative organizations or organizations affiliated with them.

The Board has been very active in the grain marketing field. I wish to mention briefly four types of activity.

First, it has loaned its moral and financial support to existing cooperative organizations. There has been a great increase in activity, particularly among the non-local groups. Most of the agencies in the field sought recognition and financial support. In Illinois, a state that has lagged in non-local developments, there are now three state-wide groups that are actively in the field seeking for membership among the local farmers' elevators. The Board should be of constructive value in fostering sound developments and in lending financial assistance.

Second, it has organized a grain marketing organization of nation-wide scope, The Farmers National Grain Corporation. This was set up by the Board, working with representatives of various non-local cooperative grain agencies (the commission companies and the pools, representatives of the various state associations of farmer elevators, and representatives of the three national farm organizations, the Farm Bureau, the Farmers Union, and the Grange). This agency presumably aims to coordinate the handling of grain in this country. According to reports it has handled a large volume of grain during the present marketing season. Because of its close contacts with a governmental agency, the Federal Farm Board, this corporation cannot be looked upon as a strictly cooperative enterprise. It should, however, if well managed and if properly coordinated with other organizations be of constructive value not only to the cooperatives but to the grain producers as well.

A third line of activity of the Board has been in the field of price stabilization. As the wheat market weakened last winter, the Board organized a Grain Stabilization Corporation. This entered the wheat market and bought wheat on a large scale. Present holdings are reported to be about 60 million bushels. These operations may have had some temporary effect on the market but subsequent developments do not indicate that this effect was of great duration. Certain farmers who had grain to sell during the period when these operations were being carried on benefited from whatever price enhancement resulted. One practical result was to relieve some of the cooperatives and some of the regular grain trade, or their respective bankers from a part of the serious loss caused by the severe decline in values. The Board has at least

temporarily withdrawn from these stabilization operations, although the Stabilization Corporation is still holding the wheat, or an equivalent amount, which it acquired during its period of active operation. It seems to the speaker that it will be wise to stay out. While stabilization looks simple in theory, in practice it presents some very practical difficulties.

A fourth line of activity of the Board in connection with wheat marketing is that of attempting to get farmers to reduce wheat acreage. Perhaps no part of the Board's activities has stirred up more discussion. Anyone who is familiar with the condition of farm production realizes the practical difficulties in the way of a large wholesale reduction in wheat acreage, even though many local adjustments can be made. However, it seems to the speaker that in sounding this note shortly after getting into active operation, the Board did a very commendable thing. It swept away a great deal of the false optimism that its establishment created.

The psychology of our farmers and of all of the institutions developed to serve farmers including agricultural colleges, experiment stations, and extension services, tends to extend production and to hope for a lucky market to make the operation profitable Presumably the same may be said of Australian, Canadian and other farmers. The Board in its acreage reduction campaign has merely served notice that it sees danger ahead in the rapid expansion of wheat production that has been going on in many parts of the world and that it does not know how to establish or maintain a higher level of wheat prices under such conditions. It is a warning that our farmers as well as those of other lands may well heed. If farmers in some sections of this or other countries find it profitable to grow wheat at prices that permit it to be used freely as a feed for live-stock, it is of course good business for them to do so, but they should not be misled by the notion that by some revolutionary change in the marketing system, wheat production may become a more profitable business.

THE COOPERATIVE MARKETING OF WHEAT IN WESTERN CANADA

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THE SPECTACULAR emergence of the wheat pools in Western Canada and their remarkable development have given rise to an erroneous impression in some quarters that the pools are mushroom-like growths with shallow roots extending only into the post-war depression period. The true significance of the wheat pool movement can only be appreciated by envisaging it as the culmination of nearly four decades of strenuous and resourceful self-help on the part of enterprising prairie farmers to develop a satisfactory system of grain marketing by the application of the principles of cooperation.

The evolution of the wheat pools, or the struggles of prairie farmers to place the full control of Western Canada's principal industry—wheat production—in the hands of the producers, is given in the following chronological account which traces the organized farmers' steps for over two score years.

HISTORICAL BACKGROUND

Shortly after the completion of the Canadian Pacific Railway in 1885, which opened up the western plains, the production of wheat increased rapidly. An acute shortage of handling facilities soon developed. The Canadian Pacific Railway offered concessions to companies who would build elevators along its lines. The company also prohibited the use of flat warehouses for temporary storage and refused farmers the right to load their grain into cars from loading platforms. These severe restrictions virtually placed the private grain companies in a monopoly position, as farmers, having no alternative, were obliged to accept the price, grade and dockage the grain companies offered.

Farmers complained bitterly over the unfair treatment they received and finally a Royal Commission was appointed in 1899 to investigate the grain trade. The Commission held that the farmers' stand was justifiable and recommended reforms to remove the

[1] Read in the absence of Mr. Cairns, by H. C. Grant, Department of Agricultural Economics, University of Manitoba.

cause of the complaints. Many of the reforms were not put into practice and the farmers continued to fight for fair treatment. In 1901 they organized the Territorial Grain Growers' Association in what is now Saskatchewan. The new association strained every effort to improve the system of grain marketing. It took legal action against the Canadian Pacific Railway in 1903 and was successful in getting the car distribution clause of the Manitoba Grain Act recognized.

By 1905 the private line companies had gained almost complete control of the grain trade at country points. From previous experience farmers knew that local country elevators could not compete successfully with the firmly entrenched line companies so in 1906 they organized the Grain Growers' Grain Company. The new company purchased a seat on the Winnipeg Grain Exchange, where it operated a commission business. By means of loading platforms in the country and their own representative on the Winnipeg Grain Exchange, farmers at last escaped in part from the monopoly practices of private companies.

After six weeks of successful operation, the new company was suspended from the Winnipeg Grain Exchange because it declared its intention of paying a patronage dividend. The farmers' company offered to meet the objections raised by the Exchange but its application to be reinstated was refused. The Manitoba government finally lent its support, and eventually, the farmers' cause won and the company was reinstated as a member of the Exchange, but not before it agreed to abandon the patronage dividend.

Farmers were not satisfied with the improvements at country points and contended that local elevators were needed to serve the producers. An attempt was made to get the governments of the prairie provinces to acquire and operate a chain of elevators to safeguard the farmers' interests. The Alberta and Saskatchewan Governments refused to implement the proposal. The Manitoba Government acquired about 170 elevators during the years 1910-12. Due to a variety of reasons the venture proved a failure and after suffering a heavy loss the Manitoba Government leased the elevators to the Grain Growers' Grain Company in 1912.

The Saskatchewan Government appointed a commission in 1910 to make a study of the grain trade in the province and recommend steps to bring about improvements. The Saskatchewan Co-operative Elevator Company was formed in 1911 as a direct result

of the commission's report. The ownership and control of the company was vested in the farmers' hands. The Saskatchewan Government lent 85 per cent of the necessary capital to build the elevators, to be paid back on the amortization plan over a period of twenty years, and guaranteed the company's bank accounts In 1913-14 the Alberta Farmers' Cooperative Elevator Company was organized. The provincial government provided 85 per cent of the necessary capital for the construction of elevators and guaranteed the company's bonds. The Alberta Government, unlike the Saskatchewan Government, did not guarantee the company's bank accounts, so it depended on its financial and selling agent, the Grain Growers' Grain Company, for working capital. The ownership and control of the new company were vested in the farmers' hands. Steps were taken in 1915 to amalgamate the three farmer companies which finally resulted in the union of the Alberta Farmers' Cooperative Elevator Company and the Grain Growers' Grain Company in 1917 under the name of the United Grain Growers' Limited. The Saskatchewan Cooperative Elevator Company continued to operate independently.

The record of the two large cooperative companies is impressive. Both operated country and terminal elevators and export departments. Both had seats on the Winnipeg Grain Exchange and both used the existing market machinery and followed the trade customs. Both attempted, through direct competition, to give the producers better prices and better service than were received from private concerns. Up to 1923 the two companies had acquired about 900 country elevators and operated terminal facilities with a capacity of thirty million bushels. At the time of the Pool's appearance the two companies had a combined membership of 63,000 and handled about 25 per cent of the total amount of grain marketed in Canada. The cooperative companies eliminated many of the abuses prevalent in the grain trade and rendered invaluable services to the producers. As a result of the cooperative companies' activities farmers received a much wider knowledge of the grain business than they had hitherto. The undoubted commercial success of the companies proved the ability of the farmers to attend to their own business and indicated the possibilities of cooperation on a larger scale. In a word, they paved the way for the next important step—the Pool—in the evolution of an extensive farmer-owned and controlled marketing system.

Throughout the period of the agitation for, and the development of improved marketing machinery, the various educational or economic associations played an important rôle. The first of these, The Territorial Grain Growers' Association, which later changed its name to the Saskatchewan Grain Growers' Association, was instrumental in organizing the Grain Growers' Grain Company. Similar organizations in the other provinces, the United Farmers of Manitoba and the United Farmers of Alberta aided greatly the many much-needed reforms in grain marketing. These provincial educational associations spoke with one voice on federal and inter-provincial problems through the Canadian Council of Agriculture, a federation of the provincial bodies.

THE BIRTH OF THE POOL

The demand for some form of centralized marketing, similar to the plan the Pool now follows, grew immediately out of the farmers' experience with stable prices during the World War. In Canada, as in the United States, Australia and other countries, the wheat crop during the later years of the war was controlled by the government. During the crop years of 1917-18 and 1918-19 the Wheat Export Company, which represented the British Government, was the sole exporter of Canadian Wheat. The Board of Grain Supervisors, appointed by the Dominion Government, had complete control of the Canadian grain markets. For the crop year of 1919-20 the form of control was changed. A Royal Commission on Wheat Supplies was formed which had full charge of purchasing grain for Britain, France, and Italy. To meet this new type of purchasing agency the Dominion Government instituted the Canadian Wheat Board. The Wheat Board had complete control over the export and domestic distribution of all grain in Canada. Faced with many difficulties, the Board proved its ability to cope with the problems and render an account of its stewardship which met with hearty and widespread approval. In July, 1920, the Canadian Government announced that it had definitely decided to discontinue the Wheat Board and restore the open market for the handling of the 1920 crop.

To replace the Wheat Board a voluntary cooperative pool was suggested. The proposal was discussed by farmers throughout 1920 and 1921 until the great success of farmers' candidates at the polls in the federal election of 1921 changed the complexion

of the problem somewhat. The pool committee reported to the Canadian Council of Agriculture in 1921 that it had gone into the proposed pool very thoroughly and had found "that under existing conditions it will not be possible to secure such contracts assuring delivery to the pool for five years of all the wheat of farmers raising 60 per cent of the total," and that they "cannot recommend that the original project be further prosecuted for the time being." The Council accepted the committee's report and referred the matter of re-constituting the Wheat Board to the farmers' annual conventions. All three provincial organizations in convention, favored the re-establishment of the Canadian Wheat Board.

The farmers' representatives, who had a strong voice in the House of Commons at Ottawa, urged the government, in 1922, to listen to the almost unanimous voice of the prairie farmers and re-establish the Canadian Wheat Board. The federal government replied that the 1919 Board was established under the special war measure and that it had no constitutional power to create such a board in peace time. But the farmers would not give in and prevailed upon the government to pass the legislation within its power leaving the interested provinces to pass the necessary supplementary legislation and nominate the members of the Board. Special sessions of the legislatures were called in Alberta and Saskatchewan, both of which passed the necessary legislation. Manitoba could not follow suit in 1922 so the farmers were forced to sell their crop in 1922 on the open market. In April, 1923, the Manitoba Government introduced a wheat board bill but it was defeated by a vote of 24 to 21. The Saskatchewan and Alberta Governments continued their efforts to form a wheat board without Manitoba, but in June, 1923, they announced that they were unable to create a board "Combining all the necessary elements of experience, ability and public confidence."

In the meantime farmers had sold their crops of 1921 and 1922 below cost of production. Farmers throughout the west were in a desperate plight. They had been urged by the federal and provincial governments, and by numerous patriotic societies, to strain every effort to produce more and more food. With the cessation of hostilities, the disruption of European purchasing power, and the so-called return of normalcy, the farmers found themselves heavily in debt and unable to liquidate the heavy obligations they had incurred during the period of expansion and

inflated prices which occurred during and following the war, with the ruinous prices which they received for their crops of 1921 and 1922. But they were not dismayed by the failure of the governments to set up a wheat board and with grim determination they returned with renewed vigor to formulate plans for a cooperative pool.

In the early part of August, 1923, a committee representing the United Farmers of Alberta, the unorganized farmer, the press, the government, the banks and other business interests, proceeded with the preliminary work of organizing a pool. The drive started on August 20, 1923. The objective set was 50 per cent of the 1922 acreage of wheat. The contract provided that if the objective was not reached by September 5, 1923, the trustees of the pool could proceed with the organization after the signatories had been given an opportunity to withdraw. The drive was carried on with great enthusiasm by volunteers who gave their time gratis. Bankers, business and professional men and farmers turned out in droves and scoured the country for signatures. When the drive ended on September 5, 1923, the pool was only five per cent short of its objective. Members were given until September 22, 1923, to withdraw. The additional acreage signed between September 5 and September 22 was greater than the acreage withdrawn.

The campaign for signatures in Saskatchewan started on August 29, 1923. The Saskatchewan contract, unlike the one used in Alberta, specifically stated that if 50 per cent of the 1922 acreage was not signed up by September 12, 1923, the contract was null and void. The time allowed was too short as when September 12 arrived the objective had not been reached. However, waivers were secured to extend the date for reaching the objective. The campaign was carried on throughout the winter of 1923-24 and the objective reached in the summer of 1924. The United Farmers of Manitoba postponed their drive until 1924.

Late in September, 1923 steps were taken to put the Alberta Pool in operation. After a few weeks' negotiation the elevator companies signed a contract, similar to the one used by the Wheat Board in 1919-1920, to handle pool wheat. The Canadian Bankers Association agreed to advance the Pool a line of credit for $15,000,000 at 6½ per cent interest, on the security of terminal warehouse receipts, and an initial payment of 75 cents per bushel basis No. 1 Northern at Fort William. The Alberta Pool opened

for business on October 19, 1923. Although faced with many difficulties pioneering in a new field, the Alberta Pool carried its first year's operations to a successful conclusion by marketing over 34 million bushels of wheat at a cost of one-half of a cent per bushel.

In the summer of 1924 the farmers of Manitoba and Saskatchewan joined the pools in great numbers. Permanent boards of the three pools were soon elected. Representatives of the three pool boards met in Regina late in July, 1924, and organized under Dominion Charter, the Canadian Cooperative Wheat Producers Limited, commonly known as the Central Selling Agency or the Canadian Wheat Pool.

COOPERATIVE STRUCTURE OF WHEAT POOLS

The structure of the Wheat Pool is built on a firm cooperative foundation. The first cardinal principle of the Pool is democratic control by the producers. Each member has only one vote and therefore exercises a voice in the management of his association equal to any other voice. The second cardinal principle of the Pool is that it is a non-profit organization—one which operates solely to render efficient services to its members at cost and not to earn a profit on capital invested. The membership of the Pool is open to any wheat grower in the western provinces. The membership embraces every nationality on the prairies and includes H. R. H. The Prince of Wales, Dukes, Earls, Counts, mortgage companies, trust and real estate companies, merchants, landlords and tenants. The present (June, 1930) membership of the three western wheat pools is 142,800 compared to 91,000 in 1924, the first year all three pools were in operation. The present membership of the three western coarse grains pools, which are operated by the wheat pools, is 69,300. Some farmers are members of the Wheat Pool and not members of the coarse grains pool, and vice versa, but in the great majority of cases the members of the coarse grains pool are also members of the Wheat Pool. In addition to marketing the grain for the members of the three western pools the Canadian Wheat Pool also markets grain for 13,400 members of the Ontario Grain Pool and also for the grain growers of British Columbia who belong to the Alberta Wheat Pool. There are approximately 250,000 farms in Western Canada; the wheat pool

membership, therefore, represents about 57 per cent of the farms in the three prairie provinces.

One of the chief reasons for the solidarity and stability of the Pool is the relatively large percentage of its members who formerly belonged to various types of agricultural cooperative associations in Continental Europe and consumers' cooperatives in Great Britain. The contribution that these members have made to the Pool throughout its development and the splendid example they set to new recruits by their loyalty and unselfish devotion to the cooperative cause throughout, particularly in times of trouble and depression, cannot be over-emphasized.

To become for the first time a member of any of the provincial wheat pools it is necessary to sign a five-year contract, pay the nominal sum of one dollar for a share of capital stock (a legal technicality to enable the member to vote) and pay a fee of $2 to be used for organization purposes Membership in the Pool may be renewed merely by signing the new contract on the expiration of the old one.

THE CONTRACT

The form of the contract used by the pools in Canada is essentially the same as the one used by the United States wheat pools in the early years of their operations. Unlike the United States wheat pools, however, the Canadian pools have stuck to the rigid five-year contract.

The first five-year contract expired in August, 1928, and at that time all members were free to sign or not to sign the new contract which included the marketing of the crops of 1928 to 1932, inclusive. The membership of the Pool under the new contract is considerably greater than under the old one. The provisions of the contract, which has stood the test of the courts and is legally enforceable in each of the provinces, are essentially the same. The main features of the contract are: The Association agrees to act on behalf of the member in all capacities necessary for the cooperative marketing of the member's grain under what is commonly known as the "pooling" system. From the proceeds of the wheat sold, the Association may deduct such sums as are necessary for the general operation of the Pool. A further sum not exceeding one per cent of the gross selling price of the wheat may be deducted and applied to a commercial reserve fund to be used for

any of the proper purposes of the Association. A further sum not exceeding two cents per bushel may be deducted from the proceeds of each grower's wheat to be applied to an elevator reserve fund, for the purpose of acquiring elevator facilities for the handling of pool wheat. The total net balance accruing from the wheat delivered by any member may be paid out to the member from time to time as the directors of the Assocation see fit. The Association may borrow money for the general operations of the Pool and may pledge the wheat delivered to it by its members, or paper evidencing title to such wheat, as collateral security for such loans. In the event of a member failing to abide by his agreement with the Association, the latter has the power to enter into possession of the member's wheat lands and to possess the member's wheat and deliver same through the proper Pool channels, and any expenses, legal or otherwise, involved in such proceedings may be charged against the proceeds accruing to the member from such wheat. The Association may join with any other agency for the cooperative marketing of the member's wheat. The member must market through the Pool all his wheat, excepting what is used for seed and feed, during the term of the contract. The member may, upon application to the Pool's head office, receive permission to sell feed or seed wheat. If the member does sell wheat on the open market contrary to his agreement with the Pool, he shall pay to the Association twenty-five cents per bushel as liquidated damages on the full amount disposed of improperly. The member must ship his wheat in accordance with instructions issued by the Association or one of its associate companies.

MEMBERSHIP CONTROL

The entire organization is constructed, from the individual member to the Central Board, in a manner which provides for the complete and thoroughly democratic control by the members, of every department of every branch and subsidiary of the association. Each of the provinces is first divided into districts on the basis of membership; each district is in turn subdivided into ten sub-districts. Every grower in every sub-district is free once a year to nominate his choice for a delegate. An election is held every autumn and the nominee who receives the largest number of votes (voting is by ballot marked by the preferential system) is declared

the representative of all the members in his sub-district. The ten delegates from each district then elect their representative to the governing body or board of the provincial pool. The delegates meet twice a year to study the reports presented by the board and various departments and to formulate policies and instruct the board how they wish the affairs of the association to be conducted. In order that members may keep in touch with the head office and keep well posted regarding the operations of their association, some 1,500 voluntary cooperative locals have been organized.

In Manitoba where the members sign a five-year contract to deliver their grain to a Pool country elevator, as well as to the Pool, the local units have considerable responsibility, but in the other two provinces the locals have no definite responsibility, their participation in the affairs of the Pool being upon a purely voluntary basis. A serious effort by the provincial head office is made to keep the locals alive and active and many new ones are constantly being organized, and old ones reorganized by the field service department, but there are many casualties and a large number of them are inactive.

INTER-PROVINCIAL ORGANIZATION

The provincial pools have complete jurisdiction within the provincial boundaries including complete control of country and in-terminal handling facilities, relations with members and all business excepting that pertaining to the actual marketing of the grain for which purpose the Central Selling Agency was organized in order to eliminate any possibility of competition between the provincial pools. Pool members in each province are directly represented on the board of the Central Selling Agency or the Canadian Wheat Pool, as the governing body of Central consists of nine directors, three from each provincial board. The three representatives from each province on the Central Board are elected by and from and are responsible to their respective provincial boards. The Central Board meets once each month just prior to the provincial monthly board meetings. The representatives of each province render a report covering the operations of Central to their respective boards each month. The head office of Central is situated in Winnipeg; branch offices are maintained in several Canadian cities and also at New York, Paris, London and Buenos Aires. The Selling Agency also has agents in all the principal wheat

importing countries of the world, which agents serve Pool members by supervising their business in 60 ports of 20 different countries.

THE AIMS AND ACCOMPLISHMENTS OF THE WHEAT POOL

The primary object of the Wheat Pool is, of course, to improve the economic and social welfare of the prairie farmers by contributing to a fuller realization of the policy of "better farming, better business, and better living." The principal aims of the Wheat Pool, accompanied by a brief summary of what has been accomplished in each case to date, are given herewith:

1 To extend the system of cooperative marketing whereby farmer-owned and controlled associations, operated for mutual service at cost to all patrons, will displace private or joint stock companies operated for the benefit of a few. Since its inception in 1923 the Pool has received from its members 1,056 million bushels of wheat and 115 million bushels of coarse grains. Since 1924 when the Pool handled 37 per cent of all the wheat delivered in Western Canada the Pool has marketed each year from 51 to 54 per cent of all the wheat delivered by farmers in Western Canada. The Pool now operates 1,636 country elevators with a total capacity of 57,550,000 bushels, and 12 terminal elevators with a combined capacity of 38,426,250 bushels. These facilities have been operated on the basis of service at cost to all members and although they have in most instances charged very considerably less than competitive houses for handling and service, they have already returned several million dollars in patronage dividends. By allowing small deductions to be made each year Pool members have built up an elevator and commercial reserve of 29 million dollars.

2. Increase the farmer's independence and income by giving him a voice in the selling of his crop. A well managed cooperative association with control of a large volume of grain should, a priori, get somewhat better returns for its members than the typical individual farmer who sells his grain, without knowledge of market conditions, in a haphazard manner. The question of the Pool's influence on the general level of wheat prices is a moot one and one that certainly cannot be answered at all satisfactorily at present, indeed if ever in view of the many complicated and frequently conflicting influences which have a bearing on the problem, and

the impossibility of even making safe assumptions of what might or might not have happened had there been no Pool. Unfortunately in the early period of the Pool's organization there was a good deal of loose talk about the influence which could be exerted upon world wheat prices if half of the Canadian crop could be placed under one control. It is my personal opinion that such talk had the very unfortunate, although very natural effect of giving the average Pool member an exaggerated notion of what the Pool could reasonably hope to accomplish, which has added to some extent already, and perhaps will to a greater extent in the future, add to the problem of maintaining a satisfactory membership. It is argued by some people, and not without good reasons, that in order to get a cooperative off to a good start with a large membership it is necessary to paint an exaggerated picture of what such an organization can do. In any event, most cooperative associations bear a slight resemblance to political parties in that their accomplishments fall somewhat short of the promises made during the organizing campaign. Although it is admittedly true that in the early days of the Pool many statements were made, largely by enthusiastic local organizers, which you as economists could not subscribe to, it is also true that the officials of the Pool are suffering from no illusions regarding the power of the Pool to enhance wheat prices above the level justified by the supply of and demand for wheat, and world-wide economic conditions. While the Pool controls about half of the Canadian wheat crop, and while Canada exports on the average nearly 40 per cent of the total volume of wheat which enters into international commerce, the Canadian crop after all is only about 10 per cent of the total world crop. The Pool controls, therefore, only about 5 per cent of the world's wheat crop and its officials are not so foolish as to think they can exercise such control for the purpose of raising world wheat prices. The Pool makes no attempt to get monopoly prices as it realizes it could not do so if it tried, and any attempt to do so could not but be harmful to Pool members in the long run. The Pool is prepared at all times to sell wheat at fair prices and has not since its inception deliberately checked the flow of its wheat into consumptive channels by demanding unfair prices or prices above the normal level determined by the prevailing supply and demand conditions. The Pool's selling policy is to sell its wheat as rapidly as the demand for it materializes and

to avoid at all times taking a set or stubborn attitude toward the market, but rather to always strive to supply the consumers with a flow of wheat adequate to meet their requirements and at prices which will as nearly as possible ensure the maximum consumption at home and abroad and the minimum carry-over from one year to another.

The question of the influence of the operations of large pools on the general level of commodity prices is much too large a one to attempt to discuss in a paper of this nature, and I will have to leave it with the rather dogmatic statement that there are times and circumstances when the operations of the Pool may raise materially the level of prices in certain markets and appreciably in all or nearly all markets not influenced by special government regulations. On the other hand, it is only fair to state that there are times when the uncertainty regarding the operations of large cooperatives particularly during periods of generally demoralized confidence may prevent speculators entering the market when the demand and risk-carrying capacity of the cooperatives are not equal to the supply offered, which lack of speculative purchasing may cause a very considerable drop in price. The problem of whether two totally different systems of marketing, one a large cooperative pool and the other a commodity exchange, each controlling a large part of the trade, can operate smoothly at the same time, and to the best advantage of both organized and unorganized producers is one worthy of careful study and analysis.

But to come back to the question of what the Wheat Pool has accomplished in its second aim—to increase the farmer's income—even if we assume that the net result of Wheat Pool operations on the general level of wheat prices has been nil we have been able to demonstrate to the satisfaction of the rank and file of our membership and to a goodly number of non-Pool farmers as well that in every year since the Pool's inception up to the period for which the records are complete, the Pool member has received appreciably higher net returns for his grain than the average non-Pool farmer.

3. To reduce the margin between the producer and the consumer by reducing costs through taking advantage of the economics of large scale operations. By virtue of the very large volume of business the provincial pools' overhead expenses have averaged only about ½ a cent per bushel and the entire overhead expenses

incurred by Central in marketing wheat have always been materially less than ¼ cent per bushel.

4. Insure the farmer against the losses and uncertainty resulting from widely fluctuating speculative markets. Under the old plan some farmers got top prices, some bottom prices, and many got prices ranging in between these two extremes. Under the new plan all the Pool farmers get the same price for the same quality of product regardless of what time during the year they deliver their grain The Pool farmer by pooling his resources and accepting a conservative advance upon delivery of his grain has to a considerable extent replaced the speculator and now carries his product until the consumer wishes it.

5 To improve the farmers' social life by bringing together the maximum number to join in their work for their mutual advantage. As a result of active participation in the management and control of his own business, the greater independence, self-reliance, and improved psychological outlook of the average prairie farmer are most remarkable.

6. To give every encouragement to the extension of better farming methods and assist in every way possible to reduce the costs of production. The educational field service and research departments of the Pool have contributed a good deal to better farming by instructing Pool members regarding possible improvements in agricultural technique and by the active participation in many of the better seed and farm improvement campaigns.

TRENDS IN LIVESTOCK MARKETING

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DURING the past ten years there has been a marked trend toward what is termed "direct" marketing of livestock. For many years livestock marketing tended to become more and more centralized at public stockyard trading centers to which farmers and country dealers shipped the stock for sale and where packers secured cattle, hogs, and sheep for their slaughtering operations. Since 1920 an increasing proportion of livestock, particularly of hogs and cattle, has reached the packer without passing through public stockyards By various methods of buying and selling, such stock has passed directly from the hands of farmers or country dealers into the hands of packers. Instead of consigning livestock to public stockyard centers for sale, farmers and country dealers have sold increasing numbers of stock at near-by packing plants and packer buying stations or shipped to distant packers on order Instead of depending upon receipts at public stockyard centers for their supplies, packers have secured increasing numbers of livestock directly from local dealers and farmers. This form of trading is more direct in that farmers and country traders deal directly with packers and their buying agencies. Not only are the trading relations between country sellers and packer buyers closer in this marketing channel, but the movement of stock from feed-lots to slaughtering plants is also more direct. The stock moves from the point of assembly and even from the feed-lot in more direct relation to packers' bids than when consigned for sale to public market centers. Before it moves from the assembly point and even from the farm it is sold, or the terms of sale agreed upon.

However, this marked trend toward direct trading between country shippers and packers in livestock marketing has been closely related to other significant changes in the livestock trade. Prior to 1920 direct packer buying of hogs was not unknown. Far from it. At times when hogs were relatively scarce, packers with slaughtering plants at public market centers bought hogs in the country in sufficient numbers to attract considerable attention in trade circles.[1] But, with the upward swing of the hog production

[1] Monthly Letter to Animal Husbandrymen, Armour's Livestock Bureau, page 5. The Meat Situation in the U. S., Report No. 113, Part V, page 26.

cycles, country buying by packers ceased. Only since the period of the World War has direct packer buying of hogs shown an unmistakable upward trend. Circumstances in the livestock trade of the past decade, not so much in evidence earlier, have furnished the impetus and provided the conditions for the continual and rapid growth of this practice. These circumstances represent in themselves most important progressive changes, underlying, and in a large measure accounting for, the rapid development of direct buying by packers and of another form of direct trading which we shall later differentiate as direct selling by farmers. These underlying trends are:

1. Changing competitive relationships in the hog slaughtering industry.
2. Rapid improvement in rural transportation
3. Integration of local and terminal trading centers ensuing from, (a) progress in market communication, featured by highly developed market news reports widely and quickly disseminated, (b) wide spread development of farmers' cooperative local shipping associations and terminal selling agencies.

This paper will present a survey of the direct marketing of livestock in terms of the forms it has assumed, with a brief account of the underlying factors responsible for it or favorable to its development. Mr. Ashby's paper which is to follow, will, I believe, present a more thorough report of the remarkable developments in transportation and market communication and also of the progress of farmers' cooperative terminal sales agencies, which have been most influential factors in the evolution of livestock trading methods.

EXTENT OF DIRECT MARKETING OF LIVESTOCK

Direct marketing has increased most rapidly during the past decade in the Corn Belt States, where, in an earlier period, public livestock trading centers had become dominant. In other important livestock producing sections of the country—in the West and Southwest—public stockyards trading centers have not developed as they have in the Corn Belt States. As the slaughtering industry has grown in the cattle producing regions of the West and Southwest, packers have secured their supplies of meat ani-

mals by purchase at shipping points and even on the ranges. Here, direct marketing has always been the rule rather than the exception. A study by the United States Department of Agriculture, published in 1916, sums up livestock marketing methods in the United States as follows: "It appears from the investigation herein reported that there is a wide variation between one agricultural and livestock producing section and another with respect to marketing methods, shipment to the centralized markets being practised most generally in the Central States, and the local utilization of meat animals being most common in the East and South, while selling to packers or dealers at shipping points is characteristic of large sections in the West."[2] According to this study from 80 to 90 per cent of the livestock marketed in the Corn Belt States passed through public market centers. At that time these trading centers were supreme in the livestock trade of the paramount producing section of the United States and to the authors of this report their supremacy appeared to be secure.[3] Other investigators of that period and even several years later shared this opinion.[4] Yet, since 1918, a constantly and rapidly increasing proportion of the livestock produced in the territory tributary to these stockyard trading centers has found its way from farmers and country dealers to packers, without the assistance of the facilities and services of these trading centers.

A cursory examination of statistical data will suffice to indicate the headway gained by this significant departure from the well entrenched and generally accepted public market method of livestock marketing. That the proportion of hogs reaching the packer over the public market route has declined, appears at once from the data on public stockyard receipts and on total annual slaughter If all hogs slaughtered were purchased by packers at public stockyards, total annual receipts at these centers would exceed total annual slaughter because many animals are counted twice and some even more than twice in the receipts, due to the fact that they are shipped from one market to another. Then too, available annual data on slaughter only refer to federally inspected slaughter, which amounts to from 60 to 65 per cent of total commercial slaughter. For these reasons we are unable from these data to

[2] Ibid. page 16
[3] Ibid. page 28.
[4] The American Livestock and Meat Industry, Rudolf A. Clemen. Page 534.

deduce the percentage of all hogs slaughtered annually that were marketed through the public stockyards. We are able to infer from them only the change in relative importance of the public stockyards as sources of packers' supplies. For 1920, public stockyard receipts of hogs were 1.11 per cent of federally inspected slaughter.[5] By 1926 they had declined to 0.98 per cent of slaughter and in 1929 they were only 0.91 per cent. These data roughly indicate a decline of 18 per cent in the proportion of hogs moving through public stockyards.

The United States Department of Agriculture has published more specific data on sources of livestock slaughtered in the United States.[6] They show the proportion of each species of livestock slaughtered under federal inspection which were secured at the public markets, and the proportion secured from "other sources." The "other sources" indicate the extent of direct marketing. According to these data, in 1922, packers secured 76.4 per cent of their hogs from public markets and in 1929 only 59.8 per cent. Conversely, direct marketing of hogs increased from 23.6 per cent of all hogs slaughtered under federal inspection in 1922, to 40.2 percent in 1929.

In the Corn Belt States where hog production centers, and where it has increased most rapidly since 1920, direct marketing has made the greatest increase. Data supplied by the Bureau of Agricultural Economics, United States Department of Agriculture, indicate that 20.2 per cent of the hogs produced in 8 north central states were marketed directly in 1920 and approximately 35 per cent were marketed directly in 1928.[7] Similar data for Iowa, the premier hog producing state, clearly indicate that where the hog trade has the greatest relative importance, direct marketing has rapidly gained the upper hand. In 1920, a little less than one-third of the market supply of hogs from Iowa were marketed directly and a little more than two-thirds were sent to public market centers.[8] In 1929 this situation was reversed; approximately two-thirds were

[5] Yearbook, 1930, U S.D.A.

[6] 1925 Yearbook, U S.D.A., p 1186, for years 1922-1925. Monthly Crops and Markets, U.S D A. for years 1926-1929.

[7] The states included are North Dakota, South Dakota, Nebraska, Kansas, Missouri, Iowa, Minnesota, and Wisconsin. These data do not include hogs shipped directly to packers at public market centers. Consequently, they under-estimate the extent of direct marketing.

[8] Iowa Monthly Crop Report, January issues, 1920-1928. Infor. for 1929 compiled from data supplied by Des Moines office of Bur. of Agr. Ec., U.S.D.A.

marketed directly and the remaining one-third shipped to public market centers.

Direct marketing of slaughter cattle, calves, sheep and lambs in territory tributary to public market centers has not kept pace with that of hogs In the case of sheep and lambs there appears to be no tendency toward direct marketing. But in the case of slaughter cattle and calves, the statistics disclose a tendency toward direct marketing in the central states. Data published by the United States Department of Agriculture, referred to above, show that in 1924 packers secured 9.23 per cent of the cattle and 12.92 per cent of the calves, slaughtered under federal inspection, from sources other than the public stockyard centers. In 1929 the percentages had increased to 11.1 per cent for cattle and 16.55 per cent for calves. It has already been noted that direct marketing of slaughter cattle has always prevailed in the West and Southwest. The increase here noted in direct marketing of cattle and calves must have occurred in the Corn Belt States. Direct evidence of this is supplied by data for Iowa. In 1929, 12-14 per cent of the slaughter cattle and calves from Iowa were marketed directly as compared with only 2.4 per cent in 1920. While these increases in direct marketing of cattle and calves are not as impressive as in the case of hogs, they seem marked and persistent enough to furnish additional testimony to the declining relative importance of public stockyards trading centers as media in livestock marketing.

Data at hand for studying methods of marketing feeder cattle, calves, sheep and lambs are very meager. The only statistics are for stock moving through public market centers. There is no doubt concerning the continued importance of these centers as gateways through which feeder stock moves from producing regions to the feed lots of Corn Belt farmers. Yet, considerable feeder stock is marketed directly. Experienced feeders visit the ranges for the purpose of selecting and purchasing stock for their feed lots and those of their neighbors. Local dealers import stock directly from the ranges to supply their local trade. It is not unlikely that this method of marketing such stock is increasing. At any rate the feeder cattle and lamb pools of the National Livestock Producers' Association is a significant instance of direct livestock marketing in recent years.[9]

[9] Annual Reports, National Livestock Producers' Association, 1926-1929.

DIRECT PACKER BUYING IN LIVESTOCK MARKETING

In the Corn Belt States where direct marketing has made extensive inroads into the public stockyards system of marketing, the prevailing form is direct buying by packers. Under this form of buying packers secure their supplies through a country buying system which enables them to bid directly for their livestock, accept delivery at the plant, concentration station, or even on track at shipping point, and in accordance with bid prices upon inspection of the stock. The following is a classification of methods of direct packer buying:[10]

I. Operation of country buying agencies.
   1. Packer track buyers.
   2. Packer concentration stations.
II. Buying through private operators delivering to plant
   1. Local stock dealers.
   2. Private concentrators.
III. Buying from producers delivering to plant.
   1. Farmers.
   2. Farmers' local associations.
   3. Farmers' concentration and sales agencies.

At the present time all types of packers are buying hogs directly from farmers in the areas of dense hog production. Only the so-called interior packers buy cattle directly. With plants located at centers within livestock producing regions, far from public stockyards, these packers have always depended for their supplies almost entirely upon stock which they could buy from farmers within hauling distance and at shipping points on railroads serving their plants. During the past ten years these packers have greatly increased their slaughtering operations. While they are principally hog slaughterers and pork packers, many of them are slaughtering some cattle and apparently are gradually building up a trade in beef. It has only been within the last five years that the national packers, with extensive slaughtering facilities at public stockyard centers, have entered the arena of country buying. Already they have extensive country buying systems through which they secure many hogs for their plants at public stockyard centers. Eastern

[10] Taken from my paper entitled, "Direct Packer Buying in the Marketing of Livestock," published in the Journal of Farm Economics, Vol. XII, No. 2, April, 1929, p. 300.

slaughterers, located at important consuming centers and catering to the fresh pork trade, are also represented by their buying agencies in the country hog trade of the heavy producing regions. Apparently though, only a few of such packers secure many hogs through their own country buying agencies. Most of them rely upon the public market centers where they place their orders. More recently, farmers' direct selling agencies (discussed later) have supplied packers of this sort with all or a part of their requirements.

If the direct packer buying situation in Iowa is typical of that of other heavy producing areas, it would appear that interior packers have played the leading rôle in its development. Iowa packers alone, exclusive of those at the Sioux City terminal market, took 30 per cent of the Iowa hog supply in 1929.[11] In 1920 they took just one-half of this proportion or 15 per cent of the supply. This was about half of the hogs bought directly from farmers and local dealers in 1920. The other half was taken by other interior packers and eastern slaughterers operating reload stations in Iowa. In 1929, the proportion going to eastern packers through their own buying stations was about the same, approximately 12 per cent, while mid-western interior packers, outside of Iowa, alone took 12 per cent of the Iowa supply of hogs. Altogether then, interior packers located in Iowa and adjoining states bought directly from farmers 42 per cent of the Iowa hogs in 1929 as compared with about 19 per cent in 1920. Country purchases by public stockyard packers in 1929 accounted for 10 per cent of Iowa hogs while four or five years ago there was practically no country buying by such packers. The latest entries into the field, they have from all indictations taken up the business in earnest. Together with interior packers they have been responsible for the exceedingly rapid extension of direct buying of hogs in Iowa during the last few years which now reaches into practically every hog producing locality of the state.

On the face of it, direct packer buying appears to have grown to its present proportions in large part because interior packers have, within the past ten years, greatly expanded their operations. If their location with reference to hog supplies has been a contributing factor to their rapid growth within this recent period, it

[11] Iowa Crop and Livestock Reports, January, 1920-1928. Comparable data for 1929 made available by Des Moines Office of the U. S. Bur. of Ag. Economics.

must have become much more advantageous during this period than formerly. This has undoubtedly been true. Most important developments have reduced the costs and inconveniences of country buying. But, there must be other reasons for the great increase in their slaughtering operations since 1920, because after all, they must sell their products in competition with other packers. Public market packers, who have also become extensively engaged in country hog buying, have given as a reason the shortage of hog supplies at these trading centers, due to the country buying on the part of interior packers, and the great increase in buying on order at the public markets adjacent to regions of increasing hog production.

Trends in the packing industry since the period of the war throw some light upon the situation.[12] Until 1918 hog slaughtering and pork packing tended to become more and more centralized at the primary public market centers—those in closest proximity to regions of increasing hog production. But since 1918 a reversal of this tendency has been manifest. In 1918, local hog slaughter at all the public markets was about 74 per cent of total federal inspected slaughter. Since then it has declined until in 1929 it was only 57.6 per cent of federal inspected hog slaughter. Practically all of this decline in the relative importance of public market slaughter has occurred at seven principal markets, Chicago, St. Louis, Kansas City, Omaha, St. Joseph, Sioux City, and South St. Paul. Local slaughter at these markets declined from 49 per cent of all hogs slaughtered under federal inspection in 1918 to 32.9 per cent in 1929, a decline of 16 points.

This no uncertain decline in the relative importance of hog slaughtering at these primary public market centers has been offset by a correspondingly rapid increase at interior packing centers within territory tributary to them. What may be termed interior slaughter in contrast to local slaughter at the stockyards markets, has increased about the same in proportion to total hog slaughter under federal inspection, as market slaughter has declined. The increase in interior slaughter has been most pronounced in the central and northwestern Corn Belt States. At the present time about one half of the hogs slaughtered in these states are killed by interior packers; interior hog slaughter equals market slaughter.

[12] See paper by the author entitled "Direct Packer Buying and the Marketing of Livestock," Journal of Farm Economics, Vol XI, No. 2, April, 1929, pp. 289-300.

While this decentralization of hog slaughtering in the most important hog producing states has been in process, slaughtering in the important pork consuming sections of the country has had a tendency to increase. In proportion to total hog slaughter under federal inspection, slaughter in eastern and northeastern states has changed but little since 1919 In the southeastern states a marked increase has occurred during this period. The same is true of hog slaughter on the Pacific Coast. It is therefore evident that in relation to slaughter at the principal public market centers of the Corn Belt States, hog slaughter in pork consuming territory has made substantial gains. To put it more accurately, hog slaughtering in pork consuming territory has maintained its relative importance in the industry while slaughtering at the principal public markets has failed to do so by a considerable margin.

It requires no stretch of the imagination to apprehend the effect of these extensive readjustments in the localization of hog slaughtering upon competitive relationships in the packing industry. The packing industry is in quite a different relationship to the source of its raw material from that existing ten years ago. While it has become thus decentralized, hog production has become more and more localized within the central and northwestern sections of the Corn Belt.[13] Elsewhere with few exceptions, hog production has fallen off sharply since 1915. East of the Mississippi Valley declines have been general. Packers in this territory have seen their local hog supplies dwindle and in order to maintain their operations have been obliged to reach into the midwestern market centers and producing regions for hog supplies. Conclusive evidence of this is furnished by the sharp upward trend of shipments of slaughter hogs from these market centers since 1918. Taking the seven principal stockyards markets together, shipments in percentage of receipts increased from 19.3 per cent in 1918 to 34.5 per cent in 1929. While eastern packers have come to these markets for increasing numbers of hogs, interior packers have been busy cutting off receipts at these centers. Caught between these forces, local packers at these centers have faced a precarious supply situation.

Slaughterers in pork consuming territory on the one hand, and interior packers on the other, have been able to conduct such ex-

[13] O. E. Baker, Address on "Do We Need More Farm Land?", Mimeographed publication of Bureau of Agricultural Economics, U.S D.A.

tensive forays into the sources of supplies of mid-western public market packers because of peculiar advantages in the meat trade enjoyed during the post-war period. Eastern slaughterers have been able more than to hold their own in the pork trade even in the face of a receding hog supply because of two apparently favorable circumstances. These are relatively favorable freight rates and the increased demand for fresh pork. Since 1918, the rate between Chicago and New York on dressed pork has been generally higher in relation to the hog rate, than in the period before and during the early years. Probably of greater influence have been the opportunities of the fresh pork trade. This trade has assumed a much greater relative importance in later years than formerly. Fresh pork can be produced economically in comparatively small plants Since it is such a highly perishable product, producers in consuming territory have had sufficient advantage in competition with those located nearer hog supplies to overcome their relative disadvantages in procuring hogs for their operations.[14] In passing it may be noted that packers in consuming territory may lose some or all of their relative advantage from location if new methods of freezing and refrigeration, now under experimentation, become perfected and successfully adapted to pork. Experimenters with this process in the meat trade appear to be convinced that it is destined to revolutionize the preparation and marketing of fresh meat.

Circumstances of the post-war period have been even more favorable to the interior packers of Iowa, Minnesota, and neighboring states, than to the eastern packers, in their competition with the national packers, the bulk of whose facilities were located at the principal public market centers. Emerging from the period of the war in a relatively strong position in the domestic pork trade, gained while national packers were occupied with export business, these interior packers have been able to forge ahead under beneficial adjustments in hog and pork railroad rates, the advantages of rapid progress in rural transportation, and developments in the country hog trade. Well established in the trade of important pork consuming centers, they have been able to widen their sphere in the local pork trade by means of the motor truck as the mileage of hard-surfaced roads has increased. But the truck has played a

[14] Merchandising Packing House Products, E. L. Rhoades, p. 80.

more important rôle in their behalf as a means of livestock transport. This and other developments in the country trade have sufficiently reduced the costs and inconvenience of buying from farmers and local dealers, to enable interior packers to procure adequate supplies for large-scale slaughtering operations. Of nine packing plants in Iowa only three killed fewer than 25,000 hogs in 1929, two others were under 500,000 and 3 of them slaughtered between 700,000 and 1,000,000 head each.

This survey of trends in the pork producing industry, even though kaleidoscopic, has made it evident that during the post-war period two important types of hog slaughterers have emerged to contend with the national packer in the competitive struggle for hog procurement. Each, in a different position with reference to sources of raw material, would be most likely to exploit any advantages peculiar to his situation. Interior packers, always dependent upon country procurement, were destined, under pre-war conditions in the country hog trade, to remain always relatively small-scale operators. But the past decade has brought developments greatly extending their horizon. Among these, perhaps of greatest importance, have been progressive developments in local hog marketing. Such developments as improved rural transportation, improved market communication, and better organization of the local hog trade have enabled them to draw adequate supplies for large scale operation against the pull of the public market centers. As a result, large-scale packers, depending upon receipts at these centers, have found their source of supplies no longer adequate at prices which they could afford to pay. Like Ulysses of the legend, they have found it precarious sailing between Scylla of eastern packers and Charybdis of interior packers. Unable to meet the prices of eastern slaughterers for select butcher hogs and unable from public market receipts to secure hogs on a competitive basis with interior packers, they have attempted to meet their situation by engaging with interior packers in country procurement. Since they have rapidly extended their facilities for direct buying, it would appear that they have accepted it as the best way open to them for meeting their interior competitors.

Concerning the developments that have made it feasible for packers to carry their competiton for hogs even to the farmers' feedlot, little more than mention can be made in this paper. The remarkable developments in truck transportation and in market

communication will be passed over with only the comment that they have been fundamental factors in the development of direct trading in livestock The former materially reduces trading and assemblying costs by widening the sphere and increasing the volume of a buying enterprise, and of a cooperative selling enterprise too, for that matter. Interior packers were naturally the first to take advantage of this new and efficient method of transport. In 1927 twenty-six per cent of Iowa hogs were delivered to packing plants by truck. Since then truck receipts at these plants have declined because stockyards packers have cut into their trucking territory by means of strategically located buying stations. In 1929, thirty-nine per cent of the receipts of such concentration stations in Iowa were truck deliveries. Improved market communication has provided a relatively satisfactory basis of information without which, large-scale country buying would be practically impossible. Even munificent bids would not deter farmers and country dealers from shipping to public markets if they felt unable to formulate a fair judgment of values on the basis of information readily available.

Another important development of the past decade has prepared the ground for direct marketing, first in the form of direct packer buying and perhaps later, in the form of direct farmer selling. This development has been a step in organization for marketing rather than, as in the case of the other developments mentioned above, a perfecting of external facilities available to traders, whether buyers or sellers. The development referred to is that of the cooperative livestock shipping association and the cooperative commission agency. Strange as it may seem, these farmer marketing agencies, designed to adapt farmers to the public market system, have prepared the local trade for the reception of direct packer buying. Perhaps in time these agencies, revised and reorganized, will succeed in recasting direct marketing in the form of direct farmer selling in place of its presently prevailing form, that of direct packer buying. This possibility will be later considered Here we are concerned with the influence of the cooperative livestock marketing movement of the past ten years upon the local livestock trade. Briefly, it appears to have had two important effects. First, as it gained momentum, it put local livestock dealers upon the defensive and forced them to look to their connections and outlets. In many communities they could not maintain themselves in

competition with shipping associations, for farmers, through such agencies, could assemble and ship on even narrower margins than they. As merely assemblers and shippers, dealers were in a measure superseded in the country trade. In order to hold their position, new and better outlets were required. These were made available in many communities by the interior packers, who as we have seen, were seeking wider connections in the country hog trade for their expanding operations. With interior packer connections, local dealers have had little trouble in holding their own, and shipping associations in their turn have, after much hesitation and objection, turned to interior market bids. Second, the cooperative agencies, although not designed for country trading, have in a measure prepared farmers for it. While it remains to be seen how promptly and thoroughly they will adapt their organizations for a more complete exploitation of direct marketing, they have already acquired, through their organizations, not only information concerning market values and requirements but also a certain degree of sophistication in livestock trading. For these reasons the wide-spread development of farmers' local shipping associations and terminal selling agencies have helped to prepare the way for direct packer buying Together with other technological developments they have brought about a measure of integration of local and terminal trading sufficient to enable direct packer buying to take root and flourish.

If our observations are correct, packers have, through direct buying, merely taken advantage of these progressive changes in the country hog trade, in order either to enlarge their operations or to fortify themselves against the vagaries of public market receipts. The stimulus was supplied by changing competitive relations in the packing industry. Whether direct buying enables those packers who have formerly depended upon public market receipts to procure hogs at lower costs is perhaps an open question. Our main contention is merely that direct buying is much more economical and feasible than it used to be. But such studies as have been made indicate that a packer's buying station with a good volume can deliver hogs to a public market plant at costs somewhat lower than prices paid at the yards, even after paying prices at local shipping points higher than those realized by shippers from consignment to the stockyards center.[15] Of course some

[15] See paper by B B Derrick, published in American Cooperation, 1927, Vol. I.

stations are more efficiently operated than others. In general, it is reasonable to suppose that if direct buying were too expensive for public market packers they would support prices at their centers rather than engage directly in the country trade.

DIRECT SELLING BY FARMERS

Direct packer buying implies direct farmer selling. In a sense they are merely the opposite sides of the same thing. When the packer buys directly the farmer sells directly, and to the same extent. But as already explained, direct marketing of livestock has assumed various forms differing from each other with respect to the technique for trading. On the one hand packers have established facilities for buying directly from individual farmers. This is direct buying. On the other hand farmers have established facilities for selling hogs directly to packers, delivering them on order in accordance with quantity and quality specifications. This is direct selling. Under the former system, packers buy hogs mostly upon inspection, at prices adjusted somewhat to meet local competitive conditions. If they can find some cheap hogs they will not refuse them. Under the latter system, by means of proper organization, farmers offer packers an opportunity to buy hogs on a competitive basis and in accordance with their requirements. In between these two opposite forms of direct marketing, variations are found partaking of the nature of each.

Farmers have had the same opportunities to develop facilities for direct selling that packers have had for establishing facilities for direct buying. But there has not been the same urgency in the case of farmers. Packers have obviously been greatly concerned with competitive buying while farmers have been little concerned with competitive selling. In fact they have commonly regarded cooperative organization as a means of enhancing prices by eliminating competition in selling, or eliminating middlemen, and have generally overlooked its practical value as a means of preparing and offering their livestock for sale in the market in such a way as to enable packers to bid highest prices for it; higher prices than they could pay under other conditions. This reason, coupled with a certain apathy and ineptitude with respect to problems of efficient marketing, explains, perhaps, why farmers have not taken as full advantage of improved transportation, communi-

cation, and commodity standardization in their selling as packers have in their buying.

However, the rapid projection of direct buying by packers has given farmers a real concern with the problems of direct marketing. Many of them, accustomed to shipping, either independently or cooperatively, to public markets, were inclined for a time to ignore the country bids of the packers. But when the bids appeared particularly attractive they were able to overcome their prejudice enough to take advantage of local offers and finally many have come to depend entirely upon country bids. Such farmers not only considered packers' prices attractive but also welcomed the opportunity, afforded by direct trading, of having a price agreement before the stock left the feedlot. It would appear that the majority of farmers have always preferred to avoid market risks by selling locally. For cash on the spot, whenever they were ready to let the stock go, they have been willing, if not quite contented, to patronize local dealers. Yet, while these farmers as well as those formerly consigning to public markets appreciate the advantages of having a definite bid before they move the stock, they view with some misgivings the thrusts by packers into producing territory.[16] Among farmers there is some apprehension lest the situation may hold in the making a buyer's market. Contemplating such prospects from direct marketing in the form of direct packer buying, farmers in many localities have manifested an interest in organization for the purpose of broadening their markets sufficiently to afford protection against domination by any given packer interest.

Moreover, there is evidence that farmers are coming more and more to regard organization as a means of dealing more efficiently and effectively with packers in direct trading as well as at the public market centers. Experience has taught them that there are many things to consider in direct marketing that someone else looked after for them when they consigned their stock to public markets. There is the matter of getting in touch with as many packers as possible in order to secure the very best bid. An individual farmer at best, has limited trade connections. Then there is the question of grades. Some packers are bidding stronger on one grade at a particular time than on another. Unless a farmer

[16] See contribution by Dr E G Nourse, in Recent Economic Changes, Vol. II, p. 580, National Bureau of Economic Research.

is within trucking distance of several buying centers or at a shipping point where several packer buyers are operating, he has little or no opportunity to sell his hogs on a well sorted basis Usually he must content himself with the best price offered for the bunch. Such considerations and others, involved in country selling, are leading farmers toward, and actually into, organizations for direct selling of hogs to packers.

It almost seems as if direct buying must eventually more or less give way to direct selling. There would appear to be economies in direct trading, already demonstrated by a few exceptionally enterprising cooperative sales agencies, that lie wholly within the province of direct selling as distinguished from direct buying. These may be said to fall into two classes; economies of distribution, and economies of standardization They are, of course, closely interrelated. If efficient distribution of hogs may be taken to mean movement at minimum costs from a given community to the plant of the packer paying relatively highest prices, it is clear that farmers must assume certain functions and responsibilities in bringing it about. It is evident enough that competing buyers cannot be relied upon to find for the hogs, produced in a given locality, the highest paying outlets. Business merely requires packers to meet competition. And it is unreasonable to expect that buying competition will be maintained in full force with respect to all portions of the supply under a trading system that leaves it to the packer to bid for the hogs at the farm or at the shipping point. If packers must come to the farm for the hogs, it may be expected that some communities will pay rather dearly for the service. If farmers would receive maximum prices, let them offer their hogs to the trade in such a way as to give those packers who are willing to pay highest prices a chance to buy them.

Likewise, for efficient trading, quality considerations are most important. When the packer must take some chances on the quality and condition of the hogs, naturally the prices offered must be lower than they might be for hogs guaranteed to be free from defects. If the merits of slaughter hogs could be precisely determined while the hogs are on the hoof, standardization would be a comparatively simple matter. But slaughter tests have revealed considerable variation in the value of hogs, graded as closely as possible by inspection. So, when the packer must rely entirely upon inspection in buying, he must allow for certain defects, that, on

the average, the hogs may be expected to have. Most of these defects are under the control of the producers and the handlers of the animals. Farmers could therefore offer their hogs to packers in such a way as to give assurance to packers concerning the slaughter condition of the animals This is not done at the public markets. There the packers must take their chances.[17] The result is that all producers selling at these markets are penalized by lower prices because a comparatively few of them have shipped hogs below standard with respect to these concealed qualities. At these markets, too, the general practice of "filling" complicates the situation and tends to defeat the purpose of efficient selling. Buying hogs in the country, directly from farmers, packers undoubtedly are able to realize a higher pork yield than from public market hogs. There they are better able to control the practice of "filling." They also may more readily learn the localities from which the poorer hogs come and pay accordingly. But even there, they are not able to buy on the basis of quality and condition most advantageously unless farmers have taken steps to make their hogs available strictly on this basis. This farmers cannot do effectively without organization for selling. It would therefore appear that the problem of standardization in livestock marketing may be most effectively dealt with by farmers' direct selling agencies.

In the cattle producing regions, where packers have customarily sought their requirements on the ranges, direct buying has, in a measure at least, given way to a system of direct selling. Twenty-five hundred stockmen in the states of California, Arizona, Nevada, New Mexico, and Oregon are now members of the Western Cattle Marketing Association. This organization commenced operation in 1925. Since then it apparently has established a splendid sales service for its members, which enables them to meet packers' demand much better than formerly. Shipments are commonly made directly from the shipping points on packers' orders. It is significant that this organization gives careful consideration to applications for membership, and that one of the important qualifications is the quality of stock produced. The Texas Livestock Marketing Association is another organization of the same character. Organized later, it has already become well established.

[17] See paper by E. M Wentworth, entitled, Elements of Speculation and Risk in Livestock, American Cooperation 1927, Vol. I, p. 557, American Institute of Cooperation.

Among the cooperative livestock marketing agencies of the Corn Belt States, direct selling of hogs has gained much headway within recent years. Undoubtedly, the most important recent developments in the cooperative livestock marketing movement of this region have been adjustments for direct selling of hogs. When it is recalled that the characteristic cooperative livestock marketing agencies of this region were originally designed for the public market method of selling, there is little occasion to wonder at the apparent confusion in the movement created by the rapid progress of direct packer buying of hogs. Direct packer buying was, so to speak, a flank attack upon this movement of organized selling, delivered before the organizations, local and terminal, had been able very clearly to establish their line of march toward more efficient farm marketing. For this reason it is not surprising that fatalities among local shipping associations were rather heavy in those districts where the attack by direct marketing was most vigorous. In spite of these losses, local associations as a class have pretty well held their ground by taking steps to be of service to members in direct selling to packers. Many successfully established connections with country buying packers and quickly developed into effective local sales agencies. A few of these have already become fair sized concentration stations, drawing hogs from the territory of surrounding shipping points. Others have had indifferent success in making this transition from shipping to selling. At the present time the vitality of these local agencies is manifested by district agencies created by them for larger scale handling and selling.

By federation, reorganization, or absorption, local shipping associations are forming themselves into larger business agencies designed to take full advantage of the truck for assembling hogs in larger numbers for grading and sorting, as well as to broaden connections with packers In order to provide themselves with more efficient distributive and sales service, these growing assembly or concentration agencies are already laying plans for regional, state, and even national overhead organizations. In Ohio, where shipping associations were organized on the county basis, large-scale assembly or concentration agencies most quickly and readily took shape in response to improved transportation and the advantages of closer grading and sorting for market distribution. Among these local agencies in Ohio is the Fayette Producers' Association

which deserves special mention in any report on farmers' cooperative livestock marketing agencies in the Corn Belt. One of the first to engage in direct selling to packers, it has been most successful, securing for its members substantial premiums for all high quality hogs.

The terminal cooperative sales agencies, too, have contributed to the development of facilities for direct movement of hogs from country points to packing establishments. Becoming well established as farmers' commission agencies at the public market centers by 1925, and much earlier in several cases, these agencies have, generally speaking, been alert to opportunities open to them for developing more direct and satisfactory trading relations between their farmer members and the packers. While a few have felt impelled to resist the trend toward direct marketing, joining in defence of public market methods with the interests concerned primarily with maintaining the prestige of their respective stockyards markets, the majority have recognized the validity of direct trading and lent their efforts to the formation of direct selling agencies in their territory. Besides assisting local agencies in their efforts to secure direct contacts with packers, and more recently, actually establishing concentration stations in their territory, these terminal agencies, or a group of them, were instrumental in the organization and development of the National Order Buying Company. This agency provides an overhead sales service for farmers' local marketing associations as well as an order service for terminal agencies. By establishing contacts with eastern hog slaughterers, the National Order Buying Company has provided direct outlets for local agencies too small to maintain wide market connections. Another example of the development of direct marketing service by cooperative terminal agencies is furnished by the feeder pools of the National Livestock Producers' Association. Through these pools many thousand head of feeder lambs, cattle, and calves have been moved directly from the ranges to the feedlots of Corn Belt farmers.

In conclusion it may be said that direct marketing of livestock in the Corn Belt States has already proceeded far enough to give promise of amounting to something more than merely a deviation from established methods. But since its progress is limited by the very conditions out of which it has grown, certainly it is not destined entirely to supersede the public market method. Fundamen-

tally its progress has been due to underlying progressive developments, which have paved the way for closer trading relations between farmers on the one hand and packers on the other. Initiated by packers in their competitive efforts to expand or to fortify their sources of raw material, it may be perfected by farmers in their efforts to reduce to a minimum, risks and wastes in the market distribution of their livestock. It would appear that the future of direct marketing will depend largely upon the facility that farmers are able to acquire in making their livestock available to packers in accordance with the latters' requirements and to the extent that, in so far as possible, quality is guaranteed.

TRENDS IN MARKETING LIVESTOCK

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As 80 to 90 per cent of our total crop of Indian corn is marketed in the form of livestock and since livestock furnishes the best medium for turning into marketable form the production of some three-fourths of our total acreage of feed, forage and pasture crops, the importance of livestock in our farming organization is apparent. Inasmuch as meat animals provide a cash income of from 2 to 3 billions of dollars annually it is not surprising that stockmen are giving more attention to their marketing.

Not in many years, if at all, have conditions in the livestock marketing field been so unsettled as recently. Therefore, in discussing trends in livestock marketing the first problem is to decide which of many factors are likely to be significant in shaping the livestock marketing system which is expected to evolve.

I have been requested to mention motor transport of livestock, and market communication In addition, I have selected three other factors—terminal cooperative livestock sales agencies, county livestock marketing committees (in Illinois), and standardized market classes and grades of livestock. We have then, two topics from the field of cooperative livestock marketing and three from the general field. They will be taken up in the following order: first, cooperative terminal sales agencies; second, county livestock committees; third, motor transport; fourth, market communication, and fifth, market classes and grades

COOPERATIVE TERMINAL SALES AGENCIES[1]

During the last 15 years cooperative sales agencies have had a rapid development on the terminal livestock markets. During 1929, 28 such agencies were credited with total sales of 302 million dollars of livestock. Omitting 5 of these agencies, operating on what I do not regard as primary livestock markets, there remain 23 agencies with sales of 292 million dollars of livestock in 1929—the largest firm with sales of over 30 millions and the smallest with

[1] For a detailed discussion of this topic see Technical Bulletin No. 57, U S Department of Agriculture.

sales of over 2 millions. This volume was approximately 18 per cent of the total consigned to the markets concerned.

One example of the growth of these agencies will suffice. Starting in 1920 on a borrowed capital of $7,000 the National Livestock Producers' Association operated 12 terminal agencies in 1929, with a total sales volume of nearly $150,000,000 of livestock. In the meantime, several of these agencies had set aside from earnings, reserves of from $30,000 to over $60,000 each. A second group, known as the Farmers' Union group, includes 9 controlled or affiliated agencies, with total sales of around 100 millions of dollars in 1929. There are also certain independent agencies, notably the Central Cooperative of South St. Paul. With the recent organization of the National Livestock Marketing Association and of the Farmers' Livestock Marketing Association, further development in this field is awaited with deep interest.

It must not be assumed that cooperative terminals have had no opposition or have faced no problems. On the contrary, they have encountered all the obstacles that organized and financed opposition could put in their way, ranging from trivial annoyances to absolute and vicious boycotts. From the first, organization and management problems have been, and continue to be, of the greatest significance.

Although operating but a few years, terminal cooperatives have accomplished worth while results, five of which may be mentioned:

1. The terminal cooperatives provide an effective check against increases in selling charges on their respective markets. In several instances they have materially reduced rates.
2. They have improved market service.
3. They have, in several territories, set up their own credit corporations, often saving their members 1 per cent interest on feeder loans.
4. They enable stockmen to retain control of their product one step further in its movement from producer to consumer.
5. They provide an agency through which stockmen may exert their collective influence in matters affecting the livestock industry.

With respect to direct selling, it should be noted that its rapid increase has been largely coincident with the development of the terminal cooperatives. Should direct selling continue its recent rate of increase, many of the terminal cooperatives may find them-

selves in the situation of a mill built on a good stream, but which some one taps farther up, diverting the water and leaving the mill unable to operate effectively.

COUNTY LIVESTOCK MARKETING COMMITTEES

Some 75 Illinois county farm bureaus have selected livestock marketing as one of their definite projects and have organized county livestock committees, having at least one member in each township and often one in each local unit. In some counties the livestock committee includes as many as 50 members. Working with these county organizations is the Livestock Marketing Department of the Illinois Agricultural Association with two well trained men on full time. Two forms of activity have been emphasized; first, county and local discussional meetings, and second, organized inspection tours, one county at a time, to the terminal livestock markets. In one and one-half years over 5,000 Illinois stockmen have visited the Chicago yards under this plan. As a result of these activities, Illinois stockmen are fast gaining a better understanding of livestock marketing problems and are studying them as never before.

MOTOR TRANSPORTATION OF LIVESTOCK[2]

Trucking or motor transportation of livestock, has increased with great rapidity during the past five years and affects the livestock marketing system in several ways: first, it seemingly tends toward decentralization of livestock marketing; second, it has affected adversely a large portion of the local cooperative livestock associations; third, it may be contributing to decentralization of our packing industry, and fourth, it is, in many instances, affecting livestock transportation service by rail. On the other hand trucking affords greater convenience to stockmen. Their livestock is picked up at the farm feedlot, thus saving them the labor of moving it themselves. Trucking offers greater flexibility of movement, since livestock may be moved at any time of the day or night, and it makes available a broader market outlet than formerly. Where trucking is generally practiced, the stockmen selling less than a carload of livestock at a time must either truck to market or sell

[2] For statistical data see the mimeographed report "Driven-In Receipts of Livestock." Bureau of Agricultural Economics, Washington, D.C., 1929.

locally. Debatable aspects, as between truck and rail movement, are the relative expense, comparative shrinkage enroute, and the extent of losses from crippling or death. The relation of improved highways to the volume and distance of truck shipment is basic to the whole question, but must be omitted here.

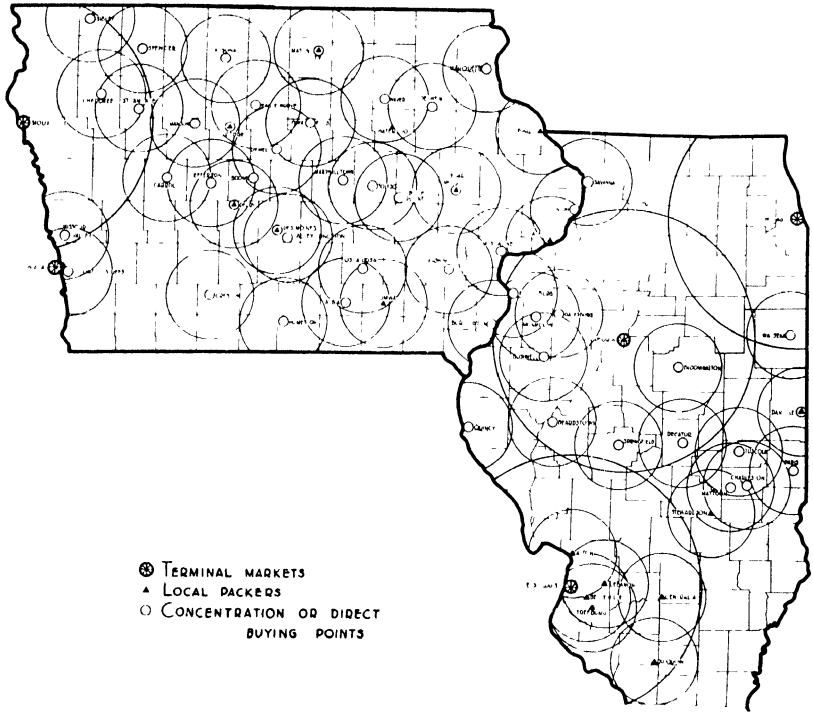

FIGURE 1. LIVESTOCK MARKET OUTLETS IN IOWA AND ILLINOIS, 1930
A circle with a radius of 25 miles is transcribed about each local market or packing plant, and a circle with a radius of 75 miles about each terminal market. Note how nearly these circles cover all the territory.

As to the volume of livestock trucked, evidence is abundant, so illustrations only are included here. For example, at 16 terminal livestock markets in 1929 nearly 14,000,000 head of livestock were trucked in, representing 21.9 per cent of the total receipts. This was estimated as equivalent to 366,000 railroad decks (or floors) of livestock or some 4,000 train loads. Over 1,000,000 head were received by truck at each of 3 markets; over 600,000 head at each of 3 others. In one year (1928 to 1929) truck receipts at 8 markets increased by 20 per cent.

The possible influence of motor transportation as tending toward decentralization of livestock marketing is an aspect of major importance. Possibilities in this direction are clearly indicated on the accompanying map of the two leading hog-producing states, Iowa and Illinois, which show the location of, (1) local livestock markets or concentration or direct buying points, (2) local packing plants, and (3) terminal livestock markets (figure 1). A circle, with a radius of 25 miles, is transcribed about each local market or packing plant, and a circle, with a radius of 75 miles, about each terminal market. Note how nearly these cover all the territory. If the smaller circles were extended to 50 mile radii (50 miles is a very common trucking distance) practically all the territory would be included.

The increasing volume of livestock trucked to market indicates that more trucks are operating. This produces increased competition among truckmen and greater traffic congestion. In many localities rate competition has been carried to a point where it is questioned if truckmen are really making expenses. Under such circumstances, trucking is then not only taking the business from the railroads, but it may not be paying a return sufficient to maintain adequate truck service. Apparently, the only remedy is state or federal regulation. A decisive step in this direction was Truck Operator Rate Schedule Number 1, promulgated by The Board of Railroad Commissioners of the State of Iowa, effective July 15, 1930, applying on all motor freight transportation within Sioux City, Iowa, and on all livestock and household goods moving between Sioux City and 18 counties in that section of the State.[3]

One of the immediate problems in livestock marketing is to work out a balanced condition between motor and rail transportation, in line, of course, with further changes in our livestock marketing and in the meat packing industry.

MARKET COMMUNICATIONS

Considering the distances over which our livestock moves, the number of market outlets available, and the continuous fluctua-

[3] Further publications dealing with the marketing of livestock by truck are Ohio Experiment Station Bulletin No 440; Illinois Experiment Station Bulletin No. 342; Indiana Experiment Station Bulletin No. 337; Illinois Experiment Station Circular No. 331; "Driven-In Receipts of Livestock", Bureau of Agricultural Economics, Washington, D.C ; "Truck Operator Rate Schedule No. 1," Iowa Board of Railroad Commissioners.

tions in price, the importance of market information, is obvious. An effective market communications service involves three essentials, (1) dependable, accurate, and comprehensive information from all important livestock trading centers, (2) prompt and general distribution of that information to stockmen and to the trade, and (3) ability of stockmen to understand, interpret, and apply the information received. This discussion will deal with the second element only.

Two of the early forms of livestock market news information were the "news letter," as sent to individual shippers by various livestock commission firms, and the livestock market paper. It may be said that one of the market papers (Chicago Daily Drovers Journal) is regarded, from the farm standpoint, as one of the best all around daily newspapers in existence. The general market letter, just referred to, is being replaced to a considerable extent by more specialized letters.

Telegraphic reports have long been used. At present both of the large telegraph companies furnish a regular commercial livestock telegraphic news service to regular subscribers, at definite monthly rates depending on the number of messages required per day.

The basic market news service in the livestock field is that operated by the Division of Livestock, Meat, and Wool, Bureau of Agricultural Economics, United States Department of Agriculture. The Bureau maintains offices and market reporters on 23 of our livestock markets. A wire system is utilized in assembling, continuously during trading hours, market information from these offices and in getting it out to the public. At the larger markets the Bureau of Agricultural Economics office posts bulletins at frequent intervals, sends out a wide range of market information, and distributes daily a mimeographed market news summary.

Of most recent development, and probably of greatest significance because of wider and more immediate use than any other, is the radio market news service. Already there is a tendency for certain stations to report concurrently several markets that are equally accessible to shippers in their territory.

Other important considerations might well be presented under this matter of communications but time does not permit.

STANDARDIZED LIVESTOCK MARKET CLASSES AND GRADES

Standardized classes and grades for livestock is a much less tangible subject than that of motor transport. To many it would appear of far less importance. Actually it is a fundamental consideration in modern livestock marketing. In early days all transactions were direct; buyer, seller, and livestock were all present Livestock prices were local, no distant terminal market establishing basic prices. Today standardized market classes and grades for livestock are recognized as necessary, first, to provide the basis for definite, adequate, and comparable livestock market reports, both from the terminal markets and of sales to packers direct; second, to equalize livestock prices, both as between markets and as between localities; third, to facilitate trading where buyer and seller are not both present or where the livestock is not on display, and fourth, to enable stockmen to realize prices proportionate to the actual merit of their livestock.

Omitting further discussion of that phase of the question let us consider, first, what has been accomplished in the way of developing standardized market classes and grades for livestock and, second, what conditions are requisite to their greatest utility in the trade.

Thirty years ago the Animal Husbandry Department at the University of Illinois Agricultural Experiment Station made a thorough study of market classes and grades of market meat animals Illinois Bulletins 78 (1902), 97 (1904) and 129 (1908) resulted. Bulletin 147, Market Classes and Grades of Meat, followed in 1910. With the introduction of a government livestock market reporting service at the larger terminal livestock markets, shortly before the World War, the necessity of recognized market classes and grades of livestock was apparent. The Bureau of Agricultural Economics has issued a number of bulletins and circulars along that line, among them, by title, "Market Classes and Grades of Livestock," "Market Classes and Grades of Cattle," "Market Classes and Grades of Calves and Vealers," "Market Classes and Grades of Dressed Lamb and Mutton," "Market Classes and Grades of Dressed Veal and Calf Carcasses." Recently the Bureau has submitted for consideration of the livestock trade a bulletin, "Tentative Standards for Grades of Slaughter Hogs."

That progress has been achieved in working toward a usable basis of standardized market classes and grades of livestock is

evidenced by reference to government livestock market reports. However, the classification used by the Bureau of Agricultural Economics market reporting service is not followed throughout the trade. Several of the leading livestock market newspapers continue to use the system which they had developed previous to the introduction of a government service. The various packers use still other systems which they have developed to meet their particular conditions.

That the problem is important, to many at least, is indicated by the introduction in the last congress of a bill providing for both a system of federally approved market classes and grades of livestock and for government grading. The American Institute of Meat Packers has several committees studying this problem. Stockmen's organizations are becoming increasingly interested in this important matter. To secure the desired end it will be necessary to (1) develop a simple, practical and usable set of market classes and grades, (2) secure general use of such classes and grades in the trade, (3) familiarize stockmen with them so that they may interpret market reports accurately and better adjust their production activities to market preferences and to market requirements, and (4) demonstrate to stockmen that meat product grades and prices are, or will be, reflected back in the "on-foot" grades and prices. It seems obvious that to be most useful a system of livestock classes and grades should be directly correlated with a system of meat grades that will benefit the consumer. Stockmen are interested in a set of classes and grades that will enable them to interpret market reports accurately, to fit production to market preferences, and that will reflect prices paid by consumers for the product marketed from the livestock they sell. Consumers will benefit by such a system of meat classes and grades as it will enable them to be assured of the quality of the product which they buy.

ECONOMIC FACTORS AFFECTING MILK SUPPLIES OF LARGE CITIES

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THE FOLLOWING discussion is based largely on the results of a study of the New York City milk shed made by the New York State College of Agriculture in cooperation with the New York Central Railroad. The data for the study were made available through the courtesy of New York milk distributors and manufacturers, the Dairymen's League Cooperative Association, Inc., and the New York State Department of Agriculture and Markets

The New York metropolitan area constitutes one big fluid milk market. Within its limits are approximately ten million persons, nearly two-thirds of whom are in New York City proper. The rest are in suburban sections and near-by municipalities in New York and New Jersey. Milk routes of the larger distributors cover practically the entire area, while numerous small distributors, particularly wholesalers, cover sections throughout the territory.

Three factors characterize the New York milk market and affect its supply of milk to a great degree. They are: (1) strict sanitary control of all sources of supply; (2) sale of milk through producers' cooperative organizations at prices varying with the utilization of the milk; (3) absence of any form of seasonal production control other than that of appeal to dairymen.

The New York City Department of Health permits milk and cream to be shipped to the city only from farms and plants that have been inspected and approved. This regulation definitely determines the limits of the milk shed for New York City, and to some extent, for the metropolitan area, because the larger dealers who sell in surrounding districts as well as in the city, have their entire supply approved. Some of the suburban municipalities have their own inspection service; others accept New York City inspection; while some receive supplies, particularly cream, from uninspected sources.

At present, the New York City approved milk shed is limited to New York State, parts of New Jersey, Pennsylvania, Maryland, Connecticut, Massachusetts, Vermont and adjoining regions in Ontario and Quebec, Canada. The recent increase in the tariff has almost eliminated the latter territory as a source of supply.

The outer limits of the milk shed are slightly over 500 miles from New York by rail, and the center of production, 267 miles.

The rapid increase in population in the New York metropolitan area and the greatly increased per-capita consumption of the last ten years, have required increasing quantities of approved milk to meet the demand. The average annual increase has amounted to approximately 5.5 per cent, or 60,000 gallons per day. Demand has pressed so closely on supply that in November, 1927, and again in November, 1928, slight shortages occurred, and for a few days

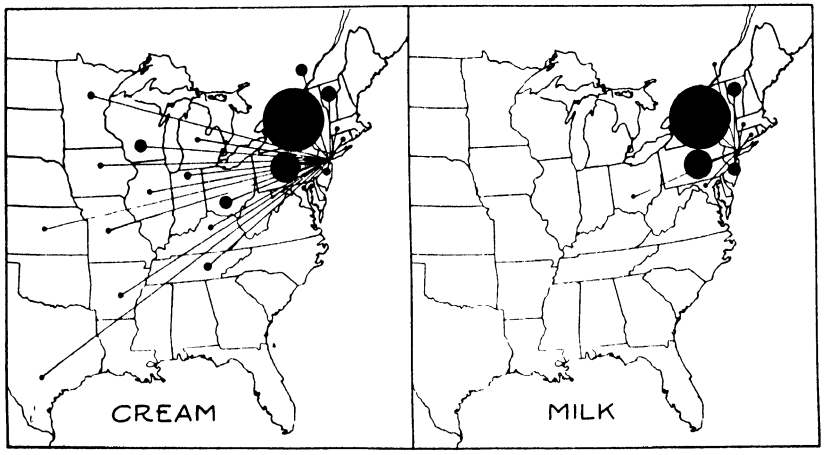

FIGURE 1. STATES SHIPPING MILK AND CREAM TO THE NEW YORK METROPOLITAN AREA IN 1929

New York City's milk and cream supply came only from sources inspected and approved by the Department of Health. Cream shipments shown from states west of Pennsylvania, went to suburban points outside New York City.

dealers were forced to limit sales. In 1929, the supply was more than adequate in November, but in the early part of September, an acute situation existed because of low production and high demand.

Despite these shortages, the market is subject to surplus conditions during the rest of the year because of the wide range in seasonal production. If the demand for milk continues to grow, additional supplies can be obtained during the shortage period in three ways: (1) extension of the milk shed into more remote dairy regions; (2) increased production in the present milk shed; (3) adjustment of seasonal production to more nearly conform to seasonal consumption. Only the last two methods will be considered here.

Aside from the question of quality control and inspection, there are certain economic advantages in handling the entire supply through the plants and equipment of the present milk shed, pro-

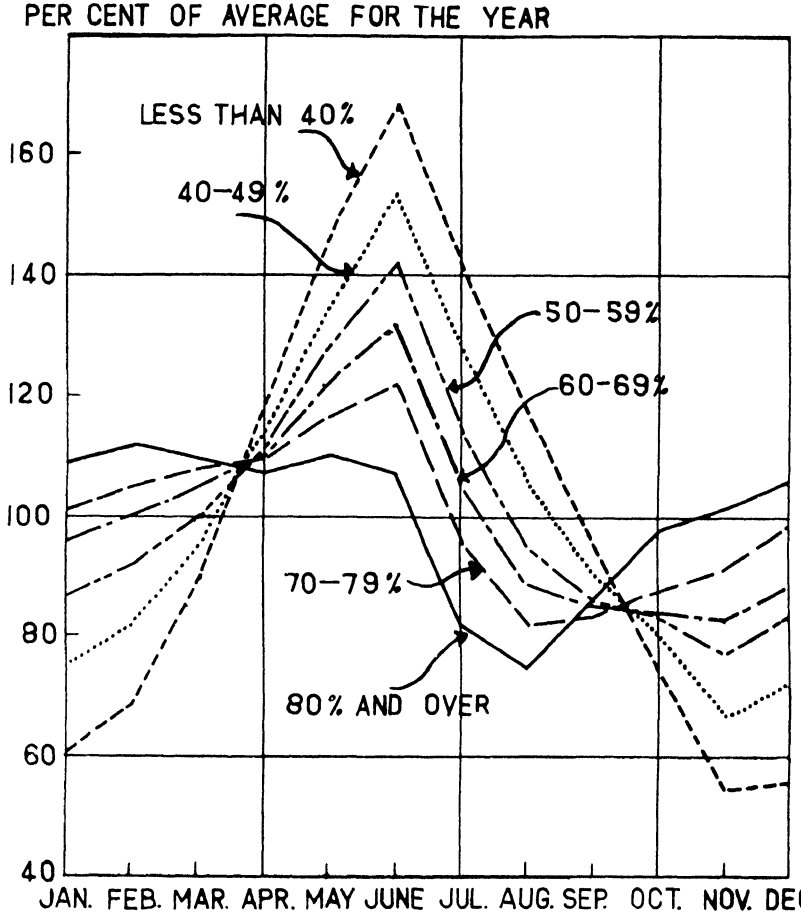

FIGURE 2 SEASONAL VARIATION IN MILK PRODUCTION AND IN THE RECEIPTS OF MILK, CREAM AND CONDENSED MILK (IN TERMS OF MILK EQUIVALENT) AT THE NEW YORK MARKET

Consumption, as measured by receipts, increases during the summer months, but production increases at a still more rapid rate and, ordinarily, there is a surplus eleven months of the year.

vided an adequate supply can be obtained in this way. Unfortunately, the New York milk shed is over-supplied with milk plants. This tends to shorten the haul from the farm, but the

dairy industry is saddled with a heavy plant operating expense due to the low volume per plant.

The average New York approved Grade A plant handles 230 cans of milk a day in June and 160 cans in November, while the average approved Grade B plant handles 287 cans in the former month and only 133 in the latter. There are 240 approved plants in the milk shed, which handle less than 78 cans per day in November. The volume at unapproved manufacturing plants located off railroads is, of course, much smaller, averaging 96 cans per day in June and 33 cans in November. Many plants of this

Table 1. Average Quantity of Milk per plant Received Daily at Various Types of Plants in the New York Milk Shed

Grade	*Cans per day*		
	June	*November*	*Annually*
New York approved Grade A milk	230	160	180
New York approved Grade B milk	287	133	185
New York unapproved milk	227	114	154
Milk manufactured on railroads	304	136	193
Milk manufactured off railroads	96	33	58
All milk	232	114	156

type do not even operate during the winter because of the small quantity of milk available.

Increased production within the present milk shed would naturally lower the unit cost of country plant operation. In many territories, dairy farms are not producing the maximum amount of which they are economically capable. The average annual production of 44,400 Grade B farms is only about 78,000 pounds, while that of 5,853 Grade A farms is nearly 117,000 pounds. Not all of this difference in production, however, can be attributed to the higher price received for Grade A milk. In locating Grade A plants, dealers have tended to put them in the more intensive parts of the milk shed so as to obtain a sufficient volume of milk close to the milk plants. The establishment of new Grade B plants in recent years, on the other hand, has largely been in the outlying regions of lower production.

A general increase in production, however, gives additional supplies of milk during the greater part of the year when there is already a large amount of surplus that must be manufactured and

Table 2. Average Annual Deliveries of Milk Per Farm at Various Types of Plants in the New York Milk Shed

Grade	Number of plants	Number of farms	Farms per plant	Pounds of milk per farm
New York approved Grade A milk	122	5,853	48	116,639
New York approved Grade B milk	603	44,400	74	77,984
New York unapproved milk	45	3,796	83	57,521
Milk manufactured on railroads	55	5,526	100	58,540
Milk manufactured off railroads	229	7,295	32	53,045
All Milk	1,054	66,870	63	75,992

sold in direct competition with similar products from the West. Seasonal adjustment of production would supply the market for many years to come and would also reduce the quantity of surplus milk.

For the milk shed as a whole, twice as much approved milk is produced in June as in November. Twenty-five per cent of the approved farms have a November production only one-third that of June, while over one-half of the unapproved farms fall in the same category.

It has frequently been said that summer dairies produce a surplus only in the spring when condenseries and cheese factories are operating, but that winter dairies produce a surplus from December to March when its disposal is most difficult. This is a mistaken idea. Since the New York milk supply is usually shortest in No-

Table 3 New York Approved Farms Grouped According to the Degree of Summer or Winter Dairying

November milk production in per cent of June production		Number		
Group	Average	Plants	Farms	Millions of pounds of milk
Less than 40	32 6	158	12,450	1,040
40 to 49	43·9	184	14,199	1,138
50 to 59	54 1	137	9,887	774
60 to 69	62 4	93	5,745	450
70 to 79	74 2	83	4,924	406
80 and over	94 2	70	3,048	340
All	49·4	725	50,253	4,148

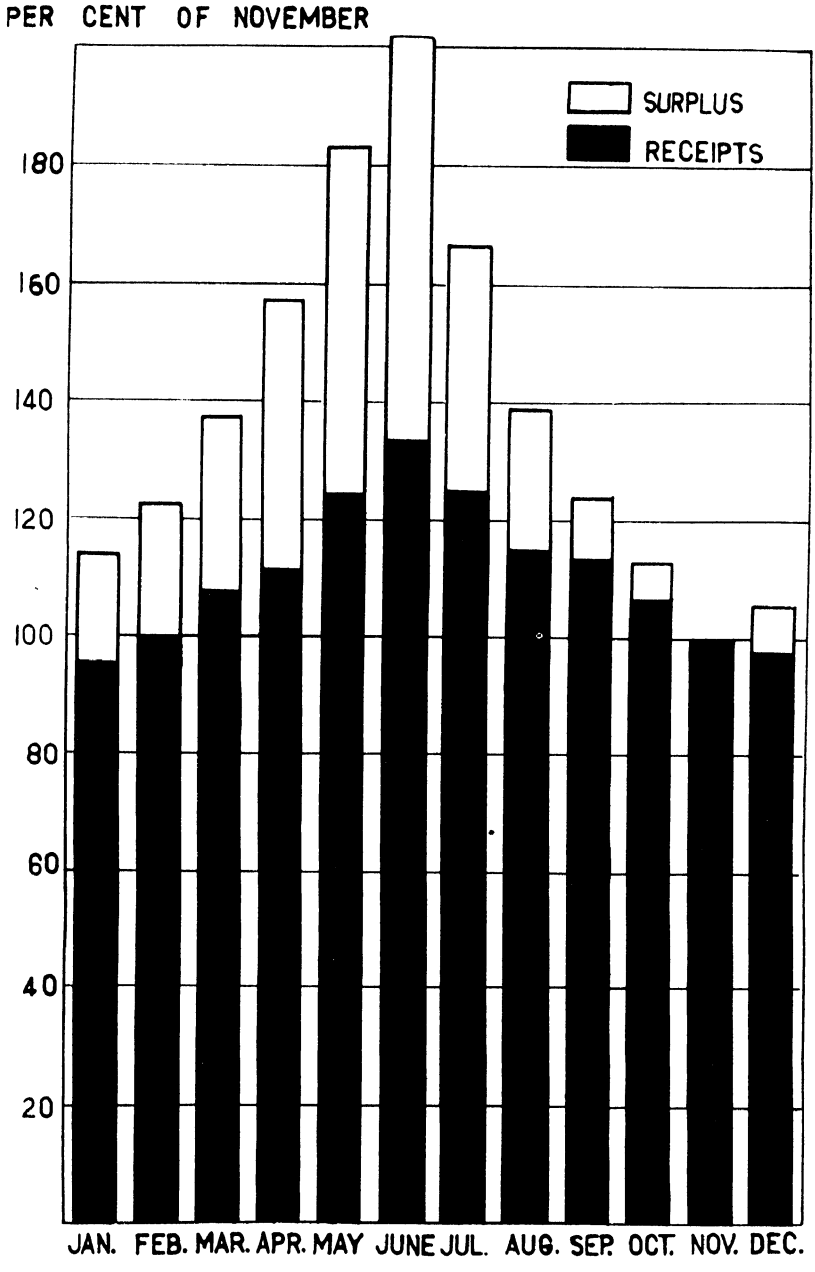

FIGURE 3. SEASONAL VARIATION IN THE PRODUCTION OF MILK BY 50,253 NEW YORK CITY APPROVED FARMS GROUPED ON THE BASIS OF NOVEMBER PRODUCTION IN PERCENTAGES OF JUNE PRODUCTION

(Average for the year = 100 per cent)

As winter dairying increases, production from April to September decreases, while production from October to March increases.

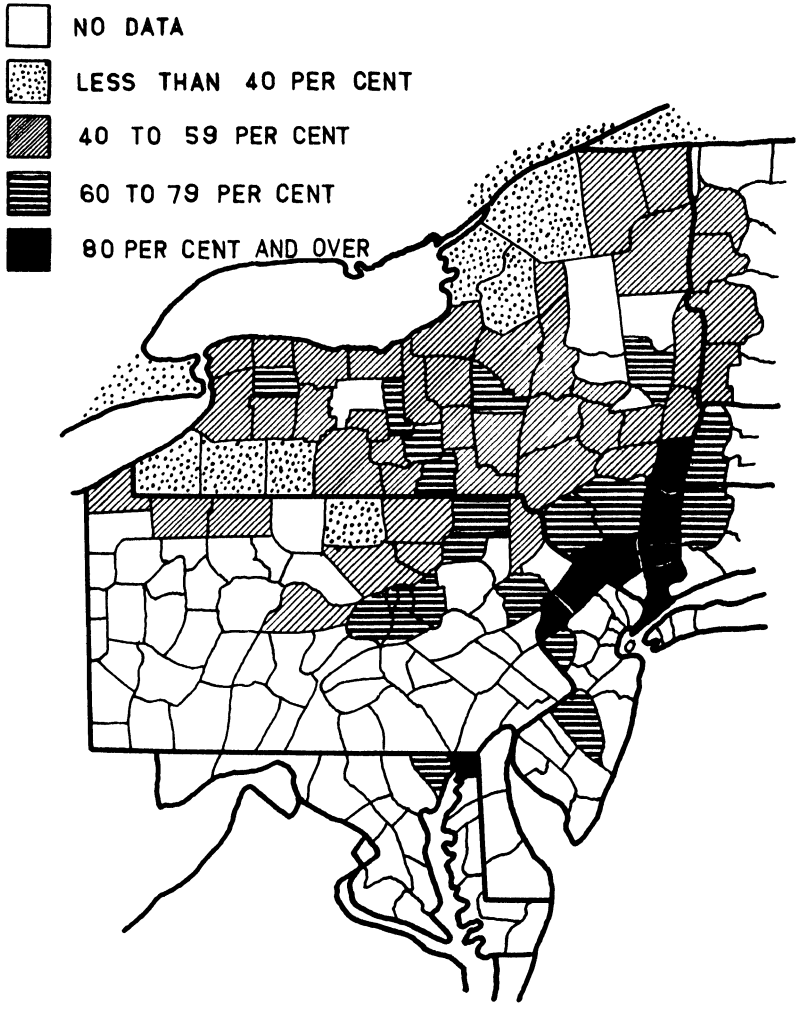

FIGURE 4. PERCENTAGE OF SURPLUS ABOVE NOVEMBER PRODUCTION FOR SIX GROUPS OF NEW YORK CITY APPROVED FARMS FOLLOWING VARYING DEGREES OF SUMMER OR WINTER DAIRYING

(50,253 farms delivering milk to 725 plants)

The more uniform seasonal production of winter dairies results in a very small seasonal surplus.

vember, the only true measure of contribution to winter or summer surplus by any given group of dairymen, is the quantity of milk produced above their November production. Surplus computed on this basis is not only greatest for summer dairymen during the spring and summer, but is also greater than that of winter dairymen from December to March.

The seasonal range in production varies greatly in different regions. For instance, Dutchess County, New York, produces more

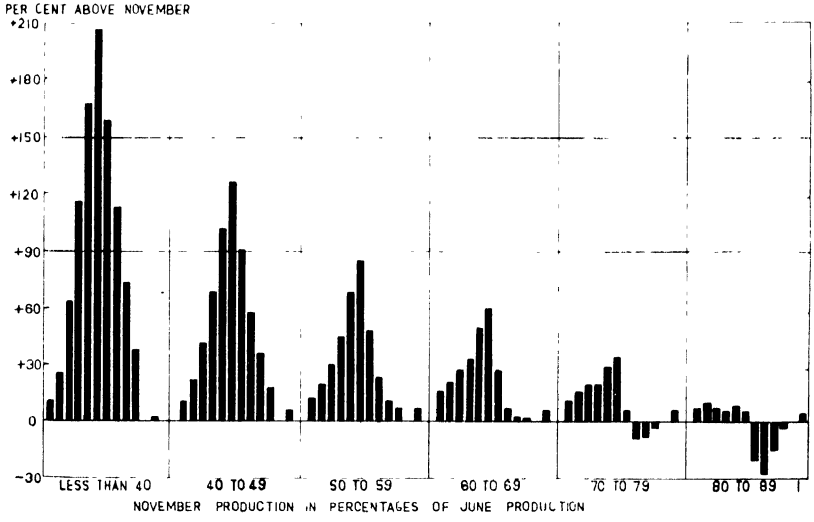

FIGURE 5. NOVEMBER PRODUCTION OF NEW YORK APPROVED MILK IN PERCENTAGES OF JUNE PRODUCTION IN VARIOUS COUNTIES OF THE NEW YORK MILK SHED

The districts which have been producing longest for the New York City market have the most uniform seasonal production.

milk in November than in June, while St. Lawrence County, New York, produces only one-third as much. Part of this difference is due to climatic, topographic, and soil factors, but of equal importance is the factor of previous markets.

As the New York City milk shed developed, plants were first located in near-by dairy regions. When these supplies proved inadequate, new plants were built in up-state New York in those regions which were probably best adapted to the production of winter milk. Further development saw new receiving stations established in summer dairy regions. St. Lawrence County is typical

of this last development, while Dutchess County has long been under the influence of the city market.

In earlier years, milk prices in the two regions were entirely different. From 1897 to 1913, the New York City market paid 74 per cent more for a pound of butterfat in November than it did in June, while a St. Lawrence County creamery paid only 27 per cent more. Obviously, dairymen in the latter region could not afford to produce as much winter milk as could those in Dutchess County.

The importance of this factor of markets is shown by the seasonal range in the production of various grades of milk. The

Table 4. Changes in the Number of Dairy Cattle Per Farm on 5,068 New York Approved Farms

Year (Nov.-Dec.)	*Cows*	*Heifer calves*	*Heifers, 1 year and over*	*Total heifers*	*Ratio, cows to heifers*
1926	15 8	2 6	2 3	4 9	3 2
1927	15 9	2 7	2 5	5 3	3 0
1928	15 8	3 3	2 8	6 1	2 6
1929	16 3	3 3	3 8	7 1	2 3
Percentage change, 1926 to 1929	+3	+27	+65	+45	
1930 (Mar.-Apr.)	16 3	3 4	3 9	7 3	2 2

November production in percentage of the June production for Grade A, Grade B and unapproved milk manufactured off railroads is 68, 46, and 34 per cent respectively. Even the factor of distance of the farms from the milk plants shows up in the seasonal production. The more distant farms having a greater hauling cost, particularly in winter, tend to produce less winter milk and to grow more young stock.

Physical factors of climate and topography undoubtedly influence seasonal production, but the wide range found in some of the summer-dairying regions today will diminish as those districts continue under the influence of city fluid milk prices. When farms from the milk shed as a whole were grouped on the basis of the percentage of land in pasture, it was found that farms with the greatest amount of tillable land had the largest percentage of

fall-freshening cows. This is partly due to the fact that grouping farms on this basis also tends to group them according to the length of time they have been supplying the city market, because receiving stations were first established in regions with a relatively low percentage of pasture. Within a given region, however, the percentage of land in pasture appears to have very little effect on the seasonal production of milk. When the seasonal production of milk on farms producing for the New York market over a period of twenty years was compared, it was found that winter dairying increased at practically the same rate regardless of the percentage of land in pasture.

Table 5. Percentages of Cows and Heifers Bred to Freshen in Different Months on 5,068 New York Approved Farms

Season	1928	1929	1930
	(per cent)	(per cent)	(per cent)
Spring			
Mar. Apr. May	31	30	28
Summer			
June July Aug.	10	10	11
Fall			
Sept. Oct. Nov.	32	35	39
Winter			
Dec. Jan. Feb.	27	25	22
Total	100	100	100

Under ordinary conditions, changing the seasonal production of milk in a large milk shed by advancing the breeding dates of mature cows is a difficult procedure requiring many years. It is relatively simple, however, to delay the breeding of heifers so that they will freshen in the fall. This, apparently, is what is now being done, and, with the very great increase in the number of young stock on New York dairy farms, a shift toward more fall freshening is occurring at a surprisingly rapid rate.

If this trend continues, the November shortage problem will be solved, but a new difficulty may develop in future years due to low production during the latter part of August and the first part of September. At that time, many fall-freshening cows are dry and spring-freshening cows are dropping in production. At the same time, relatively warm weather and the return of vacationists to the

city, combine to give a fairly high demand. This problem can also be solved by a slight change in the season of freshening, and more easily than in the case of the November shortage since it involves delayed breeding of spring-freshening cows. Whether or not this will be done is problematical. It is evident, however, that proper seasonal adjustment of production would assure the New York market an adequate supply from the present milk shed for many years, and would, at the same time, reduce a burdensome surplus.

FACTORS AFFECTING THE PHILADELPHIA MILK SUPPLY

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THE MILK supply of Philadelphia differs in one or more important respects from that of New York City. As explained by Dr. Ross, early regulations of the New York City Board of Health have resulted in restricting the sources of New York City's milk and cream supply to nearby territory, inspected by the Board of Health, and recent rulings of the New York State Board of Health, effective July 1, will in a similar way, limit the sources of supply for the entire state to sources which have been inspected. In contrast, prior to May 1, 1930, no Board of Health regulations had ever limited the sources of Philadelphia's fluid milk or cream supply. However, this does not mean that sanitary control measures were not operative in Philadelphia prior to that date.

SOURCES OF SUPPLY AFFECTED BY SANITARY REGULATIONS OF PRODUCERS' ORGANIZATIONS

The fluid milk supply of Philadelphia is produced chiefly by members of the Interstate Milk Producers' Association. This organization comprises over 20,000 member dairymen located in Pennsylvania, Delaware, Maryland and New Jersey. At the annual meeting of this association, December 3, 1923, rules and regulations governing the handling of milk on dairy farms in the Philadelphia milk shed and in transit, and likewise, the handling of milk and cream at creameries and receiving stations within the milk shed, were approved. These regulations formulated by the producers' organization and buyers of milk handling approximately 90 per cent of the fluid sales in the Philadelphia milk shed were made effective June 1, 1924, and the Philadelphia Interstate Dairy Council, an organization representing producers and buyers, was empowered to enforce them. Four years after the regulations were made effective, each of the 20,000 shippers had a permit signifying that the minimum requirements of the code had been met. The regulations compare favorably with those enforced by boards of health in various cities of the United States.

Producers took this initial step toward quality control because they believed that improved quality would stimulate consumer de-

mand for fluid milk and that it would also protect their market from outside competition. They also thought that farmers would respond more readily to regulations promulgated through the producers' own organization.

It has been the policy of those formulating sanitary control measures in the Philadelphia area, to anticipate well in advance any rulings which would be likely to originate with the Board of Health. For example, I quote from an editorial in the Milk Producers Review, the official organ of the Interstate Milk Producers Association, February, 1930:[1]

"As our producers have been advised in many meetings and by word of mouth, the probabilities were that the Board of Health of the City of Philadelphia, might at any time invoke the necessity that all milk for consumption in Philadelphia be produced from cows which by test were free from tuberculosis, and that the time of grace for such testing might be short. We were advised on January 31, that such a resolution had been adopted and that no milk would be lawfully distributed in Philadelphia after May 1, 1930, unless it comes from cows that had successfully passed the tuberculin test. For those who have not had their cattle tested the time for such action is relatively short and producers shipping milk to this city should take immediate action to have their cattle tested. We are advised that the regulation will be rigidly enforced."

One weakness of the quality control work in Philadelphia is that the non-cooperating dealers and the farmers from whom they buy milk have not been required to meet the standards of the cooperative organization. However, this situation may be changed after September 1, 1930. After that date, a state law requires all milk for consumption in Pennsylvania to be produced under certain standards of sanitation.

FLUID MILK SUPPLIED BY NEARBY TERRITORY

With no restrictions on the part of the Board of Health, prior to May 1, 1930, Philadelphia presumably offered a milk and cream market to all comers. As far as milk for fluid needs is concerned, the producers' organization contracts with dealers to take all supplies offered. In general, these supplies have been adequate to furnish fluid needs. However, in order to provide a reserve in the event of shortage, and likewise perhaps, in order to secure some

[1] An editorial, Milk Producers Review, Interstate Milk Producers Association, Inc., Philadelphia, Pa. Vol. 10, No. 10, p. 4. February, 1930.

Table 1. Receipts of Fluid Milk at Philadelphia and Metropolitan Area, by States, 1929*

State	Forty quart units	Per cent of total
Pennsylvania	5,142,301	69.18
Maryland..	956,450	12 87
New Jersey	579,825	7 80
Delaware.	652,876	8 78
West Virginia	72,869	.98
Indiana	17,028	.23
New York	6,354	.09
Ohio.	3,104	.04
Virginia	1,607	.02
Wisconsin	720	.01
Total	7,433,134	100.00

* From mimeographed reports of the Market News Service, Bureau of Agricultural Economics, U. S. D. A., Pier 4, South Wharves, Philadelphia, Pa.

price advantage, several of the large distributors have established receiving stations in northwestern Pennsylvania somewhat beyond the limits of what is usually considered the Philadelphia milk shed. However, no great expansion of the fluid milk shed has resulted.

Receipts of fluid milk at Philadelphia are closely related to whole milk consumption. Surplus milk, that is, milk above fluid needs, usually reaches the market as cream or is manufactured at the country plants. In 1929, Pennsylvania producers furnished 69 per cent of the total fluid milk receipts, and Maryland, New Jersey and

Table 2. Receipts of Cream at Philadelphia and Metropolitan Area, by States, 1929*

State	Forty quart units	Per cent of total
Wisconsin	86,589	21.93
Indiana	59,026	14.95
Minnesota	53,810	13 63
Pennsylvania	48,167	12.20
Maryland	38,947	9.86
Ohio	33,847	8.57
Missouri	27,041	6 85
Virginia.	16,691	4.23
Illinois	4,341	1.10
Kentucky	4,220	1.07
Miscellaneous.	22,177	5.61
Total.. ..	394,856	100 00

* From mimeographed reports of the Market News Service, Bureau of Agricultural Economics, U. S. D. A , Pier 4, South Wharves, Philadelphia, Pa.

Delaware combined, over 29 per cent (table 1 and figure 1). Over 98 per cent of the fluid milk supply of Philadelphia originated within 300 miles of the city. From these four states, 56 per cent of the milk reached the city by truck and the remaining 44 per cent by rail.

BULK OF CREAM SUPPLY FROM MIDDLE WEST

With no regulations concerning cream, the Philadelphia market furnishes an outlet for cream supplies from widely scattered parts of the country. The territory extends westward more than 1,000

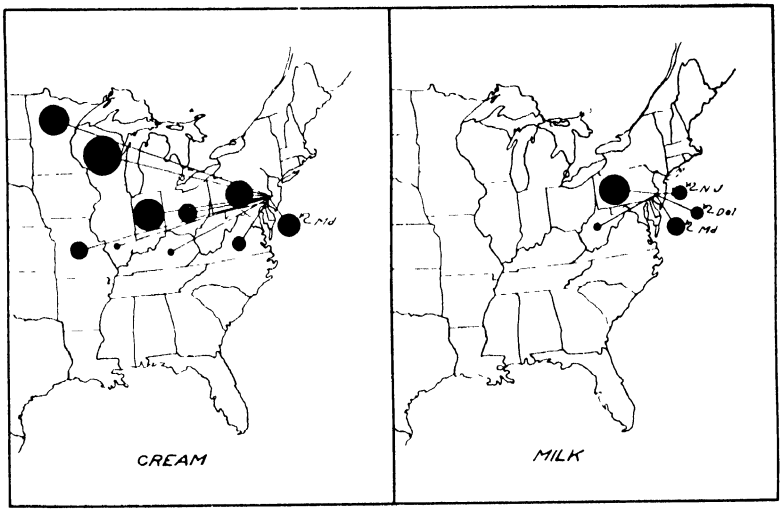

FIGURE 1. SOURCES OF THE MILK AND CREAM SUPPLY OF PHILADELPHIA AND METROPOLITAN AREA, 1929

miles across the continent, with Wisconsin the leading state—22 per cent of the 1929 supply originating within its borders (table 2 and figure 1). In contrast with the fluid milk supply, over 98 per cent of which originated in Pennsylvania, New Jersey, Maryland and Delaware, only 23 per cent of the cream supply was furnished by these four states.

MARKETING PLAN AFFECTS SEASONAL SUPPLY OF FLUID MILK

In the Philadelphia market, milk has been sold under a two-price, or basic-rating plan since 1920. A higher price throughout the year is paid for the "basic" amount than is paid for the farmer's surplus above this amount. Under this plan each producer was

originally assigned a basic quantity determined by his production during the preceding October, November and December. Recent modifications of the plan provide that the average production during these three months over the preceding three-year period shall be used as each farmer's basic quantity.

During the years 1913 to 1917, which was prior to the adoption of the basic-surplus plan, May production was 93 per cent higher

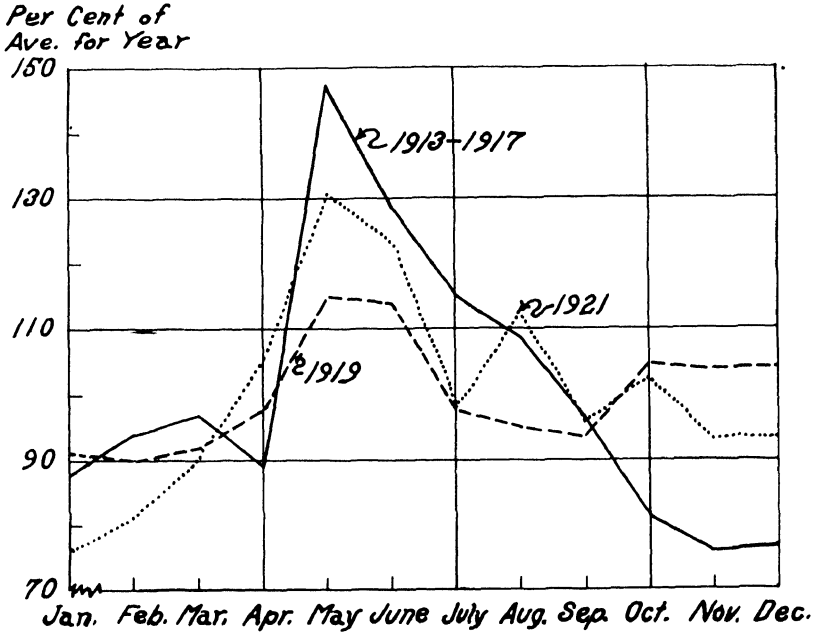

FIGURE 2 SEASONAL VARIATIONS IN THE AVERAGE DAILY PRODUCTION OF MILK IN THE PHILADELPHIA MILK SHED
(Average for the year = 100 per cent)

than—or almost double—November production (figure 2 and table 3).

In 1921, January was the month of lowest production, with May production 68 per cent higher. Four years later, in 1925, May sales were only 24 per cent greater than January sales. Summer sales for these four years continued at about the same level, the change being brought about by increased production during the fall and winter months. On the other hand, in the New York milk market, in which a basic-surplus plan was not in effect, for each can of additional milk obtained in November, 1926, over that

for November, 1922, two and one-half cans were added to the June surplus. Apparently the more even supply from month to month in the Philadelphia market was due to the basic-surplus plan of selling.

The marketing plan affects the milk supply through its influence on the price paid to farmers. The "even" producer under the basic-surplus plan receives a higher average price for milk than the "uneven" producer.

In Pennsylvania cow testing associations in 1929, there were over

Table 3 Seasonal Variation in the Average Daily Production of Milk in the Philadelphia Milk Shed*
(Average for the year = 100 per cent)

Month	1913-17	1921	1922	1923	1924	1925	1926	1927	1928	1929
January	88	76	86	91	94	92	102	80	98	91
February	94	81	86	101	93	92	100	87	99	90
March	97	90	86	92	91	94	98	91	98	92
April	89	105	89	94	91	97	98	97	98	98
May	147	130	131	106	113	115	109	114	111	115
June	129	123	127	115	111	104	113	121	117	114
July	115	98	113	102	97	97	99	103	99	98
August	109	112	114	89	97	107	97	105	97	95
September	97	96	103	102	100	101	101	105	97	94
October	81	103	93	108	107	100	99	103	98	105
November	76	93	86	101	104	99	93	98	95	104
December	77	93	85	98	103	101	92	96	94	104
Range (low to high)	71	54	46	26	22	23	21	41	23	25

* Furnished by the Interstate Milk Producers' Association·
1913–17 computed from data presented to the Governor's Tri-State Commission,
1921–23 computed from data compiled by King;
1924–27 computed from data compiled by Interstate Milk Producers' Association

32,000 cows with an average production of 7,751 pounds of milk per cow. Assuming sales per cow to be 7,000 pounds, total annual sales from a 25-cow herd would be 175,000 pounds. At 1929 prices for 3.5 per cent milk at receiving stations in the 51-60 mile zone, an even producer, whose June sales were but 37 per cent higher than November sales, would have received an average price of $2.92 per hundredweight for the year for milk. An uneven producer, who sold two and one-half times as much milk in June as in November, would have received only $2.74, or 18 cents per hundredweight less. Both producers would have received the same price during September, October and November, but during June the even producer would have received a premium of 33 cents

per hundred pounds above the price paid the uneven producer (table 4 and figure 3).

EFFECT OF TYPE OF FARMING ON MILK SUPPLY

While the basic-surplus plan has resulted in a fairly even total supply of milk for the city of Philadelphia, the seasonal adjust-

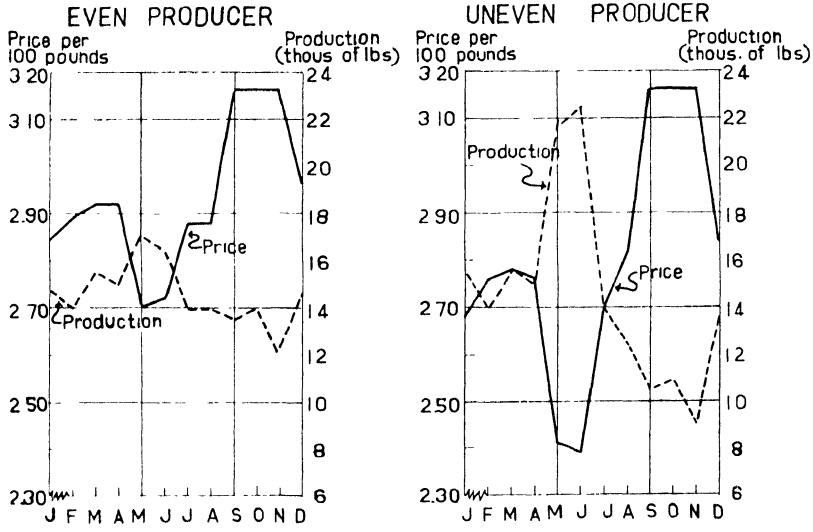

FIGURE 3 MONTHLY SALES, AND PRICES FOR 3.5 PER CENT MILK TO EVEN AND UNEVEN PRODUCERS IN THE 51-60 MILE ZONE, PHILADELPHIA MILK SHED, 1929

ments made on the various types of farms have been quite dissimilar. An analysis of production on 116 farms indicated that on dairy farms and on general farms with pasture, seasonal variation in production actually increased, while on general farms with little pasture and on crop farms, seasonal variation decreased (table 5 and figure 4).[2] For the four types of farms in this sample, there was a decrease of nine per cent in the seasonal variation.

[2] F. F. Lininger. The Relation of the Basic-Surplus Marketing Plan to Milk Production in the Philadelphia Milk Shed. Bul. 231. Pa. Agr. Exp. Sta., State College, Pa. August, 1928, p. 19.

The farms were grouped as follows:

17 dairy farms—farms with over 75 per cent of the income from milk.

56 general farms with pasture—farms with over 5 per cent of the farm acreage in permanent pasture.

14 general farms with little pasture—farms with less than 5 per cent of the farm acreage in permanent pasture.

29 crop farms—farms with less than 45 per cent of the income from dairying

Table 4. Monthly Sales and Prices for 3.5 per cent Milk to Even and Uneven Producers in the 51-60 Mile Zone Under the Philadelphia Basic-Surplus Plan, 1929

Month	Pounds sold				Price	
	Daily		Monthly			
	Even producer	Uneven producer	Even producer	Uneven producer	Even producer	Uneven producer
January	476 6	503 2	14,775	15,600	$2 84	$2 68
February	500 0	500 0	14,000	14,000	2 89	2 76
March	500 0	500 0	15,550	15,550	2 92	2 78
April	501.3	500 0	15,040	15,000	2 92	2 76
May	550 0	700 0	17,050	21,700	2 70	2 41
June	552 0	750 0	16,560	22,500	2 72	2 39
July	450 0	450 0	13,950	13,950	2 88	2 70
August	450 0	400 0	13,950	12,400	2 88	2 82
September	450 0	350 0	13,500	10,500	3 16	3 16
October	450 0	351 6	13,950	10,900	3 16	3 16
November	400 0	300 0	12,000	9,000	3 16	3 16
December	475 0	450 0	14,725	13,950	2 97	2.82
Total			175,050	175,050		
Average	479 5	479 5			2 92	2 74

There was a general increase in production on all types of farms, but the greatest percentage increase came on the strictly dairy farms (table 6). The dairy farmers also increased the basic amounts most. With the desire to stimulate production during these months, the best response came from those whose chief incomes were derived from milk.

It is essential to producers supplying a milk market that the total supply of the area meet the demands of the market at all times.

Table 5. Variation in Milk Production on Various Types of Farms in the Philadelphia Milk Shed, 1921-22 and 1924-25 (Expressed as a percentage of basic amounts)

Type of farming	Basic production for 1922	Range from high to low months		Difference in range
		1921–22	1924–25	
Dairy farms	219	20	31	+11
General farms with pasture	190	17	28	+11
General farms with little pasture	118	38	24	−14
Crop farms	123	49	34	−31
All types		26	17	− 9

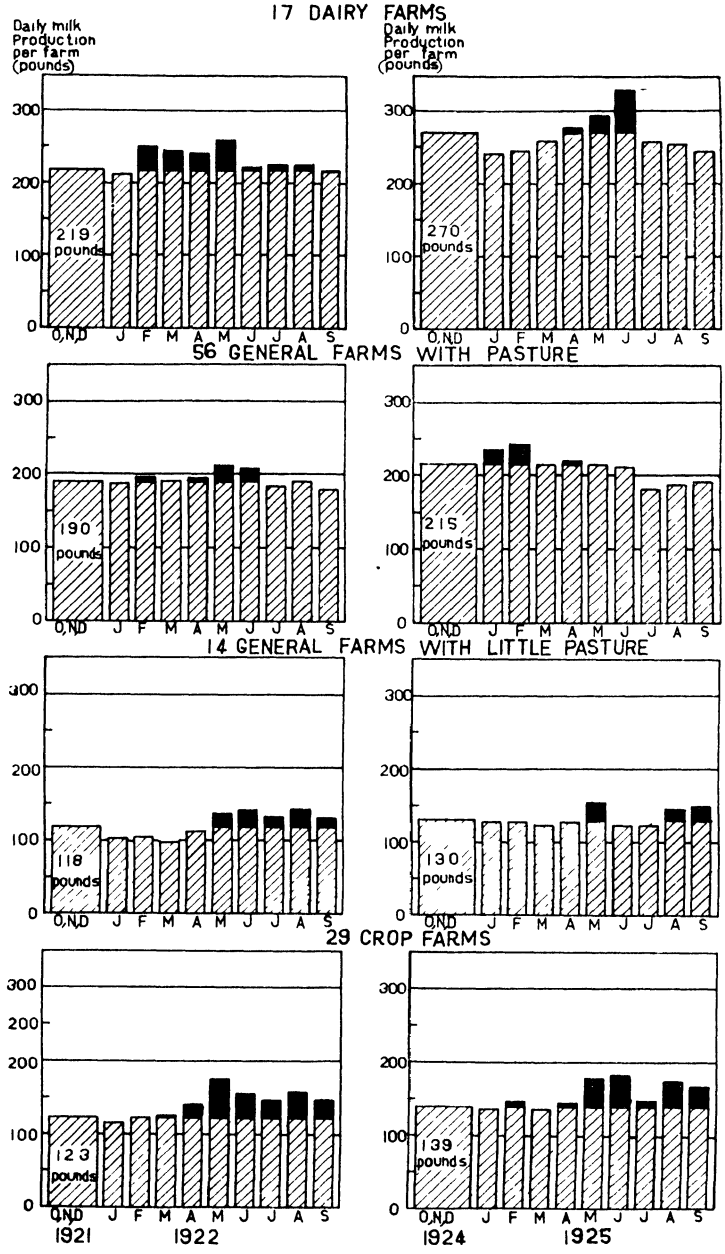

FIGURE 4. DAILY MILK PRODUCTION PER FARM FOR FOUR TYPES OF FARMING, PHILADELPHIA MILK SHED, 1921-22 AND 1924-25

The charts to the left show the relation of the average daily milk production per farm for each of the first nine months of 1922 to the average daily production per farm for the last three months of 1921. The charts to the right show the relation of average daily production during each of the first nine months of 1925 to the average daily production for the last three months of 1924.

However, it is not necessary, and often not desirable, that each individual producer furnish in accordance with the demand of consumers. For example, the dairy farmers and general farmers with pasture, who increased the range in seasonal production from 1922 to 1924, bolstered up production in October, November and December, but evidently accomplished it by fall-freshening of cows. This procedure caused them to have a low production during July, August and September. However, high production during these months by the crop farmers and farmers with little pasture, offset the low production of the other two groups, with the result that the total production for the market was very uniform.

Table 6. Changes in Production on Different Types of Farms, Philadelphia Milk Shed, 1921-22 to 1923-25

	Production during 1923–25 in per cent of 1921–22	*Base for 1925 in per cent of 1922*
Dairy farms	116	123
General farms with pasture	110	113
General farms with little pasture	109	110
Crop farms	111	113

EFFECT OF DISTANCE FROM MARKET ON SUPPLY

In the Philadelphia milk shed with the basic-surplus plan of selling in operation, it is more advantageous for the nearby producer to even up seasonal production than for the distant producer. Since the freight on milk is considered in determining the basic price in each freight zone, and the same surplus price prevails in all zones, a nearby producer is penalized more when he produces surplus milk. A detailed analysis of the effect of distance on the seasonal supply shows that under average conditions when a producer in the 41-50 mile zone sells 1,000 pounds of milk during the month of June, he will have to have a basic amount of 5,000 pounds to be on an equality with a producer selling a like amount of milk in the 291-300 mile zone, who has a base of only 4,000 pounds.[3]

Likewise, from the standpoint of producing, as well as transport-

[3] Lininger, F. F. The Relation of the Basic-Surplus Marketing Plan to Milk Production in the Philadelphia Milk Shed. Bul. 231. Pa. Agr. Exp. Sta., State College, Pa. August, 1928, p. 37.

ing milk of different butter fat tests, farmers far from Philadelphia have an advantage in selling milk of high rather than low butter fat test.[4] Some of the important Grade A shipping stations, which require a supply of milk with a high percentage of butter fat, are located several hundred miles from Philadelphia.

COST OF MAKING SEASONAL ADJUSTMENTS IN SUPPLY

A study of methods of evening production in the Philadelphia milk shed showed that 27 per cent of the producers bought cows in the fall in order to increase basic production, while 21 per cent sold cows during months following the basic period, in order to decrease the sale of surplus milk. An analysis of the normal differences in prices between basic and surplus milk indicates that this practice usually increases farmers' costs more than their returns.[5]

Fall-freshening of cows offers the best way for most producers to even up production. Fully three-fourths of the producers in the Philadelphia territory follow this method. In the years 1922-27, fall-freshened cows produced 63 per cent of the annual production during the market shortage period, October to March, while spring-freshened cows produced only 34 per cent of the annual production during this period. Fall cows produced 7 per cent more milk than spring cows, but required 6 per cent more grain to produce 100 pounds of milk. However, the larger volume of milk produced by fall cows tends to lower overhead costs per hundredweight of product.

When total production costs were considered, it was found that the cost of milk production with fall-freshened cows was $2.59 per hundred pounds as compared with $2.62 for spring-freshened cows (table 7). In other words, there was no significant difference in the cost of production, fall cows being as economical producers as spring cows. Neither was there any significant difference in cost between the Philadelphia and New York territories, although the

[4] Lininger, F. F. and Weaver, F. P. How to Adjust Milk Production to the Philadelphia Milk Plan. Ext. Cir. 123. Pa. Agr. Exp Sta, State College, Pa., March, 1929, pp. 10-11.

[5] Lininger, F. F. The Relation of the Basic-Surplus Marketing Plan to Milk Production in the Philadelphia Milk Shed Bul. 231. Pa. Agr. Exp. Sta, State College, Pa August, 1928, p. 40.

former is more strictly a winter dairying section and the latter, a summer dairying region.

Considering the Philadelphia territory, fall-freshened cows of non-basic producers appeared to produce 100 pounds of milk 11 cents ($2.59 minus $2.48) cheaper than fall-freshened cows owned by basic producers (table 7). This difference was likely due to the fact that the basic producers push their cows too hard for most profitable feeding. They feed 10 per cent more grain to cows than non-basic producers, during the basic period. On the other hand, the basic producers did not use enough grain during

Table 7. Cost of Milk Production in Pennsylvania, 1922-27*
(Based on Cost of Production data for 9,518 Cows)

Time of freshening	Cost per 100 pounds of milk				
	Philadelphia territory in Pennsylvania		New York territory in Pennsylvania	Pittsburgh territory in Pennsylvania	All territories combined
	Basic-surplus producers	Non-basic-surplus producers			
Fall (August–November)	$2 59	$2 48	$2 61	$2 63	$2 59
Spring (February–May)	2 57	2 62	2 66	2 65	2 62
Twelve months	2 60	2 54	2 59	2 63	2 61

* These costs are based on the quantities of feed required to produce 100 pounds of milk as reported in Pa. Exp. Sta. Bul. 231, applying the following prices. Grain, $2 50 per cwt., silage, $6 00 per ton, hay, $15 00 per ton, corn stover, $6 00 per ton. Pasture was valued at $2 50 per month. Overhead costs were computed at $43 30 per cow and included interest on investment in cows, buildings and equipment, breeding fees, and so forth. Labor costs were computed from unpublished data of E. L. Moffit and M. J. Armes on milk production costs for 24,191 cows in Pennsylvania Cow Testing Associations.

the pasture season, feeding 7 per cent less grain during April, May and June than non-basic producers.

When fall-freshened cows were not "over-crowded" during the fall months by too heavy grain feeding, and when they were sufficiently grain-fed during the pasture season, evidence indicates that the combined feed, labor and overhead costs per 100 pounds of milk were somewhat less—14 cents in the case of non-basic producers—than for spring freshened cows. Thus, because there are more units of milk per cow and, therefore, less overhead costs per 100 pounds of milk, and despite the fact that the feed cost per unit of milk is relatively higher, fall-freshened cows are at least as efficient milk producers as spring-freshened cows.

In the Philadelphia territory, 44 per cent of the cows owned by basic-surplus producers freshened in the fall as compared with 29 per cent for the non-basic producers, 36 per cent for Pittsburgh producers (at that time no basic-surplus plan was used in Pittsburgh) and 30 per cent for New York producers.

Thus, the basic-surplus plan of paying for milk causes farmers to increase the proportion of fall-freshened cows in their herds, and in this way may actually increase the efficiency of milk production, if fall-freshening is accompanied by proper feeding practices. However, during the past five years, in the Philadelphia territory, the disadvantage of improper feeding has more than offset the advantage of increased fall-freshening, since the total costs of producing 100 pounds of milk have been slightly higher for the basic-surplus than for the non-basic producers—$2.60 as compared with $2.54.

SUMMARY

The Philadelphia milk supply is unique in that the quality of the fluid milk supply is controlled entirely by the cooperative organization operating in the market. More than 98 per cent of the fluid milk supply of the city originates in four states and within 300 miles of the city. Of this amount in 1929, 56 per cent was delivered by truck and 44 per cent by rail. The bulk of the cream supply originates in the Middle West, only 23 per cent coming from the states supplying most of the fluid milk. The basic-surplus marketing plan has effected a close adjustment of seasonal production to market demand through rewarding producers who sell a large proportion of basic milk throughout the year. The response to uniform production varies among different types of farming. While many producers having large amounts of pasture land have increased seasonal variation in production, they have shown a marked ability to keep up production during the fall months. By increasing the proportion of fall-freshening cows in their herds, July and August have tended to be months of low production for these producers. Other producers, however, on different types of farms have maintained production during this period, so that the total supply for the market is closely adjusted to market demand. Distant producers are not justified in making as close seasonal adjustments as nearby producers. The costs of making these changes

in seasonal production, have, in many instances, been greater than the returns where farmers have depended on the buying and selling of cows to effect changes. However, fall-freshening of cows accompanied by proper feeding practices, offers a method of changing seasonal production so that it will be more nearly in accord with market demand, with little or no extra expense on the part of producers.

A SURVEY OF SOME PUBLIC PRODUCE MARKETS IN NEW YORK

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THE CHANGES in the marketing of perishable farm products in recent years, brought about largely by improved transportation facilities, by changes in the buying habits of the housewives, and by the evolution in the retailing of fruits and vegetables, have brought about the necessity for changes in market equipment and control. In order to determine how and by whom these changes should be made, a study was made of the public produce markets in the four largest cities in up-state New York.[1]

In this study the aim was to find out the volume of business conducted annually, the character of the produce handled, where it came from, the methods of sale employed on the markets, who constituted the principal groups of buyers, the consuming area served by each market, and in addition, the type of market-place best suited to present day markets The data were secured from growers and truckers who sold on the markets, from grocers, hucksters and truckers who bought produce on the markets and from the commission merchants whose place of business was in these cities and usually bordered on the markets.

The records from sellers on the markets represented from 15 to 30 per cent of all who sell on these markets. Factors were applied to the data from the records to obtain estimates for the entire market. To the volumes of produce—by commodities—thus obtained were applied the average weighted prices that obtained on the markets throughout the year as secured from leading growers, in order to convert the volume figures to a money basis as the most convenient common denominator in which to express them.

VOLUME OF BUSINESS

The total volume of sales on the four leading markets in up-state New York varied from $3,000,000 on the Elk Street market in Buffalo to almost $4,000,000 on the public market in Rochester, while the Albany and Syracuse markets each handled a volume of

[1] The cities in which markets were studied were Buffalo, Rochester, Syracuse and Albany.

about $3,700,000. These sales consisted almost entirely of produce grown in New York State and brought to the market by the grower or by a trucker-dealer who buys produce at farms to sell on the market.

The volume of business done by the commission houses dealing in fresh fruits and vegetables amounted to $6,800,000 in Albany, $7,000,000 in Syracuse, $8,000,000 in Rochester and almost $21,000,000 in Buffalo. Of these amounts, from 80 to 90 per cent represented shipped-in produce grown outside of the state.

The most important agency retailing fresh fruits and vegetables is the grocery store. Recent developments in chain grocery stores have put fresh fruits and vegetables into practically all of these stores and while the old line independent grocer has handled fresh fruits and vegetables for years, the real importance of these commodities as a means of attracting buyers to the stores has only recently been fully appreciated by those interested in all forms of grocery merchandising. The grocers of Albany retailed almost $2,000,000 worth of fresh fruits and vegetables last year, those of Syracuse about $3,600,000 worth, those of Rochester about $5,750,000 worth and those of Buffalo about $12,750,000 worth. Of the above amounts approximately 40 per cent were home-grown. That the public market is an important factor in supplying fresh fruits and vegetables to the grocers is shown by the fact that in Buffalo grocers bought 31 per cent of the home-grown produce on these markets, and in Albany, Rochester, and Syracuse from 60 to 75 per cent of the home-grown fruits and vegetables were bought on the public markets.

A second group which is of importance in the retailing of fresh produce is the huckster who is licensed by the city or state to sell produce from house to house. These men buy on the public market and from commission houses and peddle on the streets of the city, thus taking over a retailing function formerly performed to a greater extent by farmers themselves. The volume of business done by hucksters last year amounted to a little less than a $1,000,000 in Albany, to just about $2,000,000 in Buffalo and in Syracuse, and to $2,300,000 in Rochester. The percentage of home-grown produce in the sales by hucksters varied from 38 per cent in Buffalo, to 45 per cent in Albany, 48 per cent in Syracuse and 52 per cent in Rochester, practically all of which was bought on the market.

Direct sales to consumers on the public markets amounted to from $800,000 to $900,000 in Albany and Syracuse, but less than $300,000 in Rochester, while on the Elk Street market in Buffalo only about $100,000 worth of produce is sold direct to consumers. In Buffalo there are three other markets, strictly retail, on which about $300,000 worth of home-grown produce is sold to consumers by the growers. Very little selling direct to consumers is done by the vegetable gardeners. The small farmer who brings in a small load of produce very miscellaneous in character, is more likely to sell directly to the consumer.

CHARACTER OF PRODUCE HANDLED

The commodities sold on the public markets included vegetables, fruits, berries, butter, cheese, flowers, plants, live and dressed poultry, as well as all classes of dressed meats produced on the farm. Of these, vegetables constituted the major portion of sales on all the markets. They made up over 80 per cent of the sales in Buffalo, 70 per cent in Rochester, 67 per cent in Albany, and 55 per cent in Syracuse. A large number of trucker-dealers sell on the Rochester and Syracuse markets. They handle twice as much fruit as vegetables and over three and one-half times as much poultry and eggs as vegetables on the Syracuse market. Vegetables constitute only 13 per cent of the trucker-dealer sales on the Syracuse market, but 81 per cent of the sales by growers. On the Rochester market, however, two-thirds of the trucker-dealer sales consisted of vegetables. Fruit constituted less than 10 per cent of sales on the Elk Street market in Buffalo, but from 15 to 20 per cent on the other markets. The controlling factor that brings buyers to all of these markets is the quality and supply of vegetables offered for sale.

THE PRODUCING AREAS SERVED BY THESE MARKETS

From 9 to 39 per cent of the products came from distances of more than 20 miles from these markets, and from 3 to 10 per cent came from more than 40 miles. In the case of the Albany market over 4 per cent came more than 100 miles. Sellers on the Rochester and Syracuse markets have been required to register since July 1926. From that date to July, 1929, 1,821 growers registered to sell on the Rochester market. These growers came from 14 coun

ties. In the same period, 3,686 growers from 27 counties registered to sell on the Syracuse market. The wide area from which growers come to these markets indicates the regional character of the markets so far as an outlet for produce is concerned. The producing areas which depend in part on these markets are, however, wider than these figures indicate. Approximately 40 per cent of the products sold on the markets in Rochester and Syracuse are not sold by the grower, but by trucker-dealers who tap practically every county in central and western New York. Some of these men have regular routes over which they buy produce every week, while others visit any section within a radius of 100 miles from these markets where produce is available at the particular season. Most of the trucker-dealers specialize. Some handle only poultry and eggs. Others bring in berries in the spring and summer, turning to peaches, apples and potatoes in succession as these crops become ready for market. The development of the trucker-dealer business is a direct result of the building of good roads and of motor trucks.

From the standpoint of the consumer the trucker-dealer makes available many products that would otherwise not find their way to these markets. From the standpoint of the farmers, distant from good markets, they provide a market which is far superior to the neighborhood grocery store or local dealer. From the standpoint of the wholesalers and jobbers in these cities, they frequently furnish keen competition, but they are also used by the trade as an outlet for odds and ends. To the grower who sells on these markets the trucker-dealer is often an unwelcome competitor and frequently one who employs methods which are distasteful to the grower if he has to occupy a stall beside him. That he is not an unmixed evil is indicated by the fact that many growers on the market recognize that the trucker-dealer is an important factor in keeping a constant volume of business on the market throughout the year. By keeping a supply of produce on the market during the "off seasons" they keep enough buyers coming to the market at all times so that growers feel confident of finding buyers for such products as they wish to bring in at any time. Inasmuch as the trucker-dealer uses the market much more regularly than the grower who sells only his own produce, he is usually charged from 50 to 100 per cent more rental for a stall. Probably even a higher rental would be justified out of fairness to other businessmen in the

city with whom he competes, but in return he should be given as good quarters as any of the other sellers on the market. By giving them good facilities and charging an adequate rental, irresponsible dealers are kept off the market and at the same time the income thus derived makes it possible to charge moderate rentals to growers and still operate a market without a deficit. Ample justification for such a policy is found in the fact that the grower selling his own produce is the key to a successful produce market. A rapid decline of business has occurred on many markets where the number of dealers has been allowed to increase to the point where they made up the major portion of all sellers. Since the growers' section of the market is essential to the trucker-dealer, it is fair that he should help to support it.

METHODS OF SALE ON THE MARKETS

These markets which were established years ago, in order to enable growers to sell direct to consumers, perform that function to-day in only a limited way. As cities grew and the problem of buyers coming to one market place became more difficult, there was less and less buying on the part of consumers and the public markets became largely wholesale markets where growers and truck-dealers sold to other retailers. The percentage of sales to various groups of buyers on each of these markets is shown in table 1.

Consumers purchased relatively large amounts of poultry, eggs, dairy products and meat. On the Syracuse market the poultry and eggs sold to consumers amounted to twice as much as the vegetables. On the Albany and Rochester markets poultry and eggs bought by consumers were exceeded slightly by purchases of vegetables, but of the sales to all buyers on these two markets, vegetables constituted from 67 to 71 per cent. Of the purchases on the market by truckers who supplied grocers in other cities, vegetables constituted from 63 to 93 per cent, showing that the supply of vegetables is the factor that keeps these men coming to the markets. Among the purchases by grocers, vegetables predominate almost to the extent as in the buying by inter-city truckers. Since these two groups buy from 50 to 60 per cent of the products sold on these markets, it shows that the modern trend in produce markets, which is decidedly toward wholesale markets, makes vegetables the determining factor in their growth. Most of the vegetable gardeners, who bring less diversified loads than do the

general farmers, are in favor of the discontinuance of selling at retail. That their ideas are probably economically sound is indicated by the fact that those who sold less than 50 per cent to consumers sold 43 per cent more goods per hour than those who sold over 50 per cent to consumers. The costs of marketing in the latter group averaged over 13 per cent of the value of the load, while for the former group the costs averaged less than 9 per cent of the value of the load.

In addition to the three groups of buyers already mentioned, the grocers, the inter-city truckers and the consumers, two other groups

Table 1. Percentage of Sales to Various Groups of Buyers on the Markets in Albany, Rochester and Syracuse, and the Elk Street Market in Buffalo, 1929

Classes of buyers	*Albany*	*Buffalo*	*Rochester*	*Syracuse*
Commission houses	5 3	15 9	10 8	8 6
Truckers supplying other cities	46 7	4 0	11 4	26 1
Hucksters selling in city ..	11 9	28 4	30 1	19 3
Grocers .. .	13 9	47 9	40 4	21 1
Consumers	22 2	3 8	7 3	24 9
Totals	100 0	100 0	100 0	100 0

are important. The hucksters' purchases range from 12 per cent on the Albany market to 30 per cent on the Rochester market. The commission houses buy 5 per cent of the produce sold on the Albany market, 8.6 per cent at Syracuse, 10.8 per cent at Rochester and 16 per cent on the Elk Street market in Buffalo

CONSUMING AREAS SERVED

The regional interest in these markets is also illustrated by the volume of inter-city trucking from the cities where these markets are located These markets and the car lot receivers, located on sites adjoining the markets, each supply from half a million to a million and a quarter dollars' worth of produce to cities and small towns lying more than 60 miles away, while from the four markets, inter-city truckers haul over $14,000,000 worth of produce of which about $6,000,000 worth is hauled over 40 miles. The total trucked from each city was estimated by getting records from a number of inter-city truckers together with as complete a list as possible of all inter-city truckers, from the wholesalers and

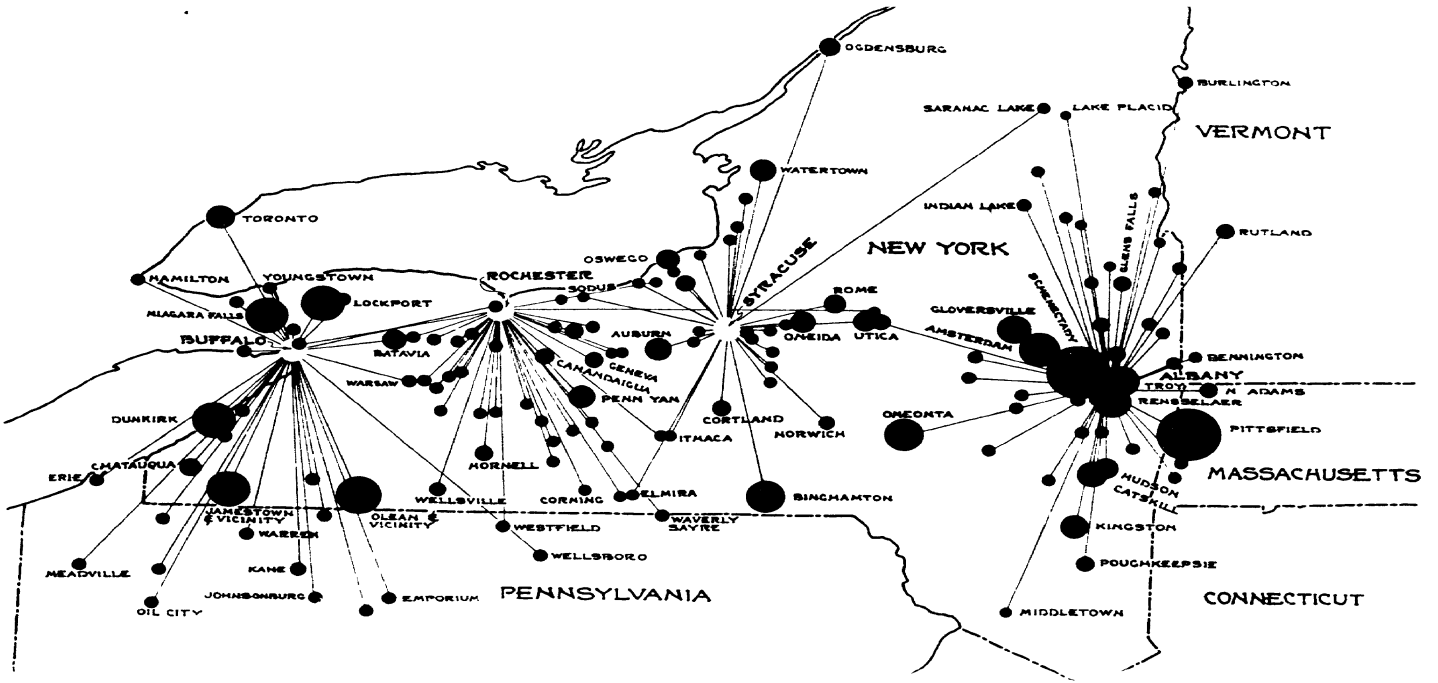

FIGURE 1. INTER-CITY TRUCKING OF FRUITS AND VEGETABLES FROM ALBANY, BUFFALO, ROCHESTER, AND SYRACUSE, 1929

The smallest dots represent a range from $4,000 to $100,000, the largest $800,000, the others, amounts in proportion to size. The large amount trucked from Albany to Troy and Schenectady is due to the fact that many commission firms owning houses in Albany and either Troy or Schenectady unload many cars in Albany that are split between the two houses.

growers who sold to them, and applying the value of the loads in the records to all the truckers on the list. By getting the wholesalers to classify all inter-city truckers on the list as "large," "medium" and "small," fairly accurate allocations were possible.

The large amount of home-grown produce trucked out of Albany is due to the fact that Vermont, western Massachusetts, the Adirondacks, and the Catskills represent vast areas that are not well adapted to the production of fruits and vegetables. The large amount of shipped-in produce goes largely to the cities of the Hudson Valley and in the areas mentioned above that are too small to receive solid car lots of western and southern produce.

The amount going within a distance of 20 miles from Albany is increased by the fact that some wholesale firms have houses in Albany and also in Schenectady or Troy. These firms unload cars in Albany and truck part of the produce to the other two cities.

Syracuse, located centrally so far as producing and consuming areas are concerned, has developed a large inter-city business, over 35 per cent of which goes more than 60 miles from Syracuse.

Buffalo is the source of over $4,000,000 worth of produce trucked to other cities, but less than 4 per cent was purchased on the market. Congested conditions on the Elk Street market discourage farmers and inter-city truckers from doing business there.

The inter-city truckers have almost entirely replaced the less-than-car-lot shipments by which many small cities were supplied in the past. The two large brokers in Buffalo whose business is almost entirely represented by express or less-than-car-lot freight shipments say that their business has declined from 65 to 90 per cent in the last 15 years because cities within a radius of 100 miles, which formerly were dependent upon them for small lots of specials, now have this service available at their doors daily or at least two or three times a week through the work of the inter-city truckers. The 10 or 15 per cent of the brokerage business which still remains in Buffalo consists largely of high class specials for a group of small cities located from 125 to 175 miles from Buffalo. A belt including Binghamton, New York; Elmira, New York; and Dubois, Pennsylvania, furnished most of the brokerage business for Buffalo. This belt is somewhat beyond the area served by inter-city truckers from Buffalo. The inter-city truckers have done more than any other single group to pro-

mote the consumption of fresh fruits and vegetables by making these products available 12 months in the year in every town and village, no matter how small. Such a distribution was entirely impractical when it was necessary to depend entirely upon the railroads for transportation.

Due to the congested conditions on the Elk Street market in Buffalo, less than half the home-grown produce hauled from that city by inter-city truckers is purchased on the market. The truckers would rather "pay a higher price to commission men than to take a chance of getting tied up for 3 or 4 hours due to the congestion in the farmers' market section."

From the data thus far presented, it is evident that markets which were designed to accommodate a grower selling from a wagon to the housewives of the city have become obsolete under present day conditions of traffic and merchandising practices. Chain grocery stores and independent grocers have made fresh fruits and vegetables available in every neighborhood in our cities and towns at prices only slightly above the retail prices prevailing on the public markets. Distribution of shipped-in, as well as home-grown produce by motor truck from the large centers of population to the smaller cities and towns, have made these products available 52 weeks in the year to almost every housewife, no matter where located. These conditions call for markets designed for transfer of produce from truck to truck, for selling of large loads in a reasonably short time, for the sale of home-grown and shipped-in produce in close proximity to each other and for market areas with ample traffic and parking facilities for the movement of large numbers of trucks and automobiles.

That these markets should not be entirely controlled and dominated by the political régime of single cities is plain from the wide producing and consuming areas which they serve.

The Special Committee appointed by the New York State Conference of Mayors at the request of Governor Franklin D. Roosevelt to study the problem of food distribution in New York State recommends that "Since farmers, wholesalers, grocerymen, consumers in the city and consumers in other cities and villages over a wide territory are served by a regional market, such a market should not be controlled by any one local interest. The Committee believes that the best method of ownership is by the state,

or the state in cooperation with the city, or with one or more counties or both."

To these recommendations of the committee might be added ownership by the city and one or more counties, or by a cooperative organization of the growers. For the purpose of obtaining the adoption of uniform practices throughout the state in regard to grading, packing, and market and price reporting, however, state participation is desirable.[2]

[2] Presentation of detailed plans for markets is impossible in a paper of this character. Those desiring more detailed presentation of the study can obtain it by writing for Cornell Experiment Station Bulletin "A Survey of Some Public Produce Markets in Up-State New York" now in the hands of the printer.

INTERNATIONAL COOPERATION IN THE FIELD OF MARKET REPORTING

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THERE is no doubt that the financial returns from farming depend as much today upon efficient marketing as upon efficient production. Therefore, the farmers of today must not only be efficient producers, but they must market their products to the best possible advantage if they are to make a success of their business. Since the farmer, located far from business centers, is almost always more poorly informed regarding markets than is the buyer of his products whose office is either situated in a large city or in close connection with the leading markets, the education of the farmer in marketing has become one of the most important problems of the present time. It is of particular importance in the greater part of Europe where the farmers, who in pre-war times had little trouble with the merchandising of their products and therefore totally neglected this branch of farm management, are now placed in competition with farmers from all over the civilized world.

In order to enable the farmer to compete on equal terms with the buyer, who naturally wishes to buy as cheaply as possible, it is necessary:

1. To secure for the farmer the same information concerning general and special market conditions as is available to the buyer.
2. To educate the farmer to a point where he is able to make practical use of this information.

The second task is one of education and the methods by which it can be successfully accomplished in the different countries will depend in large part upon the degree to which the farmers in each country are accustomed to making use of marketing information at the present time. The first task, however, is one of organization.

As long as international commerce continues to be carried on in its present form and continues to be as important as it is today, it will be necessary for the farmer to be familiar not only with market conditions and developments in his own country, but also with developments in the international markets. That is why the

first problem mentioned above is, and in the nature of the case, must be, one of international organization.

Up to the present time, an international organization for supplying the farmer with practical market information has never existed. The International Institute of Agriculture at Rome is doing only scientific work. Its publications cannot be understood by the average farmer and are always issued so long after the period to which the reported data apply that the individual farmer cannot make use of the information in the solution of his current marketing problems.

Have no fear that I am going to suggest the formation of a new international organization for taking over the practical work of market reporting. One can organize a system for international market observation and reporting without founding a new association and without engaging additional employees or spending more money. This can be done through the international cooperation of all those offices and bureaus which are already working in the field of market reporting in the different countries. The necessity for some such system of cooperation is becoming greater and greater. I shall now try to show some of the principal ways in which such a system can be instituted and operated.

I believe that three questions are especially important:

1. What is the object of international cooperation in the field of market observation and reporting?
2. What offices or bureaus shall cooperate in this work and how shall the system operate?
3. What are the advantages, or perhaps the disadvantages, of such cooperation from the standpoint of the individual countries?

In treating the first question—the object of international cooperation in market observation and reporting—the field is so broad that it is only possible to roughly outlined it and to show, with a few examples, the necessity for international cooperation.

The first thing the farmer needs is reliable current information concerning the prices paid for his products on the principal markets of the world. It is known that price fluctuations today are more than twice as great as they were before the war. It is not necessary to investigate the causes of this fact here; it is sufficient to state the fact. The prices of agricultural products not only fluctuate from day to day, but with some products, as for example, fruits and vegetables, the price at the end of the day may be only

one-half as high as it was in the morning or even at noon. Consequently farmers must not only be informed every day, but if necessary, several times a day, concerning actual prices. Since domestic prices are determined, not only by conditions existing in the domestic market, but by developments in foreign markets as well, it is absolutely necessary that the farmer be informed of price movements in foreign markets.

A few examples may serve to illustrate the above point. The first question of the German grain dealer when he enters his office in the morning, and the last question before he leaves the office in the evening, concerns grain prices in Chicago, Winnipeg, Buenos Aires, and other American grain markets. If these prices have changed, he changes his business tactics accordingly. The farmer must also have this information if he is to bargain on equal terms with the buyer.

The dominant butter market of Europe is Copenhagen. If the German butter dealers hear from their Danish friends that the price of butter has gone up, they immediately telephone the neighboring dairy plants, or drive to them in their cars, and buy all the butter obtainable. They can usually buy to advantage, since the managers of the dairy plants are not yet informed as to the important changes that have occurred on the Copenhagen butter market. Numerous other examples of a similar nature might be given.

"But," you may ask, "what has all this to do with international cooperation in market observation and reporting? Anyone interested in foreign prices can obtain them as quickly and as accurately as can the dealer." The difficulty is that the cost of getting such information is at present so high that the farmer, or even a farmers' organization, cannot afford it. It is one thing for a dealer who buys and sells every day to pay for a market reporting service, and quite another thing for a farmer who sells his principal products but once or twice a year to pay for such a service.

The possibilities and value of international cooperation in the field of market reporting may be illustrated by an agreement between my institute, Preisberichtstelle beim Deutschen Landwirtschaftsrat, Berlin, Germany, and the Empire Marketing Board, London, England. We cable to the Empire Marketing Board, changes in the price of butter on the Berlin market, which information they disseminate to the British farmers. In return for this,

they furnish us with weekly figures concerning the supply of grain and dairy products on the British market. Each party pays telegraph charges and other expenses, but each saves the expense of collecting the necessary information. When it is realized that the expense of collecting such information is very high, and that my institute, for instance, is paying more than 50 dairy and vegetable reporters in foreign countries, in addition to grain and livestock reporters, the advantages of such international agreements for the exchange of market information are at once apparent.

However, reports are only the beginning of market observation and reporting work and much additional information is necessary to supplement them. Price reports are not sufficient. Even if a farmer has reliable current price reports available, the question as to when he shall sell his products still remains to be solved. In Germany, few farmers sell when prices are going up, for everyone thinks that prices will go still higher and that he will lose money if he sells today. On the other hand, when prices are falling, all the farmers try to sell because they are afraid that prices will go still lower the next day. To prevent them from following such marketing policies, it is necessary to give them, in addition to the price reports, special explanations of the character of the market and the factors which led to the price changes reported.

Such reports already exist, but they are for the most part reports of the dealers themselves. Just here is where a difficulty arises. An explanation of market movements which is sufficient for the successful running of a dealer's business is not satisfactory for the farmer. He must have a report which sees market movements with "agricultural" eyes rather than with the eyes of a dealer. While the dealer is interested only in the margin between buying and selling prices, that is, in relative prices, the farmer is interested in the actual or absolute level of prices. He must, therefore, be informed relative to all the factors related to the price changes reported. He is interested, for example, in knowing whether or not the price on a given exchange was determined under the influence of a valorization of stabilization operation. The usual trade reports do not furnish the answers to such questions.

I must confess that I do not believe that the men engaged in trade are as keen-minded as they are commonly reputed to be. The following example may serve to illustrate my point. When the famous McNary-Haugen Bill, which, I might add, was famous

in Europe as well as in this country, passed Congress in its first form, authorizing the United States Government to pay export bounties on certain agricultural products in order to get rid of the surplus, the prices of those products in the United States naturally went up. And what was the reaction of the European grain trade to an increase in grain prices brought about in this fashion—the grain trade which is generally credited with being highly intelligent? They bid prices up in Europe because "America had gone higher." European grain prices blindly followed the development of prices in the United States although prices in the United States went up only on account of an expected artificial restriction of the domestic supply which was to be brought about by increasing exports, to Europe and elsewhere, through the payment of export bounties. The actual carrying out of such a scheme would naturally have tended to depress European grain prices rather than to increase them. Examples such as the above serve to illustrate the necessity of explaining to farmers the real relationships involved in particular market situations.

Another example may serve better still to illustrate the necessity for, and the possibilities of, international cooperation in market reporting. In almost every country it is difficult to judge as to the significance of the prices reported on the principal markets. The quantities of produce sold in the country districts are sometimes much greater than sales on the market from which quotations are issued. All of the facts are not available. Some years ago the New York Cotton Exchange began to publish figures showing the weekly volume of sales. If I remember correctly, these figures showed that an amount of cotton equal to the total yearly cotton production of the United States was sold on this one exchange within a period of one or two weeks. A storm of protest broke out, and furious attacks were directed against speculation in cotton. The New York Cotton Exchange stopped publishing the figures. That strikes me as rather a queer remedy to have used. If the temperature is too hot or too cold, the destruction of the thermometer can scarcely be expected to remedy the situation. The action of the New York Cotton Exchange was just about as logical as that: to get out of a disagreeable situation it stopped publishing figures which indicated nothing more or less than what was actually going on.

It is important that farmers know the quantities of products

sold as well as the prices for which they sold. In Germany, for example, the most important produce exchange is at Berlin. Many sales are made in other parts of the country based largely upon prices fixed on the Berlin Exchange. It frequently happens that the price of grain quoted on the Berlin Exchange is based on sales of as little as 30 tons of grain. On the same day, however, sales of grain in the country may amount to 10,000 tons or more, and the price at which the larger quantity sells in such cases is largely determined by the price at which the smaller quantity sold. The price at which the smaller quantity sold may be largely a matter of chance. In varying degrees, the same conditions exist in almost every country. Furthermore, it applies not only to the grain markets but to the markets for all classes of agricultural products. I believe that it is always important that all of the facts relating to a given market situation be made available, and that great advantages are to be gained for the farmer through the development of a more complete market reporting service.

The only remedy for the above situation is to compel the administrations of the various markets to publish figures showing the quantities of products sold as well as the prices. Farmers could then determine for themselves whether or not the quantities sold were sufficiently large to establish representative prices. Here then is an opportunity for international cooperation in improving our market reporting service, since the condition referred to above exists in the markets of practically all countries and it is becoming more and more important that we have reliable price quotations from all of the important markets of the world.

There is need for a systematic study of the factors affecting prices in order that we may more clearly determine the relative importance of these factors. Theoretically, of course, we know what the factors are, but such knowledge is of little practical use to the farmer. He needs to know the relative importance of each factor, and furthermore, he must be kept informed at all times of changes in conditions affecting any particular factor. Take, for example, the question of the supply of a certain product on a given market. Data relative to carlot shipments consigned to a particular market are of little value to the farmer unless they are made available *before* the shipments arrive. The possibilities of international cooperation in making such data available may be illustrated by the following example: Italy is one of the most

important exporters of fruits and vegetables in Europe. Large quantities of such products are sold on the German markets. Through a cooperative arrangement we are informed of carlot shipments of Italian fruits and vegetables consigned to German markets two days before the trains reach the German boundary. When the trains pass the tunnels of Brenner and Chiasso we know not only the quantities of oranges, cabbage or spinach coming into Germany, but also the market to which they are consigned, and the quality of the products in question. We are in a position, therefore, to inform our farmers in advance of the fact that on a given day the markets of Munich or Leipzig will be overloaded with Italian fruits or vegetables. The German farmers are enabled thereby to choose a more favorable day for shipping their products to these markets or to ship to some other market where the competition from Italian products is not so keen. Such an arrangement has its advantages from the standpoint of the Italian growers as well, since there is less likelihood of their products running into strong competition with German products. I am convinced that marketing information of this type is very useful to growers and to farmers' marketing organizations.

There are many other factors affecting demand and supply for different products concerning which information from the countries involved would be of great use to the farmer. However, I shall cite only one other example, and this only because of its great importance. The Bureau of Agricultural Economics of the United States Department of Agriculture began the practice of asking farmers regarding their intentions to increase or decrease their production of crops, livestock, and livestock products. We studied the system in this country and developed a somewhat similar system in Germany. It is my opinion that the development of such statistics on an international basis may be one of the ways of solving the international surplus problem. If such figures were available for every country, for example, prior to the time that crops were planted, they might influence the final decisions of the farmer.

I realize that the value of such data must not be over-emphasized. If in Germany, for example, we issue livestock statistics and advise our farmers to stop pig-breeding for a time as the figures indicate a probable over-production of pigs, some of them

will follow our advice. Others will take exactly the opposite course, reasoning that if a large number of farmers follow our advice the market for pigs is likely to be good. Even so, I believe that such statistics are of the highest value.

The above examples illustrate the possibilities of international cooperation in the field of market observation and market reporting. They make it clear that the field is a large one. The earlier we begin work, the better for the farmers in the various countries.

We may now turn to the second of the two questions raised at the beginning of this paper, namely "What offices or bureaus shall cooperate in this work (of market observation and market reporting) and how shall the system operate?" Naturally, everyone should be welcomed who has anything to contribute. However, there are differences between the various offices, bureaus, and organizations which cannot be overlooked. The only international organization publishing agricultural statistics at the present time is the International Institute of Agriculture at Rome. The governmental offices of the various countries connected with the Institute make reports to that organization which in turn publishes them in the official reports of the Institute. As I have already pointed out, these reports are of greater scientific than practical value. That is not the fault of the Institute but of the system. In the first place the majority of governmental bureaus function more slowly than do the offices of private businessmen. It must be borne in mind that in market reporting, speed is essential as well as reliability. Furthermore, government reports can only be released after the most careful investigation of all of the facts, for a government cannot publish a report with the comment that it has not as yet been proved true. But news of this sort frequently has a great effect upon the market. Rumors and vague reports often influence prices materially. Farmers must be furnished with news of this character as well as with reports based upon careful investigation of all of the facts. A rumor of a crop shortage, for example, may influence prices considerably. Information of this sort must be published, and this can be done much better by a private than by a governmental agency.

Organizations engaged in the marketing of agricultural products may possibly be found useful in the work of market observation and market reporting. The cooperatives especially must not be

neglected. It must be recognized, however, that the interests of the dealer and of the farmer frequently conflict. For example, the Institute with which I am connected wished to install a radio market reporting service in a particular section of the country. We approached a cooperative association and asked for permission to install equipment, at our expense, in their local offices. We were refused such permission with the following comment: "If the peasants are kept informed, what will become of us?" Of course, such an attitude is not typical. Most of our cooperative associations strive to look after the best interests of the farmer. In last analysis, however, they are always either sellers or buyers and for this reason can scarcely be expected to look at the market in the purely objective and independent manner which is necessary if the farmer is to be supplied with unbiased reports.

Special organizations for collecting and disseminating market information seem to offer the only satisfactory solution to the problem. Such agencies are being established in many countries. In Germany, for example, we have three such agencies. Two of these are scientific institutes which are primarily interested in general market conditions while the third is designed to furnish the farmer with market information which will be of assistance in solving his practical problems. Similar agencies exist in Norway, Switzerland, Denmark, Austria, Hungary, and Italy. As private agencies, they are organized to disseminate marketing information promptly. Their staffs are made up of marketing experts who neither buy nor sell, and their reports are therefore objective. If offices of this sort in the various countries were to cooperate for the purpose of supplying each other with reliable market information, farmers in all of the countries concerned would benefit.

We come now to the third question raised at the beginning of this paper, namely, "What are the advantages or perhaps the disadvantages, of such cooperation (cooperation in market observation and reporting) from the standpoint of the individual countries?"

Some people may be of the opinion that it is not to their own best interests to inform foreign countries concerning market conditions in their own country. I do not share such an opinion. If anyone is really interested in getting such information he will get it in one way or another. Up to the present time, for example,

our information concerning the policy of the Federal Farm Board in this country has been supplied by our own representatives on the principal markets. We have even been informed regarding the agreements between the Farm Board and the different milling-plants. I am sure that Americans are informed concerning conditions on the German markets in much the same way. If we are securing such information anyway, I believe it would be better to inform each other directly for three reasons: First, it would be cheaper for both parties. Second, the information would be more reliable. Third, it would look better. Even the fact that an office in one of the many countries might not be interested in furnishing reliable information regarding market conditions in that country should not prevent the establishment of such a cooperative arrangement. Conditions could not be worse than they are at present. You all know that we have in most of the principal grain growing countries, a species, not of weather reporters, but of "weather makers." Their reports are not based upon fact but upon their own desires. They first report rust. If this does not influence the price, they report frost, and finally such things as the mysterious "ash rains," reports of which have come from South America during the past few years. At the maximum, not more than one per cent of the buyers and sellers of grain believe such reports. An agency organized for market reporting could not afford to follow any such policy since to do so would result in its losing its reputation. Furthermore, it is hopeless to attempt to influence the market by incorrect reports for more than a very short time. Eventually, the originator of such reports is disadvantaged considerably more than is the public at large.

A number of European countries have quite recently arranged to cooperate in the collection and dissemination of marketing information. This arrangement was brought about through the Council of the International Agricultural Commission to which most of the countries of Europe belong. The headquarters for market information concerning grain, potatoes, and so forth is in Germany, for dairy products, in Switzerland, for vegetables, in the Netherlands, for wine, in France, and so on. Information concerning market conditions and developments is assembled at headquarters for the commodity in question, and a report is then wired or sent by radio to the corresponding offices of the countries co-

operating. These offices in turn broadcast the information to their farmers. I am convinced that such an arrangement is a first step in the right direction. Lack of adequate information concerning market developments is one of the great handicaps under which practically all farmers labor.

CROP AND LIVESTOCK REPORTING

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RECORDS of the collection of statistics of agricultural production by governmental agencies can be traced back almost to the dawn of history, but it was only during the last half century that modern nations began to collect statistics of agriculture regularly and systematically. An enumeration of agricultural production in the United States was first made in connection with the decennial Federal Census of 1840. In response to the post-war demand for statistical information, the decennial census of agriculture was placed on a quinquennial basis in 1925. It was not until the Department of Agriculture was organized in 1862 that the regular and systematic collection of annual and monthly agricultural statistics was provided for in this country.

As the agriculture of the Mississippi Valley developed, annual or bi-annual enumerations of acreage, crop production and numbers of livestock were provided for by several of the important states in the region including Kansas, Nebraska, Missouri, Iowa, the Dakotas, Minnesota, Wisconsin, Indiana and Ohio. These state enumerations are generally made by the local tax assessors. A few states outside of the Mississippi Valley such as North Carolina, West Virginia, Colorado, and Utah are now making assessors' enumerations of crop acreage, either annually or bi-annually. One southern state, Alabama, in cooperation with the Federal Crop Reporting Service, is making a semi-annual sample census of agriculture, similar in many respects to the partial censuses made in Scandanavian countries prior to 1914. More will be said later concerning the importance of this method of securing reliable estimates of acreages of crops and numbers of livestock.

This country differs from many other countries in that an annual enumeration of acreage and livestock numbers is not made throughout the country by regularly employed officials. Consequently the most important problem confronting our statisticians is that of estimating changes in acreage, and changes in numbers of livestock from year to year, largely on the basis of sample data obtained entirely from voluntary correspondents—farmers who receive no compensation for their valuable services. These sample

data are obtained by mailed questionnaires or by means of questionnaires distributed to farmers and collected by the rural mail carriers of the Post Office Department.

Although this country is handicapped because of the lack of annual enumerations, a rather comprehensive system of collecting data concerning the commercial movement of agricultural products is being developed. These data serve as a check on the estimates and make it possible to measure the bias of the sample data on which the estimates are based. For example, there is the annual enumeration of bales of cotton ginned, which has been made since 1906, the excise records of the sales of tobacco, the reports from the railroads to the Department of Agriculture of the carlot shipments of fruit and vegetables and livestock, the receipts of livestock at the great central markets, such as Chicago, Kansas City, and other livestock centers, as well as the receipts of livestock at packing houses, and the Bureau of Animal Industry records of inspected slaughter. Agricultural products received by trucks at some of the principal cities are now being recorded Reports on the quantities of butter, cheese, condensed milk and ice cream manufactured are now obtained regularly. Associations of canners report the total pack of fruits and vegetables. Receipts of grain at elevators, mills, and warehouses are also reported for some states. This compilation of the commercial movement and production of agricultural commodities is valuable for other purposes in addition to affording a basis for checking estimates of agricultural production.

From the beginning of crop estimating in the Department of Agriculture in the sixties, data have been obtained concerning the condition or appearance of the growing crops on the first of each month from planting time until harvest. It was not until 1912. however, that the Department began to interpret these condition reports into terms of probable production. An arithmetical method was used in making this interpretation until within the past two years when statistical methods, based on correlation technique, were developed for this purpose. With crops in those states where there has been little apparent relationship in past years between the appearance or condition of the growing crop and the final yields per acre, meteorological data are being used successfully as a basis for making forecasts of crop production.

In addition to making forecasts and estimates of crop and live-

stock production, periodical estimates are made covering stocks of grains, potatoes, and apples on farms. Prices received by farmers for farm products are obtained monthly from special price correspondents; prices paid for farm labor are collected quarterly; values of agricultural land are estimated annually. These data of a more general economic nature form the basis of index numbers of farm prices, farm retail prices, wages, and land values.

The crop and livestock estimating work is carried on by the Division of Crop and Livestock Estimates of the Bureau of Agricultural Economics. There is a staff of twelve trained statisticians and eighty clerks in Washington. Forty-one field offices are maintained in each of which there is a trained statistician in charge, with from one to three technical assistants, depending upon the size of the state, and also a small staff of clerks. Estimating in the New England States is carried on from one field office; in Maryland and Delaware from one office; and in Utah and Nevada from one office. In each of the other states a separate field office is maintained by the Division of Crop and Livestock Estimates. In addition to the field statisticians who are required to travel throughout their respective states to observe crop conditions, a large corps of voluntary correspondents, numbering about 300,000—mostly farmers—are maintained on various lists. In June and December when surveys covering livestock are made and in September when surveys covering crop acreage are made, in each case with the assistance of the rural mail carriers, reports are secured from many additional farms. In September, about a million acreage cards are distributed through the carriers. In many of the larger states from 8,000 to 15,000 farms are included in the sample.

In thirty-seven of the states the United States Department of Agriculture has cooperative agreements with either the state department or board of agriculture or with the college of agriculture, whereby the work of making crop and livestock reports for the state is conducted jointly. So far as I know there is no state at the present time in which crop reports are issued independently by any branch of a state government. The cooperative arrangements between the state and federal governments have tended to increase the scope and accuracy of the reports by making more funds available for technical and clerical help. They have also reduced confusion by eliminating two official crop reports, one state and the other federal, for any given state. For the current

fiscal year the contributions to the crop reporting work by the various states exceed $300,000, while the federal government is contributing somewhat in excess of $700,000.

All of the crop reports issued by the Department of Agriculture are reviewed by a Crop Reporting Board, consisting of a Chairman and from five to seven members. The chairman and members of the Board are named by the Chief of the Bureau of Agricultural Economics and approved by the Secretary of Agriculture. The members are selected almost without exception from the statistical staff of the Division of Crop and Livestock Estimates. At present, the chairman is also the administrative head of the Division of Crop and Livestock Estimates, but the previous chairman was Assistant Chief of the Bureau of Agricultural Economics, and some time prior to that, the Assistant Secretary of Agriculture presided. Usually from two to three of the field statisticians are called in each month to serve on the Board, being alternated from month to month. In the case of cotton the law requires that at least three of the members shall be supervising field statisticians familiar with the growing of cotton.

The Board as a whole actually prepares the reports which are issued on speculative crops such as cotton, wheat and corn. For the non-speculative crops the Board is divided into groups, each group being responsible for certain crops. In such cases the Board simply reviews and approves the work of the group.

Most of those present have heard something of the care which is taken to prevent "leaks" of the information. Very stringent laws are in force which provide heavy penalties for divulging any of the information in advance of the time set by law or department regulation for the release of reports. Because of the influence which the reports on cotton, wheat and corn exert on the futures market you can readily see how important it is that no one shall have advance information.

The reports on the so-called speculative crops received from the field offices go directly from the post office in sealed envelopes to a safe under the jurisdiction of the secretary's office. The safe has two locks and two different persons hold the keys. On the morning of the day a report is to be released, the chairman and the secretary of the Board go to the secretary's office where the secretary or his assistant opens the safe and takes out the reports and hands them to the chairman. They are brought back to the

rooms of the Crop Reporting Board under police guard. As soon as they arrive the doors are locked and guarded until the time fixed by the secretary for release. The windows are also covered and sealed and telephones and call bells disconnected. In fact, no communication between the Board and the outside world is permitted while a report is in process of being made. The schedules received direct at Washington from reporters are tabulated piecemeal for each state and the data are not assembled by the clerical staff of the Board until after the Board is in session. These extreme precautions seem necessary because of the tremendous financial interests involved.

Just before the time of release the Secretary or Acting Secretary of Agriculture is admitted to the rooms of the Board to approve the report. A minute or two before the time of release the chairman and one or two members of the Board carry the report under police guard to the release room. Here are to be found a rather large assembly of men representing the press and other interests. They are required to stand in the middle of the room until the report is distributed face down beside the many telephone and telegraph instruments which have been provided. At a signal there is a wild rush to get the information out and in a minute the high lights of the report are known throughout the world, especially reports relating to cotton and wheat.

The estimating of the acreage of some seventy crops each year presents a great variety of problems, many of which are still awaiting solution. When the great variety of crops grown in the United States and the character of these crops is considered, a tremendously wide field is presented to the statistician. For instance, in attempting to forecast or estimate the production of apples, quite different methods must be used from those used in connection with an annual crop, such as wheat. In the livestock field, many statistical problems are presented that involve the use of sample data in estimating total numbers of livestock by age and sex classifications. Fortunately for the accuracy of the livestock reports, a great deal of check data are available in the form of receipts of livestock at stockyards, records of animals slaughtered, and assessors' enumerations for purposes of taxation.

In order to collect the information needed to cover the various reports made by the Division, about 420 different kinds of questionnaires are used each year and over 9 million questionnaires are

mailed out from Washington and the field offices. From about 1883 to within the past three or four years, a complete dual system of reports was maintained. That is, questionnaires on all subjects were sent out from and returned to Washington for tabulation, as well as from each of the field offices. The data compiled in the field offices were sent to Washington, where the results obtained from the two independent sources formed the basis of the estimates of various kinds. The work of collecting data for the estimates of acreage and numbers of livestock has now been delegated entirely to the field offices, which send out all of the questionnaires relating to acreages as well as numbers of livestock and tabulate them in their offices.

Under the present plan, immediately preceding the issuance of reports covering acreages and numbers of livestock—the bulk of which are issued as of July 1, December 1, and January 1—each of the field offices is visited by a member of the Crop Reporting Board from Washington who reviews the data collected and the conclusions reached by the field statisticians. These he submits with his recommendations to the Crop Reporting Board at Washington. These recommendations are usually accepted by the Board, with only occasional or slight modifications. The dual system is still maintained in all important states, in collecting information concerning the condition of crops, yield per acre, and similar information. The field statisticians send in to the Crop Reporting Board their recommendations as well as the results of their inquiries, which are compared with the inquiries obtained in Washington. It is interesting to note that for crops grown extensively in any state, the average of the reports concerning condition of a growing crop or the yield per acre at harvest, received by the field offices, usually agree very closely with those received and tabulated in the Washington office. When the data from the two separate sources of information do not agree it is necessary to review the two samples, district by district, in order to discover in so far as possible the cause of the discrepancy.

CONDITION OF THE GROWING CROPS AND FORECASTS OF PRODUCTION

Some persons have criticised the basis on which condition figures are obtained, namely, that of comparing the condition of a

growing crop at a given time with a normal condition taken as equal to 100 per cent. Some of our friends from across the water have been particularly critical of this basis of comparison, insisting that a normal crop was an ideal seldom realized, and which was entirely too subjective to furnish a satisfactory basis of comparison. The fact, however, that reports received from two completely different lists of crop reporters at a given time, in which they have been asked to compare the condition of a certain crop with normal, will almost always agree within one or two per cent, would seem to indicate that farmers have a rather definite concept concerning a normal or full crop.

I am of the opinion, however, that it makes no difference whatever, whether the basis of comparison for the crop reporter is a normal crop or an average crop, so long as a statistical method of interpretation rather than the arithmetical method is used in making a forecast of probable yield per acre. When the average of past years is used as a basis of comparison for the farmers' reports on condition of the growing crop, an historical series may be accumulated which may serve as a reliable barometer of the final yield per acre and be used statistically for forecasting purposes. When an average for the past five or ten years is calculated and used to arithmetically interpret the current condition figure, reported as a percentage of an average, there is a tendency for the forecasts to be less than the final out-turn of the crop, as has been the situation in England and Canada where the average rather than the normal is used. The older "par" method of interpreting the condition of a crop in per cent of normal avoided this difficulty of understatement, providing there was no time trend in the relationship between the reported condition figure and the final yields per acre.

The weakness of the arithmetical method of interpretation, including the par method, lies in the fact that it assumes a positive one to one relationship between condition and final yield. While this might be a reasonably satisfactory *a priori* assumption, we have discovered that it is possible to have an inverse relationship between the condition or appearance of a crop and the final yield per acre. This is the case with potatoes, for example, in Maine.

I think I can best illustrate this by the use of the blackboard on which I will sketch a chart showing roughly the relationship of condition September 1, and final yields of Kansas corn. On this

chart you will note that I have plotted on the vertical line the yields per acre, and on the horizontal line, the condition of the growing crop. The purpose of this dot chart is to compare the condition as of a given date with the final yield over a period of years. Charts of this character are used in making forecasts of yield per acre for every crop in each state. For instance, on September 1, the condition, say of corn, is 70. What does this mean in terms of bushels per acre at harvest? You will note that in previous years, when the condition is plotted against the final yield, that the dots tend to fall in a rather regular and more or less straight line. In some cases you will find a distinct curve to this line while in others the observations are so scattered, that the result is similar to the pattern made by a shot-gun, indicating that there is little, if any, relationship between the condition as of a given date, and final yield.

When the dots showing the relationship between condition and final yield in previous years, tend to fall on a well defined line, the matter of forecasting is very simple. When, however, the dots are scattered over the chart, there is no basis for a forecast and the necessity of approaching the problem from some other angle, such as the use of meteorological data, is apparent. It is frequently found, when an analysis is made of past years' records, that during dry years there is a tendency for the condition to be reported lower than in wet years. In fact, the rank vegetative growth common in years of ample moisture frequently fails to produce as high a yield as in years which are more favorable for the production of grains or tubers. Although the dots on the chart, on first examination, may appear to show no significant relationship between condition and yield per acre in past years, a further analysis in which weather factors are used to supplement the condition reports may reveal a satisfactory basis of forecasting. That is, methods of multiple correlation are being successfully used at this time in forecasting the yield per acre of important crops in important states.

There are some cases where the use of the condition figure is actually misleading as a basis for forecasting the yield per acre of a given crop in a particular state. The higher the reported condition, the lower the final yield has been at harvest. That is, there are cases of minus or inverse correlation. This situation

exists in connection with potatoes in Maine as of August 1. It is also true in Maryland and other Atlantic Coast States with respect to wheat. Apparently, in Maine in years of heavy precipitation the farmers are influenced by the fine appearance of the crops to report a high condition on August 1, whereas an analysis of the relation of rainfall to yield indicates that when rain is abundant within a certain period, it tends to result in greatly reduced yields. In Maryland, where we have a similar situation with respect to wheat it was found, after studying the historical data, that prior to 1900 there was a close relationship between the condition of the growing crop as of May 1, and as of June 1, and the final yield per acre of wheat, but that the relationship has been reversed in recent years. This is due to the fact that a disease called "Septoria nodorum" became prevalent, and weather which gave the crop an unusually fine looking appearance usually resulted in a serious attack of this disease and in consequence greatly reduced the yields.

This year in Florida, for instance, the condition of the crop prior to harvest indicated a rather high yield per acre of potatoes. Early harvestings supported the high figure. A careful analysis was made of the relation of weather to yield in that territory and the evidence was so convincing that a forecast was made based largely upon the relationship of the weather to potato yields in that area. From a check up of the crop based on carlot shipments of potatoes, it has turned out that this forecast was much better than could have been made from the regular condition reports The same has been found true in Maine with regard to potatoes and also with some of the other crops. One of the difficulties presented in studying the relation of weather to yield has been the shortness of the historical series as well as the inaccuracy of some of the records of yields.

With respect to forecasting the apple crop, quite a different method of procedure is followed. It has not been found possible to establish any basis of a normal yield per acre or per tree. Therefore, the crop estimating service has had to depend very largely on census reports as a basis for forecasting. As you know the census of agricultural production is taken every five years. Each year the Division asks its correspondents to estimate at the close of the season the size of the apple crop in percentage of normal.

Suppose, for example, that for the State of New York the census for 1924 showed a production of 5,000,000 bushels of apples and at the same time the crop correspondents estimated that the crop was 50 per cent of normal. This would mean that under normal conditions the crop would have been 10,000,000 bushels. Similar records for previous census years are available, and from these two known factors a par or 100 per cent production indication has been derived. This par production is adjusted from year to year in the light of new plantings, of old trees pulled out, and from the record of carlot shipments which is available. In addition to the monthly forecasts of production based on these data, a forecast is made each year on the first of November as to the carlot movement of apples. These forecasts of the carlot movement have been surprisingly accurate.

ESTIMATING CROP ACREAGES

The estimating of crop acreages (both absolute and relative) presents some of the most difficult problems connected with crop estimating. The decennial and quinquennial censuses of agriculture have been and are still the principal bases upon which annual statistics of acreages of crops are made in inter-census years. The census data are modified in the light of other information such as the commercial data relative to carlot shipments, and so forth, which are used to measure the incompleteness of the various censuses.

For nearly fifty years prior to 1925, the estimates of changes in acreages from year to year were based almost entirely upon a judgment inquiry sent to crop correspondents in which they were asked to give their best judgment as to the increase or decrease of the acreage in various crops in their locality as compared with the previous year taken as equal to 100 per cent. About two decades ago a second question was included, asking the correspondents to compare the acreage, not only with the preceding year, but also with the acreage usually grown in their locality. This was done in order to overcome the difficulty which arose when the distribution of acreages for the previous year was an abnormal one due to winter-killing, drouths, or other causes.

About 1918, the judgment inquiries were supplemented by a questionnaire to correspondents asking them to report for their

individual farms the acreage in the various crops for the current year as well as the acreage they had harvested the preceding year. This was a marked step in advance as it had been found from long experience that in the case of unusually large increases or decreases the judgment inquiries failed to reveal the change. In 1924, the collection of a more nearly random sample of acreages from the rural mail carriers was begun. This sample was less selective as revealed by the measurements of average size of farm and average acreages in crops and was more accurate when tested by check data, such as assessors' enumerations in states having annual enumerations, cotton ginnings, carlot shipments, and mill-door receipts of grain and carlot shipments of vegetables, including potatoes. An improvement of method, both with respect to the mail and the rural carrier samples in various areas, has been made in the comparison of changes on identical farms. That is, reports for each of two years from the same farms are used as an indication of the change in acreage of a given crop. In many states sufficient returns are now being received to make it possible to compare a large number of identical farms for two years. The questionnaires going to the rural mail carriers ask only for the acreage for the current year, as it has been found that memory bias tends to distort the comparison when farmers are asked to report for the present and previous year at the same time. This is especially true with cash crops and crops of small acreage. A moment's consideration, however, will disclose the great unsolved problem still before us, which we have ever in our minds, and for which a somewhat arbitrary discount must be made at present for lack of any quantitative basis of measurement. Both questionnaires sent by mail and collected by rural carriers deal with individuals living on farms now. Nothing in the sample itself reveals who was on the farm last year and not at present, or now and not last year, or what unit of land was operated last year and not this year, or this year and not last year. In other words, in a region of expanding agriculture, these samples tend to understate acreage changes, while in a region of declining agriculture, they overstate changes in acreage. Fortunately, in the great agricultural areas of the Middle West these changes are small but in other areas they are important, and ways and means must be de-

vised to go beyond the present sample in order to measure the influence of shifts of land into and out of agriculture.

A few years ago one of our field men invented what is now called a "crop meter," which is a measuring instrument which is attached to an automobile in the same manner as a speedometer and by means of which the frontage in number of feet in each kind of crop along selected highways may be measured from year to year. From frontage measurements over identical routes for two years indications of change in acreage can be derived. These meters have been made with 24 dials and can be used either for measuring 24 kinds of crops along one side of the road, or may be divided and measurements taken of a smaller number of crops, on both sides of the road at the same time. Valuable results have been secured from the use of this crop meter and we think that it will help us to solve some of our problems with respect to new land taken up for agricultural purposes, for pasture, and so forth. For instance, our statistician for Virginia tells me that along the routes he selected to cover in that state there has been an increase in land going back to forest of about 2 per cent a year for several years. It is a purely objective method of measuring changes in acreage and is especially valuable with important cash crops such as cotton, potatoes, and so forth where there is a marked tendency to understate the crop acreage of the current year.

We have come to the conclusion that sooner or later for the solution of these problems we will have to use some other method of collecting sample data from the farms. The method which shows greatest promise is that of a partial or sample census each year of representative areas well distributed over a given state. The general method of purposive selection as developed by the Scandanavian countries during the decade following 1900 could be applied with advantage to selected representative areas or enumeration districts or individual farms. Well trained and paid enumerators would take this census in the same areas from year to year. Such a sample could be made much more representative of all classes of farmers than is possible when the sample is made up only of reports from those who are willing to render a report voluntarily. This method of a partial annual census is now being used successfully in Alabama.

PROBLEMS IN LIVESTOCK ESTIMATING

The problems involved in estimating the number of livestock of different species on farms (taking an annual inventory), and in estimating the quantity and value of annual livestock production, are considerably different from those encountered in estimating crop production. They are quite as difficult of solution, however, and it is only within the last four or five years that real progress has been made. These problems also differ as among different species of livestock. For example, hogs are produced very largely for meat; they are marketed or slaughtered on the average when less than a year old; the basic breeding stock is small compared with production; and yearly changes in numbers produced may change markedly. On the other hand, cattle are marketed at all ages, from calves to worn out dairy cows; to a considerable extent they are produced primarily for purposes other than slaughter; the basic breeding stock is large compared with yearly production; and increases in numbers can be brought about but slowly.

Until a few years ago the activities of the Department of Agriculture as regards statistics of livestock production were directed largely to securing inventory numbers. The estimate of the number and value of livestock on farms, made as of January 1, was the principal livestock estimate of the year, and, as with crops, was based upon judgment inquiries, with but little effort to adjust for the bias which nearly always exists in such data. This accounts for the radical revisions which have sometimes been necessary following a new census. While a yearly inventory of livestock numbers is much more significant for indicating livestock production than a similar figure for grains, hay, or cotton would be for indicating the production of these crops, it was at best entirely inadequate to furnish a basis for arriving at the annual number and value of livestock produced. Little or no information as to actual livestock production, even after the close of the year, was secured, and practically nothing was sought as to production as it was taking place in advance of the movement to market.

At present the livestock activities of the Division of Crop and Livestock Estimates are being centered more and more upon securing information of production, and methods are being devel-

oped for obtaining such data currently and publishing them well in advance of the time when the supply will be marketed. Because of the comparatively short interval of time between birth and marketing of hogs and lambs, information as to current production is of greater utility with these species than with others. While considerable progress has been made in this field, much still remains to be done to develop a satisfactory statistical technique.

Pigs are raised generally as two crops, a spring crop and a fall crop, so that it is necessary to prepare two reports each year on pig production. Lambs are a single crop, born largely between March 1 and June 1, hence only one general estimate—in July—is made of the lamb crop. This is supplemented, however, by reports on the early lamb crop in those states where large numbers of lambs are born before March 1, and marketed before July, so that producers and the trade may be advised as to the prospective numbers of early lambs.

In addition to estimates of numbers on farms and of production, a number of estimates of short period supplies are made. These include estimates of cattle, sheep and lambs on feed for market on selected dates during the year, prospective marketings of western cattle over seasonal periods, the fall shipments of western lambs, and so forth.

The securing of dependable information upon which to make these various estimates, and checking the accuracy of the estimates as made, present some interesting problems, some of which are not easily solved. As with crops, the census enumerations are used as the basis for estimating changes in numbers between census periods. The changing of the time of taking each census, with which you are all familiar, has greatly increased the difficulties of making estimates of numbers as of the same date over a period of years.

In general the basis of most of these estimates of changes in numbers in intercensal years is the individual farm sample. The problem of such samplings is to secure large enough returns, properly distributed, to be respresentative. For livestock reports these sample data are secured from regular and special lists of reporters, and from schedules distributed by the rural carriers of the Post Office Department. The sample secured by the latter method is probably a better one than that secured from regular reporters,

since the latter tend to represent the better and more stable producers.

As with acreage, the preparation of questionnaires that will furnish the desired information, and yet be simple enough to be understood by the reporters, is not an easy matter. One of the difficulties is to adopt words and phrases that have the same significance in all parts of the country. For example, the pig survey cards ask for the "number of pigs saved" from all litters farrowed during a stated period. Over a large part of the Corn Belt, the principal hog producing area, the phrase "pigs saved" has a rather general specific meaning, which is, pigs that lived to be several weeks of age. In other sections, apparently, this phrase does not have such a meaning, and it is often difficult to determine what the reporter actually has in mind. But great caution is needed in changing the wording of schedules, both because the new schedule may turn out to be no better than the old, and because the comparability of the returns for the two years may be affected.

Covering the last seven years the Division has been obtaining quite complete information as to monthly and yearly movements of livestock by states, for the principal producing states. This includes shipments into, as well as from these states and makes possible a computation of the net output. On the basis of such information and sample data covering other items, balance sheets of livestock numbers per state, showing items of increase and decrease during the year, together with numbers at the beginning and end of the year, have been prepared. The information secured by sample, covering such items as births, deaths, and farm and local slaughter, is rather uncertain, since it involves a correct memory of such items by the reporter covering a number of months. That there is a considerable memory bias in such returns seems certain, but it is difficult to measure this from sample data alone, for the representativeness of the sample is always in question. At the same time such census data as there are covering these items are apparently lacking in dependability as giving absolute numbers that can be used as a basis for estimates.

For checking estimates of numbers on farms and other similar estimates, the marketing figures are very useful for some species. The best information for such checking purposes for cattle and

horses and mules is that obtained from the annual reports of tax commissioners or state auditors which give the number of livestock taxed each year. These are available for all of the principal livestock states. The yearly changes in assessments, except under abnormal conditions which tend to affect the normal proportion of animals returned for assessment, are probably the best indications of yearly changes, and especially of trends over a period of years. These, however, are only available for checking the estimate of the previous year. For the current year, sample data of various kinds must continue to be the principal source of information

THE DEVELOPMENT OF FEDERAL STANDARDS FOR THE CERTIFICATION OF FARM PRODUCTS IN THE UNITED STATES

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THE standardization and certification of farm products by the United States Department of Agriculture roots deeply in the needs of our agriculture. This service traces fundamentally to the desires of producers, dealers, and consumers for a uniform and universal yardstick with which to measure variations in the quality of farm products as a basis for trading in them. Before the advent of federal standards this desire was expressed in the form of local standards or brands set up by individuals, associations, chambers of commerce, and states. It was a period of much confusion growing out of a lack of uniformity in the standards, as well as a lack of uniformity in their application. It was the heyday of the deceptive pack and acrimonious disputes.

The increasing distance between producer and consumer resulting from the specialization of agriculture in areas far removed from markets intensified the problem and added further complications. Difficulties thus experienced in the marketing of farm products did much to shape sentiment in favor of a service of government standards and certification.

Another condition favoring the development of federal standards was the need for measures of quality as a basis for market quotations and information relating to farm products. Without standards it was impossible to make adequate price comparisons between markets or between periods. With the passage of special legislation in 1916 providing a definite appropriation for a market information service, the development of standards became imperative. Even today, in the case of some commodities the standards are used primarily as a basis for market reporting rather than for certifying as to grade.

The financing necessities of agriculture provided additional reasons for federal activity in this field. The passage of the Federal Warehouse Act was brought about in large measure by the condition of the cotton market in 1914. Within a few days following the outbreak of the World War, the cotton exchanges of Liverpool, New York, and New Orleans closed. There was no market for

cotton, although the banks of the North and East had ample resources. A precipitous drop in cotton prices to ruinous levels followed. Northern money could not be attracted to the South and southern banks were not in position to finance southern growers. Warehouse receipts in these circumstances appealed as effective instruments with which to tap sources of credit, but it was soon realized that the receipts then in circulation were of little value outside of the immediate territory in which they were issued. In order to attract capital from the North it was necessary to provide warehouse receipts carrying information that would enable bankers at a distance to appraise the market value of cotton covered by such receipts and that would convince bankers that there was responsibility back of the warehousemen issuing the receipts. Provision was accordingly made in the Federal Warehouse Act for requiring a statement of the grade on the federal warehouse receipt according to federal standards and for supervising the determination of the grades and the operations of the warehousemen.

As early as 1907 the need for federal standards was recognized in the appropriation act covering the work of the Bureau of Plant Industry of the Department of Agriculture and studies were initiated to provide the basis for such standards. The World War and the demand for food conservation and the elimination of waste, however, seem to have given the first substantial impetus to the development of federal standards and certification of farm products. The passage of the Cotton Futures Act in 1914 requiring the use of federal standards in future trading in cotton definitely established the Department of Agriculture in this work. The Grain Standards Act of 1916 required the use of federal standards in interstate commerce when grain was sold on grade. The United States Warehouse Act of 1916 also required that federal grades be shown on warehouse receipts except when depositors of products requested their omission. The Food Products Act of 1917, a war emergency measure for conserving food supplies, provided authority for the establishment of permissive or optional standards and an inspection service on fruits and vegetables as well as other products. These acts, together with the Cotton Standards Act of 1923, requiring the use of federal standards in all cotton transactions based on grade, and the inclusion annually of authority in the appropriation acts of the Department

of Agriculture have given the standardization and inspection service of the Department permanent legislative status.

INFLUENCES SHAPING FEDERAL STANDARDS

It is upon this ground-work of legislation that standards for farm products have been built. The standards themselves, however, are a product of evolution and have been shaped by conditions within and without the industry. It may be well to consider for a moment some of these influences.

Naturally, the standards reflect variations in agricultural commodities themselves. Farm products as contrasted with most products of industry present a wide range in qualities, because of varietal, environmental, and seasonal influences. In our extension efforts to eliminate undesirable varieties in agriculture, we have something akin perhaps to the "simplified commercial practice" of industry, but the process of eliminating undesirable varieties and undesirable qualities of the products of agriculture is a slow one at best and standards must be developed for agricultural products as they come from the soil in all their variation. Emphasis on quality factors, accordingly, will necessarily vary with the commodity. Foreign material, for example, is more readily removed from beans than from wheat; it is therefore given a different emphasis in the standards for beans than in the standards for wheat. Furthermore, farm commodities change with production practices. A class of wheat as grown today contains less admixture of other wheats than was true some years ago. This makes it possible and desirable to reduce the admixture of other wheats previously allowed under the standards. Aside from the variations in nature, some agricultural products lend themselves to mixing—a condition that is reflected in the efforts to formulate standards that permit desirable mixing but discourage objectionable mixing.

On the other hand, the demand for agricultural products is far from uniform. The preferences and requirements of consumers may vary materially from market to market, as well as from period to period. The Boston market, recent studies show, pays a substantial premium for green asparagus, while Springfield consumers, 100 miles or so away, disclose no like preference for color in this vegetable. The standards, admittedly, can not accommodate themselves to all gradations and shifts in consumer requirements, but

they seek to cover as far as practicable the major variations in market demand.

Then, too, changes in industrial technique or in methods of marketing may greatly alter the importance of quality factors or quality standards. As a result of revolutionary developments in methods of milling, hard wheat which previously sold at a discount now sells at premiums. In earlier times, before the development of modern transportation and cold storage facilities, cheeses were kept in curing rooms at factories until well cured. Today large dealers have facilities for holding cheese during the curing and ripening processes and both fresh and ripened cheeses find their way to the wholesale and consumer markets.

Nor should the fact be overlooked that the progress attained in research and standardization technique has a marked bearing on the formulation of the standards. The improved colorimeter, for example, permits the definition and measurement of the color factor with an accuracy never before possible. Progress in the field of price analysis is now making it possible to measure quantitatively the market importance of certain quality factors. But perhaps sufficient has been said to emphasize the fact that the development of standards for agricultural commodities presents peculiarly complex and difficult problems and that such standards must evolve with changes in the commodities and in the industry as well as with advances in technical knowledge.

GENERAL PRINCIPLES UNDERLYING FEDERAL STANDARDS FOR FARM PRODUCTS

Certain broad principles have come to be recognized as fundamental in the development of federal standards. In the first place such standards cover significant gradations in quality. The standards established for trading in agricultural commodities therefore are not the minimum standards of the pure food legislation and are not directly comparable with the commercial standards of industry. Instead, they cover all segments of the supply and afford a basis for trading in all qualities of the product.

The standards in the main reflect the normal spreads in the market value of a commodity. It is contemplated that steps between grades on the average will correlate fairly closely with the price differentials that obtain in the market. Until quite recently,

however, there has been no adequate measure of the price significance of separate quality factors; in fact, some quality factors affecting prices may not yield to statistical measurements. Observation and judgment, therefore, must be employed in measuring the market significance of quality factors while more adequate measurements are being devised.

On the other hand, we cannot expect the relationship between the grades and market price differentials to remain constant. The price spreads between grades of a product frequently are influenced by the relative supply of the product that falls within each of the grades. But apart from the influence of variations in the supply upon price differentials, it is apparent that these differentials are not always based upon differences in the intrinsic or objective value of the product. In other words, premiums and discounts may reflect buyers' opinions as to value which do not always correspond to intrinsic value. Prior to the adoption of federal standards, for instance, "pea-green color" was the factor of quality in alfalfa hay which commanded a premium. Studies have disclosed that the feed value of alfalfa hay correlates more closely with its leafiness, and the factor of leafiness therefore is given greater emphasis than color in the standards. The influence of the standards and the educational work accompanying their introduction is reflected, it is believed, in the steadily increasing premiums paid for "leafy" as compared with "pea-green" alfalfa.

Thus for some commodities standards are formulated that express the relative food, feed, processing or manufacturing utility of the product. Such standards, even though they may not always correlate closely with price differentials, assist in bringing about a better adjustment between prices and variations in quality.

A still further requirement of the federal standards is stability from year to year. They are not shifted from season to season depending upon the quality of the crop. On the other hand, the standards are not static but are flexible in the sense that they are adjusted from time to time to significant longer-time changes in the character of the product and in market requirements, and to progress in technique.

The standards are uniform within reasonable limits throughout the country. Federal standards are national in scope and cannot vary from region to region. They therefore cover characteristics common to products grown in all major regions and do not re-

flect the characteristics that are peculiar to products in only limited areas, except where differences in the quality of a product are so marked as to differentiate them as separate classes of the product.

In the standardization work of the Department of Agriculture it is deemed important that the standards be thoroughly practicable in the buying and selling of farm products. Established trade practices are reflected in the grades as far as possible, and every reasonable effort is made to secure the adoption of the standards by the industry. Although the federal standards in many cases have replaced the private standards or brands previously prevalent in the industry, the experience of the trade with private standards has played no small part in the development of the federal standards.

STRUCTURE OF THE FEDERAL STANDARDS

A consideration of the structure of the federal standards would lead us into a technical field with which it would be impracticable to deal at this time. The factors selected to represent quality naturally vary with the commodity. Cotton is graded primarily on the basis of color and freedom from trash, while length of staple is dealt with separately. Grain is graded on numerous factors of quality, among which test weight, moisture content, foreign material, damage, and the various factors of condition, such as coolness, heating, sweetness, sourness, and so forth, are of fundamental importance. The wool standards are at the other extreme and at the present time are based on only one factor, the diameter of the fiber. It is well to observe here, that standardization has not progressed equally in regard to all commodities. For some products, much remains to be done before all significant factors of quality can be adequately appraised and given their place in the grades.

The emphasis placed upon quality factors likewise varies with the commodity. Color, for instance, is more important as a factor in the market value of hay than of wheat. Even in hay, color is regarded as a more important index of quality in timothy than in alfalfa hay. In the case of some factors it is possible to apply accurate measurements, as of the moisture of grain and the color of hay. In the case of other commodities, such as livestock, the present resort must be to purely descriptive terms. For some com-

modities, moreover, the quality factors are weighted in arriving at the grade, whereas in others this is not so feasible.

The points at which the upper and lower limits of grades are placed likewise differ with commodities. The limits of a grade must be wide enough apart to avoid technicalities that impair their practical use. On the other hand, if the limits are not reasonably narrow, significant differences in quality between commodities near the bottom and those near the top limits of the grade will result. Naturally the success of a grade in reflecting the market value of a product will depend upon the completeness with which it deals with the factors influencing price and upon the range of quality permitted within it. It will thus be seen that in the formulation of grades each commodity presents a problem by itself.

PROGRESS IN MORE ACCURATE MEASUREMENTS OF QUALITY FACTORS

The quantitative measurement of quality factors in agricultural commodities presents unusual difficulties, and researches to date have not developed mechanical or chemical tests with which to measure all factors of quality. In fact, the standards are still more or less empirical, and grading according to them, to a large extent, rests upon the expertness of the grader.

It is an encouraging fact, however, that greater definiteness in the specifications of the standards and in certification according to them is gradually being attained. This is the result of research. Ten years ago only a few mechanical and chemical tests were used successfully by the Department of Agriculture in measuring quality factors; today such tests are constantly increasing in number and efficiency. Ten years ago such tests were applied in the case of only three or four commodities as compared with many commodities today.

Where previously it was necessary to describe in general terms a factor of quality in a commodity, it is now possible to give that factor specific value in the standards. Three of the factors of quality in grain—moisture content, test weight, and cleanliness—lend themselves to determination by chemical and mechanical tests. A new device for determining the moisture content of grain, based on the principle of measuring the resistance to an

electric current as it passes through a body of grain, is in process of development and promises to replace the old method commercially. The new method requires only thirty seconds for a determination as compared with forty minutes under the old method.

Both the Federal Department of Agriculture and the state departments of agriculture have employed technical tests for some years in measuring certain quality factors in fruits. The saccharimeter is used in determining the sugar content of grapes in accordance with the standards. The sugar acid test for maturity of citrus fruits and the specific gravity test for maturity of cantaloupes are employed by several states in the enforcement of state laws prohibiting the shipment of immature fruit. In the examination and grading of canned fruits and vegetables a pressure gauge is used to ascertain the "vacuum condition" of the can, the density of sirups is tested with hydrometers, brine solutions are tested with salinometers, and penetrometers are used in determining the consistency of such products as canned pumpkin. With the colorimeter it is now possible to measure with satisfactory definiteness gradations of color in hay, cotton and honey. The development of an improved cotton-fiber sorting machine permits the measurement of the uniformity of fiber lengths with a high degree of accuracy. With the bundle fiber test the strength of cotton fibers can also be ascertained.

Additional tests, such as a mechanical device to measure the maturity of canned corn, the fruit pressure tester to determine the maturity of plums, apples, and pears, are now in process of development. Studies in the field of price analysis are showing us how better to evaluate quality factors from a market point of view. Studies of the palatability of such products as meat are expected to help establish the relationship that exists between external evidences of quality and the quality of the product itself.

The tendency throughout is to substitute, wherever possible, accurate technical tests for human judgment in the appraisal of quality factors, but it admittedly will be difficult to devise technical tests with which to measure quantitatively such factors of quality as flavor and odor. Furthermore, the tests must be of a simple and practical nature if they are to serve in the commercial certifying of commodities. But even though the difficulties to overcome may be numerous, the possibilities in this field are well-

nigh limitless. Encouraging progress, moreover, is being made on this type of research.

LIMITATIONS OF THE FEDERAL STANDARDS

It is freely recognized, of course, that the federal standards have their limitations. Because of their very nature it can not fairly be expected that they would meet all requirements of producers, consumers, and dealers. Some hold that the standards are couched in too general terms; that they are too purely descriptive and do not afford an adequate basis for measuring variations in quality. There is merit in this suggestion but the difficulty inheres in the product itself, and the limitations of our knowledge. There is at present no known method of measuring quantitatively many quality factors and there is therefore no alternative in these instances to descriptive terms based on observation and judgment. Fortunately, researches are yielding more and more accurate measures of quality factors.

Some of the present grades, it has been found, do not adequately reflect market values, but in general there is a reasonably close correlation between the grades and market prices. The price studies of quality factors now under way are yielding valuable information in this connection. Although confined to but a few markets, these studies are showing that the grades for some products are satisfactory for those markets, whereas the grades for other products are less adequate. Some adjustments in grades have already been made as a result of these studies.

It has been suggested that the margin between the upper and lower limits of some grades is too wide and that they do not adequately reflect qualities peculiar to the products of various regions. The purpose of national grades is to serve the entire industry; this makes it impracticable to narrow the grade limits to the point where they cover all gradations in quality. It is believed that the characteristics of a commodity that are peculiar to a region and that have market value may well be covered in additional comments, made by those locally interested, to supplement the federal grades.

Perhaps it may be found, as some have suggested, that different sets of standards may prove desirable at different stages in marketing. Special consumer grades specifying qualities with-

in narrower limits may be found more practicable for the consumer at retail than are the present grades so largely used in wholesale transactions. It is worthy of observation that at least some of the federal standards lend themselves to successful use in retail channels. This is true of the standards for butter, cheese, poultry, eggs, and meat. In general, the question of consumer grades is one of the many standardization problems still awaiting solution.

ADOPTION AND USE OF FEDERAL STANDARDS

After all, the best test of the practicability of the standards is the use to which they are being put. The federal standards have not as yet completely established themselves in all parts of our agriculture. By some groups their adoption and use is even vigorously opposed. But it must be remembered that the standardization program of the Department of Agriculture has been in progress for the brief period of only fifteen years. In that short time federal standards have been widely adopted for use in this country and even in many foreigns lands.

Some of the federal standards are mandatory and their use is required in interstate transactions based on grade. This is true of the standards for both cotton and grain. Federal standards must also be used on federal warehouse receipts except where depositors request that grade certification be omitted. On the other hand, all other federal standards are of a strictly permissive character and their use is wholly voluntary, except that certain states have made the use of certain federal standards obligatory under specified conditions.

Since 1914, standards for practically every agricultural commodity have been issued. Within each commodity may be several classes or types for which separate sets of standards have been provided. In many cases these standards have been adopted as official standards by states, exchanges, and associations. Ten years ago, for example, thirteen states had their own grades for barrelled apples; today only five have such grades. Under a special agreement, reached in 1923, with the European cotton exchanges, the grade standards for cotton were issued as Universal Standards. The standards for grain and other commodities are also receiving recognition in many foreign lands.

Perhaps the most concrete evidence of the usefulness of the

federal standards will be found in the records of the inspection service. Certification under the standards is made in large part by inspectors licensed by the Department of Agriculture. Unfortunately a common basis for comparing certification of the various commodities is not available. The certification of grain and cotton according to federal standards is mandatory when the commodity is sold according to grade; for other commodities certification is wholly voluntary. Under these mandatory requirements a total of 1,353,800 carloads of grain were inspected in 1918-1919; ten years later (1928-1929) these inspections had mounted to 1,916,940 carloads, an increase of 42 per cent. Similar data covering inspections by licensees are not available for cotton, but the increased distribution of type samples and the growing number of licensed cotton classers are indicative of the growing use of federal standards in the merchandising of cotton.

The record of inspections under the purely permissive standards is a varied one. In all commodities there has been substantial progress, in the volume of products inspected, although in the majority of cases the inspections account for only a small percentage of the commercial supply, ranging from less than one per cent in meats to as high as 80 per cent in the case of potatoes. For a group of products as a whole, the use of the permissive standards is perhaps most marked in fruits and vegetables. In 1918, the inspection of fruits and vegetables covered slightly over 6,000 carloads; by the current year the quantity inspected amounted to over 288,000 carloads, representing better than 25 per cent of the carlot movement for the entire country. The use of standards by the fruit and vegetable industry has expanded markedly at shipping points; 94 per cent of the certificates issued during the current year were based on federal grades, and 85 per cent of all inspections were made at shipping point. This growing use of inspections at shipping points forcefully illustrates the value that shippers attach to the service. When this is coupled with the further fact that the inspections are made for a fee and that the shipping point inspection is practically self-supporting it becomes evident that this service is selling itself.

The desire for standardization and certification of farm products recently has taken some new directions. Canners expressed a wish to purchase vegetables from producers on the basis of grades, and canning-tomato grades were accordingly issued in 1926. This

year 57 canners, located in ten states, indicated their intention of contracting with their growers for the 1930 crop on the basis of federal grades.

Standards for canned fruits and vegetables are fast becoming an important factor in the financing of the canning industry. More recently the demand has materially broadened to cover their use in the buying and selling of canned foods. Under present legislation, however, the use of federal standards for canned fruits and vegetables is limited to products stored in federally licensed warehouses. The growing demand for this service on canned products for merchandising purposes is illustrated by the stipulation of a large chain grocery company that all canned tomatoes purchased for its account have to be shipped to federally licensed warehouses, the avowed purpose being to have the goods inspected on the basis of federal standards.

ECONOMIC VALUE OF FEDERAL STANDARDS AND CERTIFICATION

In the short span of a decade and a half, federal standardization and certification of farm products have become integral parts of our agricultural structure. It now remains to perfect this service. With all the shortcomings of present standards, the advantages of national, uniform, and reasonably definite standards over the old hodge-podge of local, vague, and conflicting trade standards and brands are apparent, and producers, dealers, and consumers are recognizing to an increasing degree the benefits accruing from their use.

For the first time in our history the country as a whole has a common language in which to express gradations in the quality of farm products. Federal standards provided this language. This was a fundamental step in agricultural marketing. The standards supplied an indispensable basis for price quotations the country over, and made possible a comprehensive nation-wide market information service reaching all major markets. These Siamese Twins—federal standards and market news—have brought widely separated buyers and sellers closer together. They have helped the farmer to obtain the price to which the quality of his products and the condition of the market entitle him. The flat, average price paid to the producer for his product, irrespective of its quality, is not a thing of the past, but its heyday is passing.

This double service has helped to make the farmers' market

world-wide. The area over which demand can operate sensitively and quickly has been vastly broadened. The distant buyer can purchase on the basis of grade and be reassured, within narrow limits, as to the characteristics of the product he buys. Under such conditions every product, according to its quality, is helped to find its most advantageous market.

The guarantees of quality afforded by an impartial national service of standards and certification not only broaden the market, but reduce the merchandising risk incident to undesirable or fraudulent deliveries on contracts Such risks are usually covered in the prices offered by the buyer, and this levy upon the dollar of the producer and consumer will be materially reduced, it is believed, with the general adoption of the federal certification service.

Needless to say, federal standards and certification have greatly facilitated future trading in agricultural commodities. In future trading the buyer can not choose the particular seller with whom he will trade; his protection therefore must be in the accurate certification of the product under standards that adequately describe it. This protection is a necessary safeguard to future prices, for without it the disposition of the buyers would be to "run from the delivery," and thus withdraw support on the buying side and create pressure on the selling side.

It is the general observation of those associated with the inspection service that federal standards and certification have facilitated a meeting of minds between buyer and seller and placed the ethics of the market place on a higher level. Where the service is regularly used, deception and fraud by either buyer or seller are more difficult. Pernicious practices, such as undergrading and unjustified rejections, which have been all too common in the merchandising of some products, thrive less well in the spot light of federal inspection. But unfortunately, education and service alone seem unable to purge the industry of some mal-practices and resort must be had to regulatory legislation, such as the Perishable Agricultural Commodities Act, passed in the recent session of Congress, which requires the licensing of carlot dealers in fresh fruits and vegetables and the supervision of certain transactions in that trade. In the administration of this far-reaching piece of legislation—and this accounts for the introduction of this thought—an effective arm of the Department of Agriculture will be its standardization and inspection service.

The reflection to producers of price differentials according to quality is registering an influence upon agricultural production, though perhaps not as rapidly as we should like. But farmers are sensitive to the price incentive—in fact one is led to wonder at times if they are sensitive in their production plans to anything else. The shifts, for example, that have taken place in the production of fruit and vegetable varieties indicate that farmers are responsive to price differentials and seek to produce what the public wants to buy.

But the all-important element in the standardization program—grades on which individual consumers can buy—in my opinion has been passed over all too lightly. What chance does the housewife with her limited knowledge of the factors affecting quality have before a slab of red meat or a shelf of tin cans covered with colorful and beautifully embossed labels that tell nothing? And yet what guides to quality have we supplied her? A limited number, yes. The stamping of meat cuts, the tagging of turkeys, and the certificate in the pound of butter, constitute a partial response to this demand, but we must go much farther. Until the individual consumer thinks in terms of qualities and buys on the basis of grades that signify quality, there can not be the most sensitive adjustment of price to quality.

The Department of Agriculture is devoting a substantial part of its resources to the development of standards for farm products. To some it may even appear that standardization has become somewhat of a fetish with the Department. Be that as it may, federal standards are a means to practical ends. Without them the basic facts of the markets could not be had in comparable and understandable form. Without them merchandising farm products on the basis of quality would be seriously crippled. And without them the basic materials of economic research would lose much of their meaning and usefulness.

THE PURPOSE AND DEVELOPMENT OF FEDERAL STANDARDS FOR CERTIFICATION OF FARM PRODUCTS IN THE UNITED STATES

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IF FEDERAL standards coupled with official certification of grade are to become generally used in agricultural marketing, the members of the trade must be convinced that such standards are practicable and that they can be used to advantage by those engaged in moving the products from the farm to the central markets. We live in a commercial age and anything new must pass the acid test of proving itself an aid to commercial life.

Agriculture has grown from a very simple type of business into a great complicated commercial organization or groups of such organizations. At no great time back, producer and consumer were closely associated—relationships and contacts were personal. Today, we produce crops where soil and climate are best adapted, forgetting almost entirely for the moment, who the consumer may be or where he may live. This great fundamental change, brought about by rapid transportation and improved methods of communication, accounts in a large way for many of our agricultural problems and likewise explains many of the changes we find in methods of marketing.

When the farmer took his own products to market and sold them direct to the housewife, there was little need for a standard basket or barrel, or for grades established by law or promulgated by any governmental agency. The housewife used her own judgment and there existed the personal relationship between producer and consumer. No such condition exists today, however, between the grapefruit producer in Florida and the buyer of a single fruit in a store in Chicago. Sixty thousand carloads of grapes are grown each season in California but no grower there has made delivery direct to a consumer. There exists no longer the old personal contact between the farmer and the consumer of the products from his fields.

When production reached a point where cars were being loaded at outlying points, more or less distant from the markets, the consignment method of selling grew in popularity. Here the buyer and the product were brought together by sending the commodity

to the buyer. A certain uniformity of the pack was needed for good results but still there was no great demand for established grades since the buyer always had the opportunity of examining the products personally.

A later development was for the buyer to journey to the point of production and there inspect the carloads personally and make his purchases on the basis of the quality he found. Again the buyer and the commodity were brought together, but the expense involved was constantly increasing.

As time went along, however, the advantages of a standardized commodity were recognized. Retailing establishments covering a wide territory were buying in large quantities and needed uniformity in their commodities. Large distributing agencies were handling thousands of cars, distributing them in many markets, all of which tended to force better standards for agricultural commodities.

Finally, as standardization continued to improve, buying and selling was done more and more by telegraphic service and a common language between buyer and seller was needed. It would be impossible to describe accurately over a wire service the exact quantity and condition of each car of produce, and the necessity of having well established and thoroughly understood grades in the agricultural marketing field became apparent.

With the need for grades established, the next consideration is as to how and by whom such grades shall be made. The past twenty years have demonstrated that, with our agricultural commodities scattered so widely and with the flow of goods between states of paramount importance, the logical place for standardization work to head up is with the Federal Department of Agriculture.

Naturally, there has been a great amount of skepticism on the part of many in the trade as to whether civil service employes in the Department of Agriculture were sufficiently acquainted with trade practices to develop satisfactory standards on which millions of dollars of merchandising could be done. With each year of work, however, more confidence has been established and a greater use has been made of grades established on a voluntary basis.

With but few exceptions, the trade now recognizes the value of a uniform grade for farm products. Quite generally also, the soundness and practicability of grades established by the Federal

Department of Agriculture are admitted. There are, however, some wide differences of opinion on the part of the trade as to whether the government should force mandatory standardization upon any agricultural commodity group or whether better standardization should be the outgrowth of education.

This really brings us to a discussion of the second part of the topic assigned, namely standardization for the purpose of certification. Certification of grade and condition of any commodity by the Federal Department of Agriculture represents a type of service which has grown in popularity greatly during the past ten years. It is destined to become an ever increasing service in American agriculture.

The process is simple and the method fits into our modern ideas of doing business. After careful research by trained men, tentative grades for any agricultural commodity are published. Public hearings are held throughout the districts where the particular commodity is an important one. Producers and members of the trade are given an opportunity to express their ideas regarding the tentative grades. More research work may be required; the grade specifications may need rewriting. Finally, however, the Federal Department of Agriculture issues a set of tentative grades, not mandatory in any way, but simply official grades promulgated by the Secretary of Agriculture of the United States for those who desire to use them on a voluntary basis. These grades are supplemented and greatly strengthened in the case of numerous commodities through an act of Congress which permits officials of the Federal Department of Agriculture to inspect a carload of produce on the basis of the grades already promulgated and to issue a certificate which, by law, is made *prima facie* evidence as to the quality at the time of inspection.

Under this method, the apple shipper in the Pacific Northwest can issue quotations on the basis of government grades providing for an inspection certificate to accompany the bill of lading and, with buyer and seller both understanding the grade specifications and with a disinterested public official making the inspection, both are guaranteed a square deal and thus business is greatly facilitated.

The inspection and certification constitute a well defined service which is paid for by the party requesting the service. The tax payer is not compelled to pay the expense of a service which is

maintained chiefly in the interest of a few. The growth of this kind of service during the years since it has been available indicates the confidence the trade has in it. Let it be said in honor to the men in the public service, that the complaints against the honesty or integrity of inspectors have been almost nil. Let me emphasize again that this kind of standardization work is entirely voluntary. In the opinion of the writer, this type of service should always precede any attempt at making grades that are mandatory.

The discussion, so far, refers chiefly to a class of business that we consider as spot or cash business. It is the common merchandising business of moving the commodity from point of origin to consuming markets or, in some cases, to cold storage plants in cases where the buyer chooses to purchase at harvesting time, a surplus to be used at later periods. We now come to consider the more advanced type of marketing known as future trading.

The foundation of future trading and all futures contracts rests on thoroughly understood and accepted grade terms. In all commodity exchanges where future trading has been conducted in an organized way, the exchanges have at first determined their own bases for such trading. Likewise, the inspections have been performed by employes of these exchanges. The importance of a set of standards has always been recognized. At times, however, it has been difficult to carry out an inspection system without bias or without undue influence being exerted by traders who were vitally interested in a market position.

Standards set by the Federal Department of Agriculture have, therefore, been quite generally used as the basis for future trading. Some standards, such as those for cotton, have been imposed by legislation for exclusive use on the commodity exchange with the officials of the Federal Department of Agriculture charged with the responsibility of passing upon the commodity as to whether good delivery has been made by the seller.

With other commodities, the government standards play a very important part even though the standards are not set up on a compulsory basis. The extensive future trading in grain is all carried out with standards based upon government work. Butter standards for future trading on the Chicago Mercantile Exchange are, for all practical purposes, the official governmental standards and the time will doubtless come when the certificates issued by the

Bureau of Agricultural Economics will be the basis for the Exchange certificates for all deliveries.

It can, therefore, be seen that great progress has been made in the past twelve or fifteen years in developing federal standards for agricultural products and in securing a very general adoption of such grades by the trade. Millions of dollars of produce are bought and sold annually with the buyer depending entirely upon an official inspection certificate as his guide. This means increased efficiency in marketing. Loss of time and travel expense are avoided by this more direct and business-like method of merchandising farm commodities.

With an ever increasing development of large-scale organizations in the field of marketing this increased use of federal standards makes it possible to direct the distribution of many crops much more effectively, and each city is able to secure its particular needs more efficiently. After all, the great problem in distribution lies in taking the products from the farms and packing houses and placing them as to time and condition where the consumer wants them and is willing to pay for them. Uniformity in standards facilitates this great task. The federal government is the one agency to which we should look for taking an aggressive position in advancing the cause of better standards. They have done a good work so far and with the support and cooperation of the trade, still greater progress can be expected in the future.

MACHINE PRODUCTION AND THE PRICE OF WHEAT

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UNDER the influence of machine production and other factors, the price of wheat has fallen to low levels. In July, 1930 the highest price for No. 2 hard winter wheat at Kansas City was 93 cents a bushel. In comparison with the wholesale prices of other commodities, hard winter wheat had a purchasing power of 72 per cent in July, 1930 when the five year period, 1910-14, is taken to equal one hundred. Other classes and grades of wheat have suffered similar declines in price.

In this discussion, no attempt will be made to determine quantitatively the relative importance of the various factors which may influence the price of wheat. Rather, an attempt will be made to describe some of the conditions contributing to the present situation and some of the changes that have resulted from these changed conditions of which low wheat prices are the most apparent evidence. Particular emphasis will be placed upon the increased use of large-scale machine methods in wheat production in the western portions of the United States.

Brief mention may well be made of some other factors influencing wheat prices in the United States at present. Wheat production has been expanded in many important wheat growing countries. The wheat produced in three crop years, 1927-28, 1928-29, and 1929-30, gave the world the largest three-year supply of wheat in all history. As a consequence, the annual carryover of old wheat into new crop years has increased to record breaking figures, and prices have declined precipitously.

In the hard winter wheat belt of the United States significant changes in wheat production methods have occurred in recent years. Better adapted and higher yielding varieties have been developed and are now widely used. Better methods of preparing the seedbed, as compared with the methods in common use ten to fifteen years ago, are now generally practiced. These better varieties and improved methods are resulting in higher and more certain yields and reducing the hazards of wheat growing in the Great Plains region. Other wheat growing sections of the United States have made similar improvements in wheat production. These changes

have tended to lower the cost of wheat production and to maintain the total production of wheat in spite of lower prices.

The demand for wheat has also undergone changes. In the United States the home baking of bread has been decreasing and baker's bread is much more commonly used than twenty to thirty years ago. As a consequence, the demand for the high protein wheats has increased. There have been significant changes in the food habits of people. Thirty years ago the average per capita consumption of wheat and wheat products in the United States was 5.4 bushels. At present, it is 4.2 bushels. Fruits, vegetables, dairy products, and other foods have partially displaced bread and other wheat products in the diet of the average American. Also, in making bread, products other than wheat flour are now used to a greater extent. Similar changes in wheat consumption appear to have taken place throughout the world excepting in certain Oriental countries where wheat consumption has increased.

Changes in tariffs have also played an important part in producing the present situation. In 1923, wheat was admitted free of duty into Italy and Germany, while France had a duty of 30.52 cents a bushel.[1] At present, Italy has a duty of 86.67 cents a bushel, France, 85.35 cents, and Germany, 97.24 cents. These duties average nearly fifty per cent higher than the total price received for wheat by United States farmers during the harvest of 1930. Obviously, these high tariffs imposed by important wheat importing countries have a significant effect upon wheat prices in both importing and exporting countries. However, the mere statement of the tariff rates on wheat does not tell the whole story. There is the interaction of tariff rates on all commodities and their effects upon international trade. Furthermore, tariff rates may not be fully effective either because of their actual working in international trade, or because they are not fully applied to all of a commodity that is imported. These matters are mentioned to indicate the influence of tariffs on wheat prices. Any adequate treatment of the subject would far outrun the bounds of a paper such as the present one.

Also in any treatment of the subject the United States tariff act of 1930 would figure prominently. Perhaps enough has been said to indicate why no attempt has been made to consider quantitatively

[1] See Wheat Facts, Part I, Page 22, of the Bureau of Agricultural Economics, United States Department of Agriculture, July, 1930.

the relative importance of the many factors influencing wheat prices.

In addition to the factors that have been mentioned, the increased use of large-scale machine methods in wheat production in many wheat growing regions has had a prominent part in creating the present situation. Machine production of wheat began in earnest following the invention and introduction of the twine binder in the period 1860-1870. Wheat production in the United States was rapidly expanded on the level, fertile prairies of the middle western portion of the United States where free land was available. The wheat industry of the United States began to migrate westward and has been migrating westward ever since. Wheat prices, under the influence of the increased and lower-cost production accompanying the introduction of the binder, declined to low levels. The acreage of wheat grown by one farmer was increased by the use of the binder and, in turn, the size of the usual wheat farm increased.

As the wheat belt moved westward, the header came into use and added impetus to the movement toward larger acreages of wheat per farmer and larger farms. The header, a machine that merely cuts the heads of wheat and elevates them into a barge in which they are hauled to a stack, reduced costs of production and aided in extending the wheat belt further into the drier regions of the Great Plains.

During the late part of the recent World War, a third step in increased use of large-scale machinery in wheat production was taken. Under the impetus of a scarcity of farm labor and high wages, a few farmers commenced using small types of the combined harvester thresher, a machine that had been used in the Pacific Northwest of the United States for many years. This machine cuts and threshes the standing grain in one operation. It was found that the combined harvester thresher was well adapted and that it reduced harvesting costs approximately one-half. Furthermore, the acreage which can be handled by this machine in one season is approximately twice the capacity of a header and the trend toward larger farms was given new impetus. In attempting to use the newer machines efficiently wheat farmers increased the size of their farms by purchasing or leasing nearby land or by disposing of their farms in the older wheat growing sections and

moving westward to new land which they broke from the prairie sod and brought into wheat production.

The influence of these three machines, the binder, the header, and the combine, on wheat production in the United States has been toward larger farms, larger acreages of wheat per farm, and lower costs of producing wheat. The introduction of the binder more than doubled the acreage of wheat which one farmer could produce efficiently. This acreage has been doubled twice since then, once when the header came into general use and again with the introduction of the combine.

The combine should not be given all of the credit or blame for the recent expansion in the acreage of wheat in the western Great Plains region. The tractor and the truck and other large-scale machines have played an equally important part. In 1915 there were approximately 2,500 tractors in Kansas which is the largest producer of wheat of any of the United States. At that time, it was seriously questioned if the tractor would ever be satisfactory for field work. Since then the farm tractor has been materially improved and is now generally used in wheat production. Kansas has more than 50,000 tractors and other wheat growing states have proportionately as large numbers. Many farms depend entirely upon mechanical power.

The truck has also come into general use on wheat farms. The development of good highway systems has aided in making this possible. Ten to twenty years ago, all wheat was hauled to the local elevator or shipping point by horses. Now practically all of it is hauled in motor trucks. The farm that is ten or more miles from its nearest shipping point formerly was at a distinct disadvantage. Good roads and the truck have wiped out much of this disadvantage.

The use of these large-scale machine methods has not extended to all parts of the United States. They are best adapted to the fertile, level lands of the Great Plains region. Portions of the United States that could not use these machines have tended to reduce or eliminate wheat production from their farming systems. The history of wheat production in the United States has been one of migration ever westward, the increased use of machine methods and the lowering of costs per bushel.

The wheat industry in other important wheat growing countries

has undergone similar changes. Canada has been, and still is, materially expanding her wheat acreage in the western prairie provinces. Argentina and Australia have also expanded wheat production. Soviet Russia is endeavoring to encourage machine methods on her collective farms and on the government operated lands. In all of these countries and also in others, large-scale machine methods are becoming more important in wheat production.

The effect of these and other influences has been to increase wheat production in many parts of the world and to reduce the cost of producing a bushel of wheat. As a consequence, competition for world wheat markets is becoming more and more intense. Inasmuch as the United States, Canada, Australia and other countries have large additional areas that can be brought into wheat production with present methods it seems probable that this severe competition will continue with low wheat prices in all wheat exporting countries.

The shifting of the wheat industry and changes in its character in the United States have produced pronounced effects in ways other than price changes. The increased use of combines has resulted in earlier and more concentrated marketing of the crop. The combines harvest, ready for market, millions of bushels of wheat within a few weeks. Prior to 1926, wheat receipts at Kansas City during July never exceeded 15,000 cars. In 1926, they were 22,970, in 1927, a short crop year, 14,036, in 1928, 25,499 and in 1929, 25,511 cars. This market in the last five years has been receiving approximately fifty per cent of its total wheat receipts in the two months of July and August, and in 1929, approximately 40 per cent of the year's receipts came in July. This movement affects local elevators, transportation systems, terminal markets, and all other agencies aiding in the movement of the crop. It produces problems in marketing, transportation, storage, and other fields.

Within the regions growing the wheat, many problems have developed. Among these are questions of the most desirable size of farms, the best combinations of enterprises, the tenure of the land, the improvements on the land, the desirability of farm storage and local elevator storage for wheat, the place of livestock in the farming systems and many others.

The situation is one of unusual interest to farm management research workers. Large-scale production has taken the form of

large corporation farms in some instances. However, most of the farms are of the one family size. These two groups present opportunities for distinctly interesting and useful studies of relative efficiency in production and other economic problems.

The social conditions of the community are also of more than passing interest. Many of those farming the land reside in nearby towns. This has not been typical of American agriculture in the past. Will a portion of American agriculture be of this type in the future? It is sometimes said the American wheat grower works but three months of the year. This is not true of many of them. It is true that they are employed as wheat farmers but three or four months of the year but many of them have other employment or other interests during the other months of the year.

The influence of the increasing size of the average farm on farm population and through population on schools, churches, and other community institutions, provides still further interesting social problems. On the other hand, in the older regions, the withdrawal from wheat production is not accomplished without problems. In general, the factors bringing about low wheat prices are producing all of the problems of a shifting and, in many sections, a growing agriculture. These problems invite the best efforts of research workers in agricultural economics and related fields. The research workers of the United States are attacking these problems vigorously and are securing knowledge that is of great value in aiding toward the solution of these problems.

FACTORS AFFECTING THE TIMING OF WHEAT PRICE MOVEMENTS

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I AM very sorry indeed that Dr. Stine is unable to be here to take the place assigned him on this program. The pressure of work which could not be put aside has prevented his either attending this meeting or preparing a paper for me to read before you. I am sure that you are also sorry, for what I have been able hurriedly to gather together will be a poor substitute for a paper prepared and presented by Dr. Stine.

The title assigned is: "Factors Affecting the Timing of Wheat Price Movements." This seemed to me, when I first considered it, a strange title. The more I considered it the stranger it seemed, for I became more and more uncertain just what was intended to be discussed. Titles with double meanings are not uncommon, perhaps, but here is a title with a triple meaning—indeed I am not sure that more than three interpretations may not be given it. Perhaps it was intended that there should be three interpretations—hence three people were assigned to the topic with the hope that each would proceed from a different point of view.

One thought which the title suggests may be stated as follows: We find certain things which are closely related to wheat prices—changes in these things apparently causing changes in prices. Thus we know that crop conditions affect prices through their influence upon production, and changes in crop conditions may normally be expected to be followed by changes in wheat prices. Factors, then, which affect the time when crop conditions change are, indirectly, factors which affect the time of wheat price movements. Some of these relationships are quite simple. Crop conditions are subject to change during the period when the crop is growing; indeed they are most subject to change during relatively short "critical" periods of growth. Though somewhere in the world wheat is always in a "critical" period of growth, the bulk of the world's wheat is grown in the temperate regions of the Northern Hemisphere so that there are relatively short periods of time when the wheat market is especially subject to the influence of changes in crop conditions. Thus it is, that mid-summer is one of the times when signi-

ficant wheat price movements are especially likely to originate. There are other relationships of this general sort which are more complex, but nevertheless it is possible to determine the approximate time when the most important sorts of wheat price influences are especially subject to change.

Another approach to the subject is through a consideration of what we may call the "market mechanism" and the influence of this mechanism on the timing of wheat price movements. There are many and diverse aspects of the question which may be delved into from this viewpoint. At the one extreme is the broad and general effect of a speculative system upon price movements—the tendency for prices to depend upon the prospect for future supplies and future demands, rather than upon present available supplies and the immediate demand for consumption. As a result, the timing of price movements tends to coincide with changes in supply prospects rather than with changes in immediately available supplies. At the other extreme is the tendency of the market mechanism itself to generate price changes. Established practices as to margin requirements, the use of stop-loss orders, the existence of ticker service; these and many other of the minor institutions of grain trading appear to have their influences upon the timing of the minor fluctuations in prices and in some cases even upon the major fluctuations. Even the regulations and practices of the railroads as to car demurrage and the declaration of embargoes have their importance.

The third line of approach which the title suggests is a consideration of those factors which seem to interfere with what we deem to be the usual relationships between price influencing occurrences and the resulting price changes. But if we consider things of this sort to be the factors which affect the timing of wheat price movements we need not confine ourselves only to those factors which seem to interfere with "normal" relationships. There may be no given lapse, between a recognized price influencing occurrence and the resulting price change, which is frequent enough to be called a usual relationship. Rather the lapse of time may be of such varying length as to suggest a finely graduated quantitative relationship between the lapse of time and some other factor or factors.

It is this third line of approach which I wish to pursue somewhat further in discussing the factors which affect the timing of

wheat price movements. I wish to include both those factors which appear to interfere with the normal timing of price movements and those which appear normally to have an influence upon the lapse of time between what we may call the "fundamental" price influencing occurrence and the resulting price change. There is of course no precise line of demarcation between the factors which influence the timing of wheat price movements and the factors which we consider to be the "fundamental" price influencing occurrences. Nevertheless, there may be some merit in trying to draw a broad distinction between them.

In order that our thoughts may be a little more concrete let us turn for a moment to the current wheat price situation. During July and August we had in the United States a most unusually severe deterioration of the corn crop. Because wheat prices are so low we have reason to believe that the situation will have a very marked effect upon the amount of wheat which will be fed during the coming year. But what of its effect upon wheat prices? There seems thus far to have been almost no effect. For a short period about the first of this month, wheat prices responded and rose rapidly, but the effect was very short lived and prices of wheat again declined despite the maintenance of a higher level of corn prices. The significant effect, if there is to be any, appears to have been postponed to some later date.

While an examination of past years reveals exceedingly few cases when corn prices were about as high as, or higher than, wheat prices, nevertheless such cases as do appear suggest to me that the effect upon wheat prices this year might have been very different had there been a difference in the attending circumstances. Furthermore, as one looks back through the history of wheat crops and prices there appear to be numerous instances where the full response of prices to the improvement or the deterioration of crops has been considerably delayed as compared with other instances where the response has been immediate. These instances suggest two rather different ways in which price making influences may operate in the world wheat market.

We often hear the statement that the price of wheat is made in the Liverpool market. Any good economist who has considered the question knows the error of taking the statement too literally, for he knows that the supply and demand of every wheat producing and consuming country which enters into international trade has

some effect upon the price of wheat in international markets. Nevertheless, the statement is not the result of an entirely baseless assumption. Rather it is based upon a very significant tendency for the wheat markets of the world to move up and down with changes in the balance between the current requirements of importers and the current supplies being received from exporters. In a very real sense the Liverpool and other import markets are focal points where the forces of supply and demand of the world wheat trade meet and arrive at a series of supply-and-demand equilibriums. As the importing markets have quite limited facilities for storing wheat, prices tend to be very sensitive to the balance between receipts and takings in these markets.

The world trade, however, presents a picture of a singularly uneven flow of wheat from each of the exporting countries. Exports of each country vary widely, not only from year to year but also from one season of the year to another. The largest exports from each country are likely to occur within a few months after harvest and as the season progresses the bulk of world shipments shifts from one country or group of countries to another. Though it is obscured by the many conflicting price influences there is a tendency for each country to have a seasonal price cycle which reaches its low point during or shortly after harvest, and the importing countries tend to draw the bulk of their supplies from whatever country or countries are at a low ebb in their seasonal price cycles.

Under such conditions there is a tendency for prices in the importing markets to fluctuate with the relative abundance or scarcity of supplies to be had from season to season. The times when the volume of shipments from the various exporting countries increase and decline are times when significant changes in the trend of wheat prices may occur. Just when the export movement from any given country may begin is a variable quantity depending largely upon the earliness or lateness of the season, but the time when the export movement of any given country will subside is far more variable and subject in large degree to a number of factors including the size of the crop, weather conditions during the shipping season, and so on.

The foregoing has perhaps tended to give the impression of a rather haphazard and uncertain wheat market, with prices influenced only by the immediate abundance or scarcity of wheat to

fill importers' requirements. In such a picture there is much truth, but it is not a complete or an accurate picture. Though world wheat markets are influenced by the immediate demand and supply situation, they are also influenced by the outlook for the more or less distant future.

The outlook for the future has no small effect upon the size of importers' takings, but it has perhaps a still greater effect upon the rapidity with which exporting countries dispose of their supplies. Of course, this varies from country to country. It seems to us that we have evidence of but little tendency upon the part of Argentina to weigh the prospects of the future and to hold her wheat for a price. Rather it seems that wheat is shipped from Argentina and sold for whatever it will bring, the volume of shipments depending principally upon the rapidity with which the grain can be transported from the harvest fields to foreign countries. In the United States and Canada, on the other hand, provision is made for storing large quantities of wheat. Prices in these countries are not always "in line" with the prices of the importing countries even when they have a large exportable surplus remaining and the volume of their shipments at any particular season of the year shows a marked tendency to adjust itself to import demands and to the volume of shipments from other exporting countries.

In short, I believe that a large share of whatever "stabilization" we may have in the world wheat markets rests upon the shoulders of the North American grain trade. Perhaps it may seem ridiculous to use the word "stabilization" in this connection. Whether we use that word or not, however, a large share of the burden of adjusting both the intra-seasonal and inter-seasonal variations in the supply of wheat is borne by the United States and Canada—but of course the grain trade of other countries also shares the burden.

I presume my main point is now becoming clear. We have two general tendencies which affect wheat prices. On the one hand there is the tendency for prices at Liverpool and other importing markets to reflect a balance between current requirements and current receipts, and for prices in the exporting countries to follow Liverpool prices. On the other hand, there is a tendency for the flow of wheat entering into world trade to be adjusted in the light

of prospects for the future, and this adjustment takes place largely through speculative influences in certain of the exporting countries, causing their prices at times to be "out of line" with the world market. But there is an ebb and flow between the strength of these two tendencies. Sometimes price movements seem to be dominated largely by the adequacy of immediately available supplies. At other times the prospect of future adequacy appears to be dominant.

In the ebb and flow of these two tendencies, I think, is to be found a large share of the reason why a given price influencing occurrence may be either immediately effective in influencing price or may have its effect postponed to the more or less distant future.

There are, of course, many factors which influence the ebb and flow of these two tendencies. Many of them may be grouped together and called "those factors which affect the speculative temper of the market." A more tangible factor, and one which is important at the present time, concerns the adequacy of grain storage space to allow speculative influences to withhold a flow of grain to the world markets.

At the present time the tendency for the flow of grain, and for prices, to be adjusted in the light of future prospects is at a low ebb. We have had a stock market crash, a declining price level, and generally shaken business confidence. The funds of many speculators are depleted so that they are in no position to influence the market; others have no inclination to be particularly bullish until they are sure that values have reached bottom. Add to this, storage facilities taxed almost to the limit of their capacity, which necessitates the moving of a considerable volume of wheat into export in order to avoid congestion, and it is easy to see that speculative influences in the United States and Canada are not in a position to have a large share in affecting wheat price movements. Things which at other times might cause an immediate and marked rise of prices may be expected for the present to have relatively little effect. They may cause a temporary rally but, for the time being, the strength of the speculative market has waned. Prices fall back to the old levels—the market is largely dominated by the surplus of immediate supplies over requirements.

What I have said lacks much in completeness and preciseness of expression. Of course, there is no sharp dividing line between the

two tendencies in the world wheat market nor in the way in which different elements in the market react to the present and to the prospects for the future. Though I have exaggerated, nevertheless, I think it significant that there are conflicting tendencies and I think that these conflicting tendencies are of significance in affecting the timing of wheat price movements.

MATERIALS FOR A THEORY OF WHEAT PRICES

HOLBROOK WORKING
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WHEN I left this inspiring university just eleven years ago next month, at the end of nearly three years of graduate study, I considered myself well trained in economic theory. The subject had interested me deeply, and under the guidance of Allyn A. Young and H. J. Davenport I had at least had as fine an opportunity for the study of economic theory as a student could wish. As a student during the next year at the University of Wisconsin and subsequently through two years of endeavoring to expound Alfred Marshall to students, I improved my command of theory as it stood then and, in the main, still stands.

Now, after several years' work on wheat prices, I entitle this paper "Materials *for* a Theory of Wheat Prices." I shall not present and am not ready to present a theory of wheat prices. I doubt if anyone can write today a theory really adequate to account for wheat price movements as we observe them in the markets of the world. At the Bureau of Agricultural Economics, at the Kansas State Agricultural College, at the Food Research Institute, in many business offices, and elsewhere, people are reaching conclusions regarding the behavior of wheat prices. Some of these conclusions appear inconsistent—mutually contradictory. About the only conclusions I am prepared to reject are those involving the assumption that the movements of wheat prices can be explained simply and completely by reference to only a few factors. Wheat prices react to a great number of influences, the relationships are complex, and the effect of a given statistical development may be great this year and small or nearly negligible next year. That much appears to me clear.

TWO PECULIAR CYCLES

Today I wish merely to present two tendencies in wheat prices which I have recently uncovered. Specifically, I undertake to present evidence that major wheat price movements, extending through periods from two to about twelve months in length, are largely dominated by two peculiar cyclical tendencies. The cycles are not of conventional regular character and I have hesitated to apply the term, but it is the best I find. The first, which I shall

subsequently call the "long cycle," is a tendency for any three-year period of high wheat prices to be followed by declining prices, whatever the crop developments; and conversely, for a three-year period of low wheat prices to be followed by rising prices, whatever the crop developments. The second cyclical tendency, superimposed on the first and both obscuring and modifying it, is a very strong tendency for any large, sharp price rise during the crop season, reflecting what may be called a "crop scare," to be followed by an almost equal, but usually more gradual and prolonged, price decline. Such sharp price increases occurred in fifteen of the 33 years included in that part of the investigation.

The price statistics on which the present paper is based are weekly average prices of the Chicago May wheat future.[1] Two advantages are obtained by using futures prices: first, there is substantially no regular seasonal tendency in movements of prices of Chicago wheat futures, such as might obscure other price tendencies; second, by using futures prices one may follow price tendencies from the closing months of one crop year into the next crop year without having them obscured by such changes as occur in cash wheat prices in the transition from the price level of the end of one crop year to the frequently lower level of the beginning of a new crop year.

Those of you who are familiar with futures price quotations will be puzzled by the fact that prices for the May, 1930, wheat future, for example, are shown as though they were quoted regularly through fourteen months from the first of April, 1929 to the end of May, 1930. As many of you know, the May, 1930 future was first traded in July, 1929. The prices shown in previous weeks for the May, 1930 wheat future are hypothetical prices obtained by taking the quotations on the December future and adding a constant amount equal to the spread shown between the December and the May futures when trading in the May future became regular. This method had to be applied in every year, sometimes over a longer period than in 1929. Because of the stability of the spread between prices of the December and of the May futures, hypothetical prices arrived at by this method necessarily approximate very closely prices that would have been registered if trading had been active.

[1] For convenience in charting and in averaging, prices for only four weeks in each month are shown, the weeks omitted (four in each 12-month period) being weeks almost equally divided between adjacent months.

To render the price fluctuations in different years more fairly comparable, each weekly price during any crop year has been divided by the average July-June wholesale price index number.[2] The prices shown in the figure are on the basis of cents per bushel at the 1913 price level. The result, however, is not in any full sense a price series corrected for changes in the wholesale price level, since the same division is used for the price of each week in any one fourteen-month price series. The price fluctuations shown in the figures reflect changes in the price of wheat futures as they

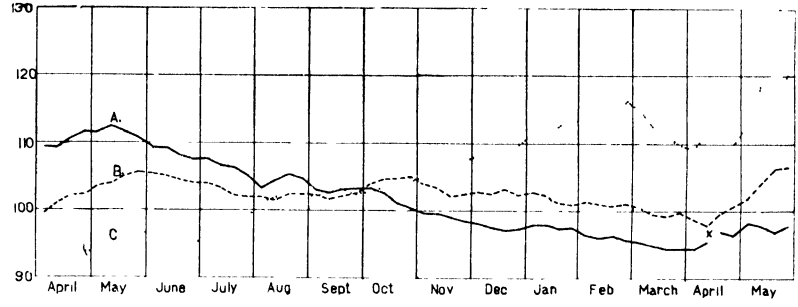

FIGURE 1. DEFLATED WEEKLY AVERAGE PRICE OF CHICAGO MAY WHEAT FUTURE, APRIL TO SECOND FOLLOWING MAY, 1887-88 TO 1913-14 AND 1921-25 TO 1928-29, BY TYPES OF YEARS, CLASSIFIED ACCORDING TO PREVIOUS 3-YEAR AVERAGE PRICE

(Cents per bushel at 1913 price level)

A—Average for 10 years preceded by high 3-year average price.
B—Average for 12 years preceded by intermediate 3-year average price.
C—Average for 10 years preceded by low 3-year average price.
Calculated from weekly averages of daily highs and lows compiled by the Food Research Institute from annual Reports of the Chicago Board of Trade and from the Chicago Daily Market Record. See appendix, table 1, page 723 for years included in each of above series.

actually occurred without either addition or deduction on account of changes in the general wholesale price level during the course of the fourteen months covered by each series.

THE LONG CYCLE

The principal evidence of the tendency in wheat prices which I characterize as a peculiar long cycle, appears in figure 1. At first glance the differences between the three curves in figure 1 may not appear great enough to deserve much emphasis. Please bear in

[2] The United States Bureau of Labor Statistics "All Commodities" index number and (prior to 1890) Snider's index number.

mind, however, that the scale used for this figure was chosen, not to bring out the differences between these curves, but to render them directly comparable with the subsequent figures, for which the scale was chosen to show conveniently the occasionally wide price fluctuations in individual years. Consider also how the figure would look if all three curves were started at the same point at the left: the spread between the two outside curves would then reach the equivalent of twenty cents in the last week of February and more in May. Consider also that the curves of upward and of downward slope represent, not the tendencies in extreme years, but in each case the average tendency in approximately one-third of the total number of years covered by the investigation.

The curve with a downward slope shows weekly the average price in those 10 out of 32 years which were immediately preceded by three years for which the average price, at the 1913 price level, was higher than in the case of any of the other 22 years. In making the selection of years the only adjustment made, other than for general wholesale price level, was to take account of the lower relative level of wheat prices since the war than before the war. All the three-year averages for the post-war years were raised by a uniform percentage to bring them on a level with the general average deflated price for the pre-war period.

The curve of rising tendency shows similarly the average weekly price during ten years which were immediately preceded by three years for which the average price was lower than in the case of any of the other 22 years. The curve of horizontal tendency represents the average weekly price during the twelve years not assigned to either of the other two groups, *i. e.,* years preceded by three years for which the average price fell in an intermediate range.

I am sorry I cannot show you the figures depicting the price movements during the individual years composing the three groups. The declining curve is made up of ten individual years all of which exhibit to a striking degree the characteristics of the curve of averages, differing chiefly in that substantial fluctuations are superimposed on the characteristic downward trend. The twelve years whose averages are represented by the curve of horizontal tendency mostly resemble the average curve except for fluctuations superimposed on a generally horizontal trend. Of the ten years whose averages are represented by the curve of rising tendency, only two (1908-09 and 1924-25) resemble at all closely the curve of aver-

ages.[3] While declines in wheat prices usually take place gradually over a long period, increases are usually short and sharp, followed by stability or, more often, by subsequent decline. The sharp increases, coming at different times during the season in different years, produce a curve of averages that is relatively smooth, but quite unrepresentative of the characteristics, in detail, of most of its components.

INTERPRETATION OF THE LONG CYCLE

Regarding the indicated tendency for high prices to be followed by a decline, and for low prices to be followed by a rise, the first reaction may be that this is a perfectly natural and obvious tendency and deserving of little comment. If we were dealing with cash prices, such an observation might be well founded. In the case of future prices, there is no necessity for such a tendency. At the end of one crop year cash prices may be high but the price of next year's May future relatively low. According to a commonly accepted theory regarding the operation of speculative markets, the price of a new crop future represents the price expected in the delivery month and is related to cash prices during the old crop season only to the extent that the supply and demand situation in one crop year bears on the price to be expected in the next crop year. The tendency for years of high wheat prices to be followed by declining prices of wheat futures, and *vice versa* is not necessarily to be expected. More than that, if the speculative market actually worked as described by many theorists, it would be quite impossible for such things to happen.

I am among those who believe that statistics frequently lead us to generalize on the basis of relationships that have occurred merely as a result of chance—what statisticians call the fluctuations of sampling. The best tests I have been able to devise indicate that it is totally unreasonable to account for the facts I have been describing on the basis of chance.

It may be suggested that the tendencies shown in figure 1 rest on a tendency for acreage to be expanded and for production to be large after several years of high prices, and *vice versa.* But if the speculative market worked as it is commonly supposed to work, futures prices would not show the characteristics de-

[3] In both these cases, however, the rise was greater than the average.

scribed even as a result of such a cyclical tendency in production. As a matter of fact, the speculative market working as it does work, I consider that the tendency for high prices to be followed by increased production accounts for part of the tendencies described. But at the most only a relatively small part of this tendency may be so explained. In the main, some other explanation is required. To find the explanation is the next task. I hope this paper may interest some of you in helping toward the solution.

CROP SEASON PRICE CYCLES

The second peculiar type of cycle in wheat prices is well exemplified in the movements of wheat prices during the crop year recently ended, 1929-30. The long decline in wheat prices after late July, 1929, has seemed to many very difficult of explanation. It has been attributed in various degrees to the stock market crash, to the general commodity price decline, to the nearly world-wide business depression, to the Federal Farm Board, to the Canadian Wheat Pool, to a British boycott, to the German and Italian tariffs, to the collapse of silver prices, and to numerous strange and unusual events in addition. Undoubtedly several of these have had some influence, but much ingenuity has been wasted in looking for unusual circumstances to explain an event which was really not of unusual character. In its main features, the course of wheat prices during 1929-30 closely resembled the course of wheat prices in well over one-third of the thirty-three years for which I have studied the record.

The chief explanation, if I may use that term—the chief explanation for the long decline in wheat prices after late July, 1929—lies simply in the sharp price increase just preceding it. For the evidence on this point I call your attention to figures 2 to 7, which I shall summarize very briefly. These figures show the price record for the Chicago May wheat future through each of the years—fifteen out of thirty-three—in which a large, sharp price increase occurred between May and early autumn, roughly the season of important crop developments. With only a few exceptions, such a rise was followed by an approximately equal decline: a short sharp decline when the peak was reached early in the season; a prolonged irregular decline when the peak was reached later. If I may venture an explanation—in years in which the peak was reached early in the season, when the size of the

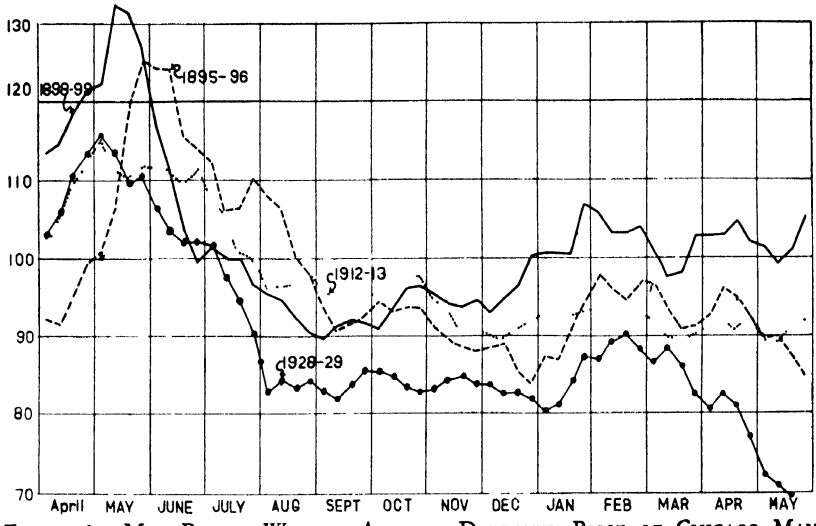

FIGURE 2. MAY PEAKS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

All the cases in the 33 years in which price peaks were reached in May are shown here except those in which subsequent crop scares resulted in one or two additional peaks, for which see figure 6. A sharp price rise in April-May tends to be followed by a similar sharp decline to levels below those from which the rise began.

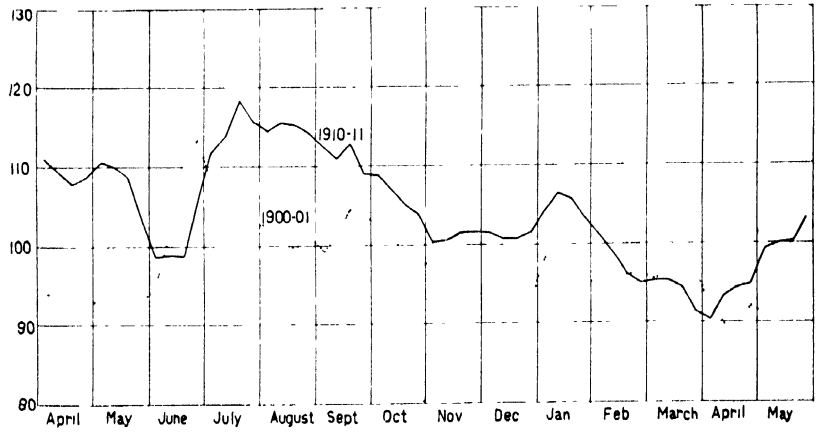

FIGURE 3. JUNE-JULY PEAKS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

A sharp price rise in June-July tends to be followed by a decline to a level similar to that from which the rise started. The decline tends to be less sharp than from a May peak.

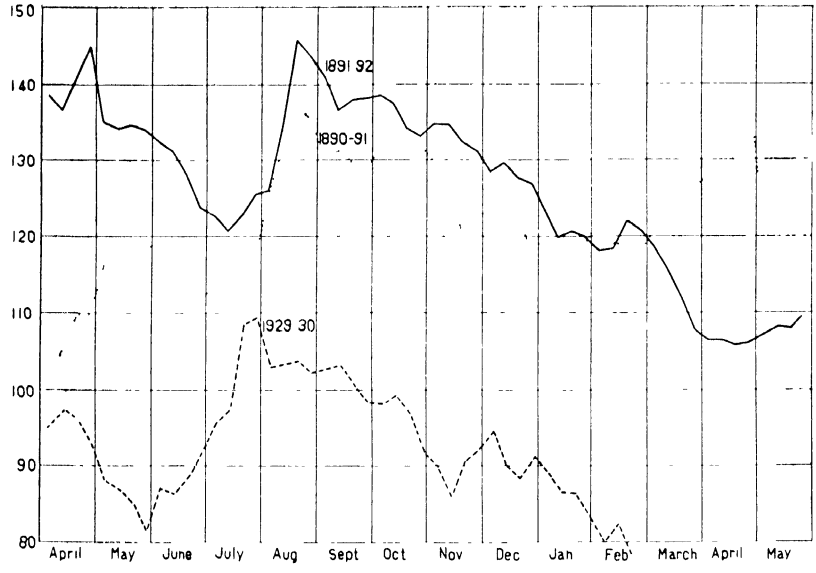

FIGURE 4. JULY-AUGUST PEAKS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

A sharp price rise to a peak in late July or August tends to be followed by a long, frequently interrupted, but persistent decline.

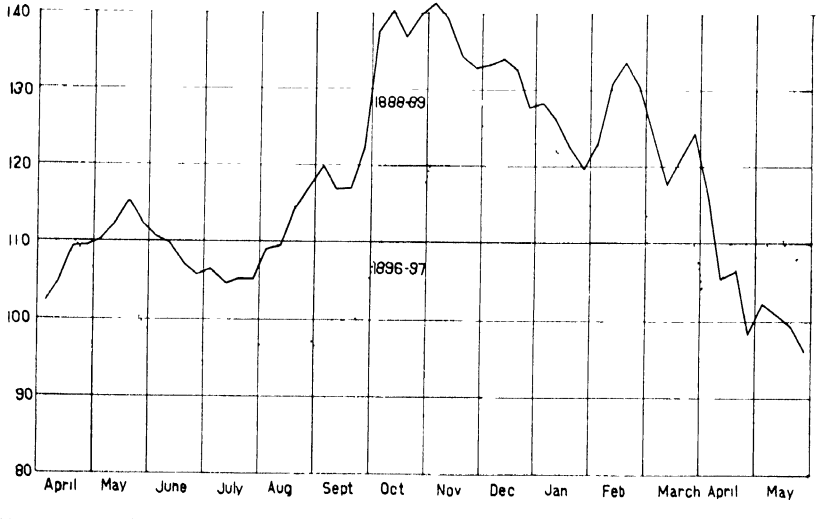

FIGURE 5. AUTUMN PEAKS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

A sharp price rise in late summer or early autumn tends to be fairly well held for several weeks, to be followed by a long irregular decline.

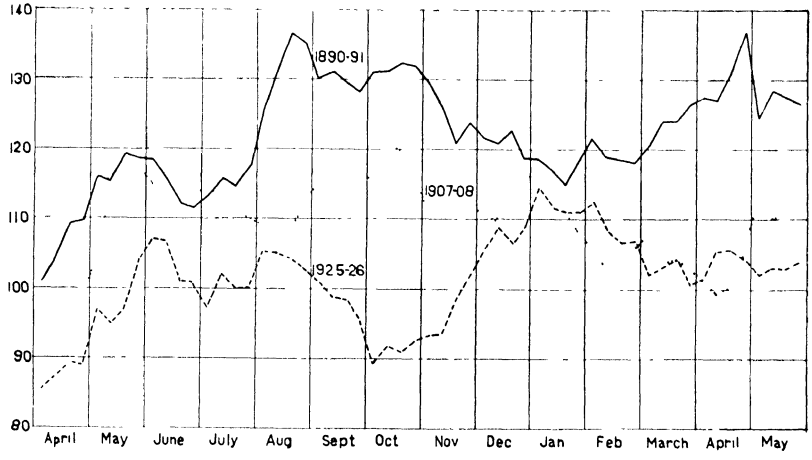

FIGURE 6. MULTIPLE PEAKS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

Extraordinarily unfavorable crop developments are capable of checking the decline from an early price peak and developing new and even higher peaks, from which a decline tends to ensue similar to that from a single peak occurring at such a time.

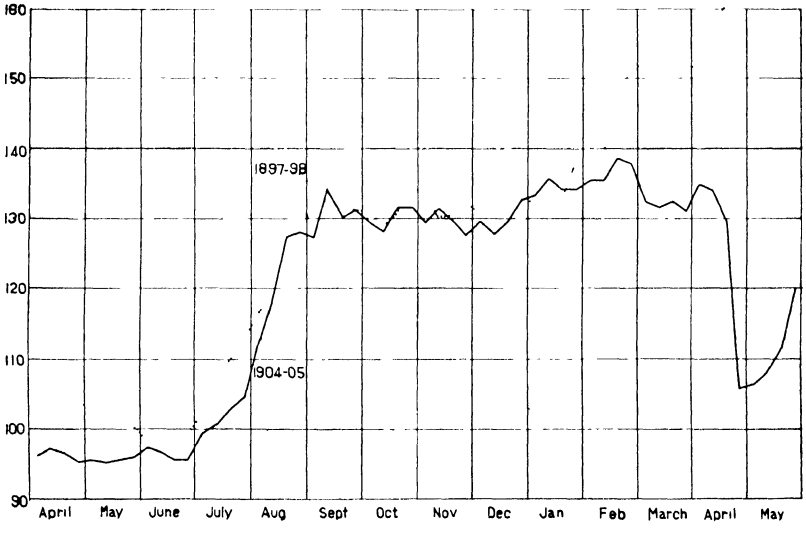

FIGURE 7. TWO EXCEPTIONS; WEEKLY AVERAGE DEFLATED PRICE OF CHICAGO MAY FUTURE IN SELECTED YEARS

(Cents per bushel at 1913 price level)

crop was still quite uncertain, those who had helped prices up were readily and quickly persuaded that they had been mistaken and prices dropped sharply. When the peak was reached later, those who had helped prices up were more confident in their opinions and changed them more slowly, with many temporary returns toward their original optimistic views.

Among the relatively few exceptions to this general rule of behavior after a sharp price rise, all but two are cases shown in figure 6 in which subsequent extraordinarily unfavorable crop developments were able to stem the tide of decline following the initial price increases and to produce one, or even two new price peaks. But after the last sharp rise, the tendency to decline reasserted itself as though that rise had been the initial one.

What I consider to be the only real exceptions to the general rule of prompt decline after a large and sharp price increase during the crop season are shown in figure 7. Circumstances in those years were quite as exceptional as the behavior of wheat prices. In 1897 the world harvested what was, relative to the level of wheat consumption at the time, the smallest crop in the 33 years under review. Worse than that, this shortest of all crops immediately followed a year in which the harvest had been below average. In these circumstances, it proved possible to maintain the level of prices reached on a sharp rise in the late summer, and at the very close of the crop year prices again rose dizzily. The second exception, unlike the first, was peculiar to the United States. In 1904 the United States harvested its smallest crop in 33 years (relative to domestic requirements). The previous crop had been short and wheat stocks at the beginning of the year were low. Under these circumstances the high levels reached by a sharp price increase in late summer were maintained for many months, though in this case a collapse in prices occurred more than two months before the first new wheat from the next crop was marketed.

I have said, rather loosely, that the long decline in wheat prices after late July, 1929, is explained by the previous sharp rise. But of course no scientist can long remain content to say that objects thrown into the air fall back just because they have always been observed to fall. He must at least find a more complicated and intellectually satisfying way of saying the same thing. Usually in the process he learns new facts of value. Again I invite your attention to what is to me a most interesting problem for explanation.

Appendix

Table 1. Years Included in Each of the Three Series Shown in Figure 1

Series A	*Series B*	*Series C*
1889–90	1887–88	1895–96
1891–92	1888–89	1896–97
1892–93	1890–91	1897–98
1893–94	1894–95	1901–02
1898–99	1905–06	1902–03
1899–00	1906–07	1903–04
1900–01	1907–08	1904–05
1910–11	1909–10	1908–09
1927–28	1911–12	1924–25
1928–29	1912–13	1925–26
	1913–14	
	1926–27	

FACTORS AFFECTING THE TIMING OF WHEAT PRICE MOVEMENTS[1]

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THE application of the results of price analysis to the problem of sales policy to be followed in marketing wheat, necessitates knowing something of the time when wheat price changes are likely to come as well as knowing their general trend and average level. When there is any financial interest involved, it is psychologically impossible to ignore the lapse of time involved in the so-called longer time price changes that appear to be impending. Furthermore, financial obligations of the farmer, his current farm and living expenses, besides the worry due to delayed marketing, all operate to confine his marketing policies within rather restricted time limits. As the so-called fundamental price making factors work themselves out through the psychology of buyers and sellers, the time when wheat price changes come is to some extent affected by this psychology.

THE EFFECTS OF REDUCED CROP PROSPECTS

The long time tendency toward a higher level of prices induced by a promise of smaller supplies affects the direction of price trend from week to week and month to month. Or, to put the matter in the order of occurrence instead of in terms of trend line influence on its component parts, the effects of a promise of reduced supplies work themselves out only through changes in the weekly and monthly price trends from what they formerly were; a trend toward higher prices can materialize only as prices from week to week and month to month begin to assume a different trend with reference to each other.

A study of these short time price relationships for the past indicates that the changes are not at a uniform rate. Reduced crop prospects do not result in a straight line trend upward in prices. After a low point in wheat prices has been reached, the principal subsequent advance is most frequently in the last three to six months of an 18 to 24 month period of prices above the low point.

[1] Contribution No. 62 from the Department of Agricultural Economics, Kansas Agricultural Experiment Station.

It is frequently two-thirds to three-fourths of the way through an advancing wheat price period before the sharpest and most pro-

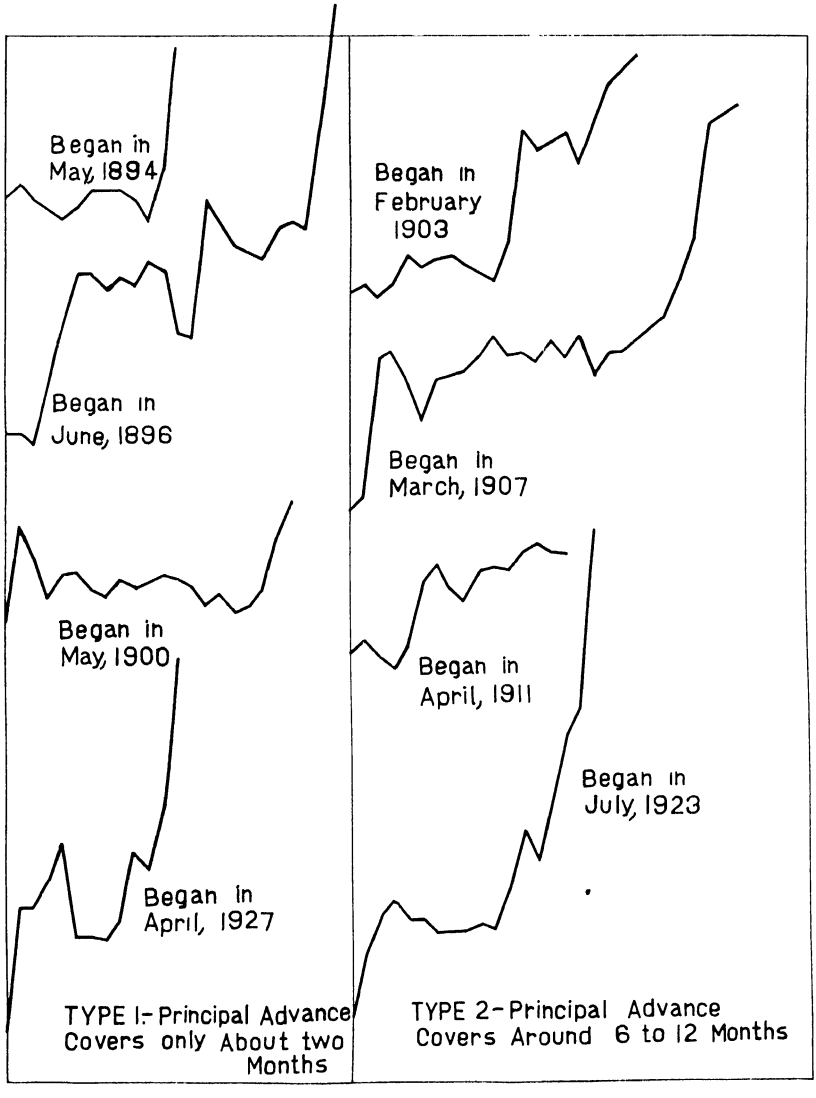

FIGURE 1 TYPES OF ADVANCING PRICE PERIODS IN WHEAT
Kansas City No. 2 Hard Winter Wheat

nounced price advances take place. There appear to be at least two rather distinctive types of advancing price periods. In one type, as from the low point in April, 1927 to the high point in

April, 1928, most of the period above the low point is marked by a sidewise trend in prices, with a sudden pronounced advance of a month or two at the end of the period. In the other type of price advance, as from July, 1923 to January, 1925, the trend upward in price begins a little earlier and gradually develops over a longer period (figure 1).

While it might prove possible and practical to identify still other types of price advances, these two types alone suggest that either the place, kind, or manner of reduced supplies affects the way price reacts or that buyers and sellers react differently to a given reduction in supplies from one time to another, or what is even more probable, that both change in supplies and change in psychology of traders with the lapse of time affect the nature and timing of the price change.

THE EFFECTS OF PROSPECTS OF INCREASED SUPPLIES

Like a decrease in supplies, any increase is looked upon as a fundamental price making factor. The tendency toward lower prices induced by prospects of larger supplies works itself out through week to week and month to month prices successively changing their relationships to each other. As in the case of advancing price periods, there appear to be at least two types of declining periods. In one case, there is a quick drastic reduction in prices and turn downward starting at a season when the influence of the on-coming new crop is added to the influence of various other factors that have initiated the decline as in April, 1928. In the other case, factors initiate the recession in price sometime ahead of the influence of new crop conditions as in January, 1925. Under such conditions prices work downward in a somewhat different fashion (figure 2). It also seems probable that the character of future trading during the uptrend in price affects the shape of the downtrend.

FUTURE TRADING INFLUENCES

The reports and records of the United States Grain Futures Administration reflect better than any other available material the psychology of a large body of traders. A study of volume of future trading, open interest, and trading by different classes during different phases of the wheat price cycle indicates the varying

reactions of traders to changing price relationships, changes in fundamental supply and demand factors and other price making factors.

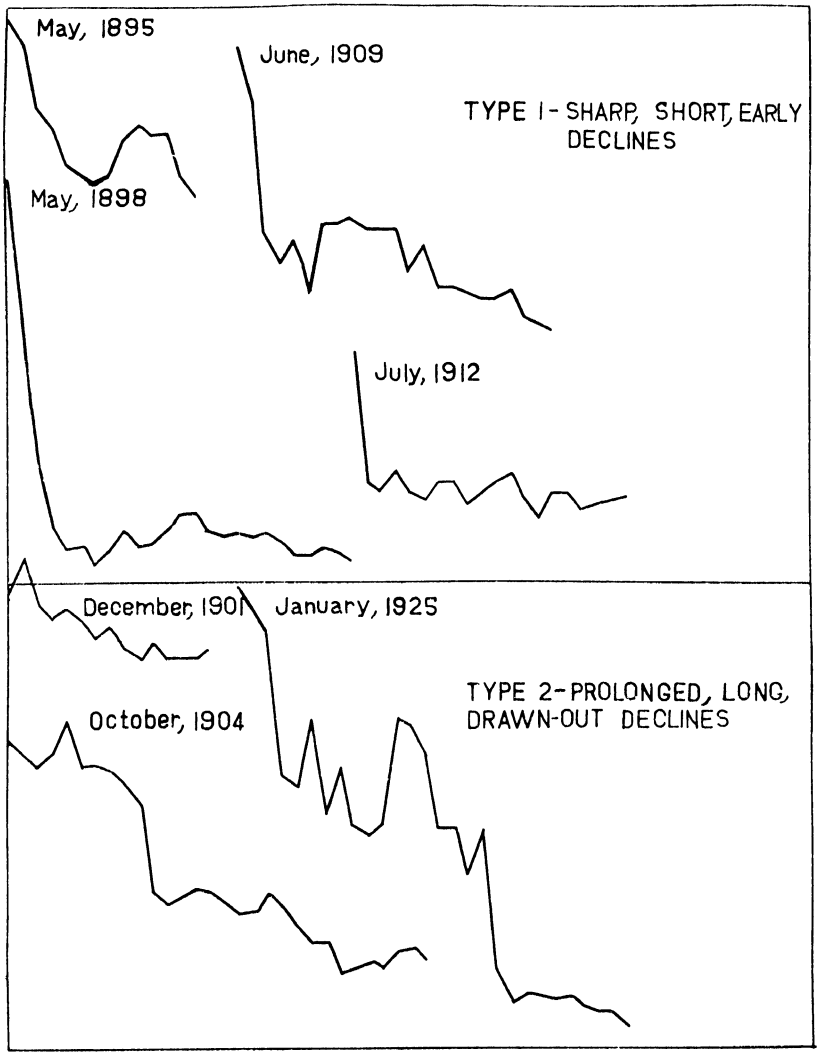

FIGURE 2. TYPES OF DECLINING PRICE PERIODS IN WHEAT
Kansas City No. 2 Hard Winter Wheat

A study of future trading data with reference to the phase of the wheat price cycle within which they fall assumes that only data falling in the same phase of the price cycle are subject to enough

of the same price making influences to constitute a statistical universe for the statistical treatment given them.

In the time allotted, only a few suggestions revealed by a preliminary study of the problem can be given.

In the first place, the particular month during which the effect of increased visible supply and carryover weighs heavily, is affected by the periodic nature of the open interest in the May future.

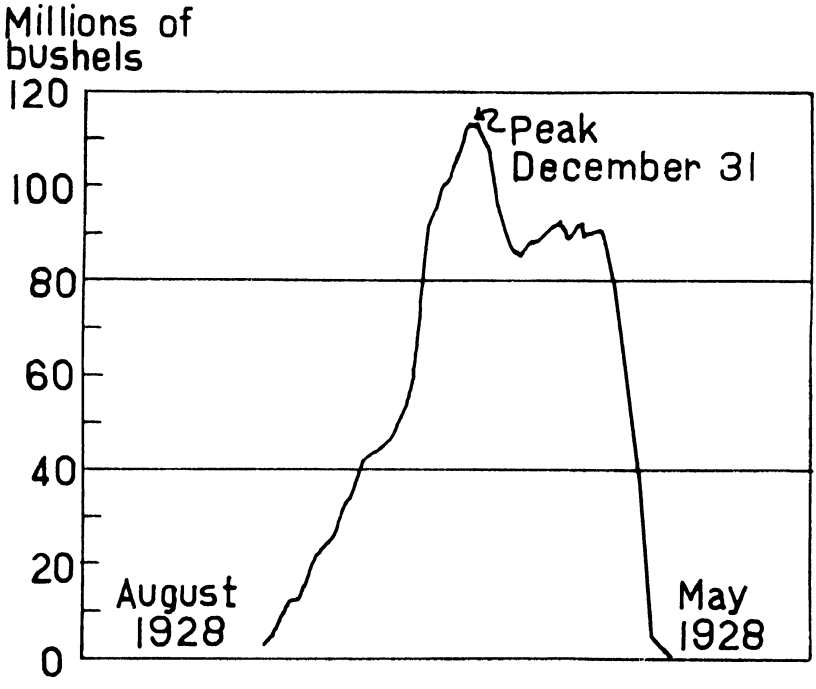

FIGURE 3 OPEN INTEREST IN THE MAY, 1929, FUTURE FROM BEGINNING OF TRADING TO EXPIRATION OF THE FUTURE

Trading in the May future ordinarily begins sometime in the previous July. Open interest reaches its maximum in December or January or in approximately the delivery month preceding the May future (figure 3). Generally the maximum point in the open interest is within 15 days of the same time year after year. The constructive period for the May future, that is the time during which the open interest is being built up, extends from July to December or January. The liquidation period, or the time dur-

ing which the May open interest must be closed out is from December or January to the last of May.

With large visible supplies and carryovers of old wheat, there is every urge for longs to liquidate holdings from January to May and little urge to hurry the shorts to cover unless there is a scare on the growing crop. As a result of the tendency on the part of longs to withhold liquidation under adverse circumstances as long as possible, April and May are heavy liquidation months. An effect of this situation on the Kansas City cash market has been that whereas top May cash price three decades ago rose over the April price five times in 10 years, and two decades ago rose above the April price six times in 10 years; in the last decade May price has been higher than the April price only four times. The influence of visible supply and carryover is especially potent in the case of May prices.

In the next place the relationship between the volume of future trading daily and the total open interest daily is indicative of whether market activity is such as is likely to support higher prices or lower prices. Cyclical peaks and sometimes seasonal peaks are marked by a daily volume of trading equal to 90 to 100 per cent or more of the open interest. When prices are on a high level, and the volume of trading in a single day is equal to the whole open interest, a turn downward is probably near. On the other hand, if volume of trading is less than 50 per cent of open interest, the market is in a weak or quiescent state. The trouble at the bottom of the cycle is that as yet no method has been discovered that will give any indication of how long the quiescent state of the market may last once it is reached, or just where the bottom is. The relationship between volume of trading and open interest is, therefore, more useful during the uptrend and at the peak of a wheat price cycle than it is in other phases of the cycle.

The existing price level, often measured with reference to some former base period, has long been considered a significant price making factor. The relationship of prices during the constructive or accumulative phase of open interest in a given future compared with the price level during the liquidation phase of the open interest exerts a short term influence on prices and is instrumental in timing changes. This is because the comparative level of prices during the two phases of the open interest affects trading pro-

fits and consequently the orderliness with which liquidation takes place.

In the phase of the wheat price cycle when prices are tending up from a low point, there is some tendency for volume of trading and prices to move up and down together. In the first half of the period the predominating tendency is for volume and price to move down together. The market has gone through a period of liquidation during the previous downtrend period so that trading is largely professional. Any further drop in volume from time to time is most frequently accompanied by a decline in price. In the latter half of a rising price period, volume of trading and price tend to move up together. Especially is this the case in the last quarter of the period. Increased volume during this period indicates to a large degree the participation of new buying and is frequently accompanied by a rise in price. Volume of trading and price in this latter period, therefore, most frequently move upward together though in both the first and last half of the rising price period there is to a lesser extent an inverse movement between volume of trading and price.

In a rising price period there is less tendency on the whole for open interest and price to move together than there is for volume of trading and price to move together. The early part of an uptrend period is apparently dominated by short selling and short covering. Short selling operates to increase open interest and decrease price thus tending to establish an inverse relationship. Short covering, on the other hand, operates to decrease open interest and increase prices, again tending to establish an inverse relationship. It is mainly in the last quarter of a rising price period that open interest and price tend to move together. This period being dominated by new buying, open interest, along with volume of trading and price, tends to move upward.

In the downtrend phase of the wheat price cycle, there is less of a tendency for volume of future trading and price to move together than is the case in an uptrend period. With prices at a peak at the beginning of this phase of the cycle, a decrease in volume of trading may indicate less public absorption of the supplies that longs are anxious to liquidate and may, therefore, be associated with a decline in prices. Alternating short sales, tending to increase volume of trading from time to time and decrease price, act as an offset to the first situation.

Decreasing volume of trading and declining prices due to less general interest in furnishing a market in which longs can liquidate, alternating with increased volume of trading and lower prices due to dominant short selling are chief characteristics of a downtrend period. Early in the period new buying now and then to support a too rapid decline in price tends to increase volume of trading and advance the price. Later in the period, however, when volume of trading is low, short covering may tend to raise price even though volume of trading is smaller and more professional. These alternating situations in a price declining period tend to destroy any correlation between volume of trading and price for the period as a whole.

Long liquidation and short selling are dominating features of the downtrend phase of the wheat price cycle. The former tends to decrease open interest and lower the price; the latter tends to increase open interest and lower the price. To a lesser extent new buying early in the period tends to increase open interest and raise price while in the latter part of the period short covering tends to decrease open interest and increase price. Thus, for the downtrend period as a whole open interest and price movements show little correlation. This is because the downtrend period, with reference to the relationship between open interest and price, is not homogeneous throughout its extent but varies from one end to the other.

The preliminary study herein reported upon, must be considered as tentative. It suggests, however, the following factors as of supplementary value to studies of fundamental supply and demand factors in that they affect the timing of wheat price movements.

(1) The particular phase of the wheat price cycle that is current affects the changing relationships between short-time prices.

(2) The incidence of the effects of certain fundamental supply factors such as visible supply and carryover, is modified by certain technique of the trading organization through which important buying and selling is done.

(3) Total trading relative to market position reflects to a degree the slowness or quickness of response to current fundamental market situations.

(4) The price level during the liquidation phase of the open interest in a given future relative to the price level that existed

during the constructive or accumulative phase of the open interest exerts a short time influence on prices.

(5) The particular phase of the wheat price cycle that is current affects the relationships between volume of future trading and prices and between open interest and prices.

The thesis being maintained in this study is, first, that month to month or seasonal price changes differ characteristically in different phases of the wheat price cycle, because the longer time cyclical influence can only work itself out through shorter time price relationships changing characteristically from what they have been. Second, trader psychology is so essentially different in different phases of the wheat price cycle that only data from the same phase of the price cycle are sufficiently homogeneous to constitute a statistical universe for a study of short-time price changes.

RECENT DEVELOPMENTS IN EUROPEAN GRAIN IMPORTS

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WESTERN EUROPE'S position in the world grain trade is conveniently conceived of as resembling the industrial center in von Thuenen's scheme, towards which the products of the outer agricultural zone move. This notion fails, however, to indicate clearly the important rôle which western Europe's agriculture itself played as an importer and processor of foreign grains. While it was undoubtedly true that the ever increasing consuming power of the industrial and urban centers furthered the importation of bread-grains from distant surplus countries, it was equally true that western Europe's agriculture as well, was based upon the unceasing influx of feeding-grain from overseas and from eastern Europe. A good many agricultural enterprises in western Europe manufactured imported barley and corn into livestock and dairy products to be sold in domestic markets, just as the larger mills ground imported bread-grains into flour for the bakeries and households of the cities.

The importance of grain imports to the agriculture of western Europe should not be underestimated. Expressed in terms of bushels of 60 pounds, the wheat imports of the countries west of Russia and Austria-Hungary, including Italy and Spain, averaged approximately 490 million bushels annually during the five years before the World War, while imports of barley and corn averaged approximately 380 million bushels per year during the same period. The difference between the imports of wheat and the imports of barley and corn expressed in terms of values, was, of course, somewhat greater than the foregoing figures would indicate, since the value of wheat per bushel was always greater than the value of barley or corn. But while the imports of wheat amounted to somewhat more than one-third of the total wheat supplies of western Europe, the imports of barley amounted to nearly two-fifths of the barley supplies. The ratio of foreign imports to the total supply of feeding-grains approached 50 per cent when corn was taken into consideration. Thus, western Europe was more dependent upon foreign feeding-grains than upon foreign bread-grains.

Hogs and cattle were not, of course, fed exclusively upon grain. However, by pushing part of the acreage which was to yield the much needed feeding-grains beyond the boundaries of western Europe, more land could be devoted to the production of green fodder, roots and tubers. Sugar beets and potatoes, though not grown primarily for feeding purposes, were the basis of an important continental livestock industry. The by-products of the beet sugar industry and the waste products of both crops, were fed to cattle and hogs. Thus, it was possible for western Europe to attain and maintain a high degree of self-sufficiency insofar as the production of livestock and dairy products was concerned. At the same time the milling industry ground even more domestic and foreign grain into flour than was needed within the area itself.

The foregoing statements with regard to the production and consumption of grains in western Europe prior to the war are in need of some amplification. Nothing has been said regarding oats, a higher proportion of which was supplied by western Europe's agriculture than was the case for barley and corn. However, I felt justified in omitting this crop since oats are used primarily as feed for horses rather than for cattle and hogs whose products enter into human consumption.

It must also be remembered that corn serves not only as a feeding-grain, but also plays an important rôle in the human diet, especially in Italy and Spain. This fact, however, tended to strengthen the dependence of western Europe upon foreign feeding-grains. The same thing held true in regard to the position of rye in the grain balances of the countries of western Europe. The area as a whole had a small deficit in rye, amounting to only 2.5 per cent of the total supplies. While most of the crop was used as bread-grain, especially in central Europe, part of it went into the feed troughs also, particularly that part of the crop exported from Germany to her northern and western neighbors. Incidentally, these exports of German rye for feeding purposes were greatly facilitated by the famous "Einfuhrschein-System" by which foreign wheat could be substituted for that part of the rye crop used for feed. All told, however, the rye crop aided the statistical position of western Europe's bread-grains far more than it contributed to the supply of feeding-grain.

Most important of all, it must be kept in mind that the general conditions described above, did not apply equally to all the coun-

tries of western Europe. Differences in natural conditions, in the social and economic structure of agriculture as well as industry, and differences in the tariff and the general agricultural policy of the various countries, rendered the picture of Europe's agriculture and of her grain trade particularly intricate and complex.

In a broad way, a distinction should be made between those countries admitting all kinds of grain free, and those levying a duty upon them. This difference of tariff policy originated in the struggle of the agriculture of western Europe against the competition of American and Russian grain in the '80's and '90's.

Following a policy of free trade, the United Kingdom and the countries adjacent to and largely dependent upon the English market, such as Denmark, Holland, Sweden, Belgium, and Switzerland, soon began to import the greater parts of their grain supplies. During the five years before the war they averaged to import more than three-quarters of the total amount of wheat consumed. They also depended to a large extent on foreign countries for their supplies of feeding-grains. England imported more than two-fifths, and the five continental countries mentioned imported more than one-third of their barley supplies in addition to very considerable imports of corn and feeding rye. Devoting most of the acreage hitherto used for grain production to use as pasture and to the production of forage crops, England and the north European countries were able to build up a very efficient livestock industry and a remarkable marketing system for the products thereof. But the demand of the fast developing industrial markets for meats and dairy products soon outgrew the production capacity of the nearby agricultural regions, supported though they were by ever increasing imports of foreign feeding-grains and other concentrated feeding stuffs. Development in this direction was most pronounced in England, where the presence of large estates limited livestock production somewhat more than was the case on the smaller holdings of western Europe. Thus, England was self-supporting only as regards her supplies of milk, cream, lamb, and veal. She had to import more than three-fifths of her meat supplies and about one-half of her dairy products. Furthermore, despite the fact that Denmark, Holland, Sweden and Switzerland were heavy exporters of livestock products to the United Kingdom, the English market had to draw very considerable quantities of such products from overseas. This applied particularly to beef and mutton

which were largely drawn from countries of the Southern Hemisphere. About two-fifths of her imports of pork products came from Holland and Denmark, the remainder consisting mostly of lard and ham, coming from North America. Dairy products made a slightly better showing. Three-fifths of England's butter imports, and a slightly smaller proportion of her cheese imports, came from European countries. Thus, the agricultural districts of western Europe exporting to the English market, had to content themselves more and more with the delivery of fresh, or lightly salted meats and dairy products, while the supply of bread- and feeding-grains, and a large part of the livestock products of staple character, such as frozen beef, mutton, lard, bacon, and even butter and cheese, were supplied by the American and Oceanic continents.

Thus, while the abundance of cheap foreign grain was made the very cornerstone of a thriving livestock industry in the free-trade countries, the larger continental states of France, Italy, Spain, and Germany protected their grain producing industry as the traditional basis of their farming systems, by a policy of high tariffs and other devices of governmental support.

The Latin countries of Europe were able to produce nearly enough grain to take care of their own requirements. Spain imported only five per cent of her total wheat requirements and no barley or corn to speak of. France imported about one-tenth of her wheat and barley supplies in addition to small quantities of rye and corn. During the five years before the war, Italy averaged to import about 22 per cent of her total wheat requirements and 13 per cent of her corn. These countries struck even a more favorable balance insofar as their supplies of livestock products were concerned. France and Italy imported some pork and pork products, but were able to export a certain amount of beef, butter and cheese.

The situation in the Latin countries of Europe was not wholly due to a protective policy. At least three other factors, whose effects on the agricultural situation in the Latin countries were certainly equal to those of the tariffs on farm products, should be mentioned. First, industry did not expand in the Latin countries as it did in England, Belgium or Germany. Second, the production of foodstuffs could be increased by curtailing the production of "industrial" crops, such as wool, flax, and hemp. This process

was furthered by the rapid growth of fiber exports from America, Australia and Russia. Third, crop yields were increased by the use of fertilizers, and by the promotion of the culture of sugar-beets, although on the whole the agriculture of Spain, Italy, and France was not benefited in this way to the same extent as was German and Austrian agriculture.

Germany, though one of the foremost protectionist countries of Europe, could not boast of grain or livestock balances as favorable as those of the Latin countries. The outstanding deficit item was that of feeding-grains. As the heaviest importer of barley in the world, Germany had to rely on foreign sources for almost three-fifths of her supply of feeding-barley. In addition, corn was also imported. Imports of wheat, on the other hand, did not amount to more than about 15 per cent of pre-war bread-grain requirements, taking wheat and rye together. This strikingly better balance between the production and consumption of bread-grains, was, however, more apparent than real. In the first place, part of the rye crop was fed to livestock. Second, the rapid growth of Germany's milling industry to a point where the output of flour far exceeded the requirements of the domestic market, was partly to be attributed to the urgent demand of Germany's livestock industry for the by-products of the milling industry.

Here we strike, it seems to me, the basic reason for the amazing growth of Germany's livestock industry before the war. While some foreign feeding-grains were imported, the German livestock industry was based for the most part upon the use of the by-products of industry. Consider the case of the potato, and even more striking, that of the sugar beet. Both crops were grown primarily to furnish human foodstuffs, but they became equally important as the bases of cattle and hog production, thus indirectly stimulating a more intensive type of farm management. Their cultivation on the large estates east of the Elbe River which were not usually given over to the production of crops requiring much hand labor, was made feasible by the importation of seasonal labor from Poland and Galicia. Thus, summarizing the achievements of Germany's agriculture in regard to its contribution to the nation's food supply, stress must be laid upon the influence of the root and tuber crops on the farming system, the importation of cheap labor for the cultivation of these crops, and the reliance placed upon foreign countries for supplies of feeding-grains.

Germany's livestock industry could not, however, fully satisfy the rapidly increasing demands of the industrial and urban centers for livestock products. Only small amounts of foreign meats were imported. The situation with regard to animal fats was less favorable. The hogs produced in Germany, which were largely fed on barley and potatoes, were not of a lard type though fatter than the Danish and English hogs. As a result, large quantities of American lard had to be imported. Similarly, ever increasing amounts of butter and of fat cheeses were imported, owing to a shortage of green fodder and of grassland to the production of which only comparatively small areas were well suited. Thus, Germany was on an import basis for most agricultural products except meats, but to a much smaller degree and for quite different reasons than England, with which she is often compared in the matter of agricultural trade.

A few words should be added about the grain trade of pre-war Austria-Hungary, also an adherent of the principle of protection. Before the war, the dual-monarchy represented an almost perfect example of self-sufficiency and of the division of labor insofar as agricultural production was concerned. In addition to some barley and corn which entered into external trade largely as a result of local conditions on the border, there were some special products such as malting barley, beer, sausages, prepared meats, and so forth, shipped out of the country, but they were insignificant compared with the trade within the boundaries of the states. Due to the fact that agriculture was highly specialized, internal trade was heavy. Hungary as the chief grain producer, shipped large amounts of grain and flour to the western areas which she also supplied with beef and pork. The deficiency of livestock products was somewhat greater in Austria proper than in Bohemia, where the by-products of a flourishing sugar beet industry were utilized in livestock production. The agriculture of Austria consisted largely of the production of dairy products, and of truck crops for the nearby capital city.

Against the background of western Europe's agriculture as it existed before the war, I shall now endeavor to picture the changes which have taken place since the war. You will not expect, of course, a complete record of the breakdown and subsequent recovery of western Europe during and after the war.

It is now apparent that the basic economic structure of the area

as a whole remained unaltered. The essential features of the trade in agricultural products are the same as before the war. There did occur, however, some very significant changes which, though not altering western Europe's position as the principal market for the grain surpluses of the world, did affect the demand for grain in at least three directions.

First, there is the marked decrease in the production and consumption of rye in the countries of middle and northern Europe. Taking industrial Europe as a whole, including Poland, Austria, and Czechoslovakia, rye supplies averaged 10 per cent less during the past three years, than before the war, the heaviest reduction occuring in Germany, Austria, and Czechoslovakia. In the years immediately following the close of the war, the deficit of rye, which was much heavier then than now, was made up by large imports, especially from North America, but since 1925 imports have declined rapidly. Not more than 3 or 4 per cent of the rye supply of industrial Europe originated in countries outside of western Europe during the past three years. Instead of a deficit there is now a serious rye surplus problem in middle Europe, due to a much lower per capita consumption than before the war. The lower per capita consumption of rye is undoubtedly due to changes in the diet of the people. Disgust with war bread may now be a past influence, but increasing urbanization, the reduction of the armies, which were once heavy consumers of dark bread, and the decrease of household baking among the rural population coinciding with the spread of large-scale milling and baking establishments are factors which are making their influence felt.

The second change, seemingly lasting in character, took place in the supply of feeding-grain, especially barley. When Russia ceased to furnish the barley needed for the maintenance of western Europe's livestock industry, over and above the amounts produced domestically, a serious shortage occurred which ultimately had the effect of decreasing the production of dairy and livestock products. The production of barley was soon increased, however, in Europe proper, and corn which was used as a substitute was imported in large amounts. The average production of barley during the past three years has been about 10 per cent higher than before the war. The countries around the North Sea led, with an increase of 33 per cent, followed by the Latin countries with an increase of 13 per cent, and Germany with an increase of 7 per cent.

Austria and Czechoslovakia have reached the pre-war level of production and only Poland and England still lag behind. On the whole, imports have decreased by about one-third of the pre-war figures, most of which is accounted for by the reduction of German and English imports. The northern countries of Europe import as much barley as before the war. The increase in production was not enough to offset the decreasing imports of foreign barley, so that western Europe as a whole shows a decrease in the amount of barley consumed, of about 7 or 8 per cent. However, only 23 per cent of western Europe's supply of barley comes from outside, compared with 33 per cent before the war. It should be kept in mind, however, that the livestock countries of northern Europe have an increased supply of barley amounting to more than one-tenth of their pre-war supplies.

To a certain extent the shortage of barley was offset by increased imports of corn, but to a smaller degree than would have been expected. All in all, corn imports averaged about 50 per cent larger during the past three years, than before the war. An increase of about 80 per cent occurred in the imports of the countries of northern Europe. Germany increased her imports about 67 per cent, and there was an increase in the imports of the Latin countries of about 50 per cent. Corn imports in England were only about 10 per cent greater than before the war. The supply of feeding-grains would seem to be relatively greater in the livestock producing countries of northern Europe than before the war, due to increased barley production and to increased imports of corn. Germany and England, however, appear to have had a smaller supply of feeding-grains than before the war, while the Latin countries of Europe had slightly larger quantities.

Coinciding with this development, we find that western Europe now depends to a larger extent upon imports of livestock products from foreign countries than it did before the war. What happened can be termed a substitution of the finished product for the raw-material, formerly processed within the boundaries of western Europe itself. The changes which have occurred in the trade of beef and dairy products are most striking. The net imports of beef into western Europe are now 75 per cent greater than before the war, the smaller increase in beef exports from the northern and Latin countries of Europe now being more than offset by imports, which bulk heavily in the case of France. Imports of butter

are now more than 50 per cent greater than before the war, in spite of the fact that the countries of northern Europe could increase their exports by 50 per cent. Germany now imports twice as much butter as before the war, an increase which is even larger than that of her beef imports. A slightly better showing is made, however, in the case of cheese, the average increase in imports amounting to only about one-third of the pre-war figure. The northern and Latin countries were able to keep up with the increasing demand more readily in the case of cheese than in the case of beef and butter. It is rather interesting to note that in the trade of pork and pork products the pre-war relationships in western Europe between domestic and foreign supplies seem to be re-established, although England imports about 50 per cent and Germany about 15 per cent more pork and pork products than before the war. However, the northern European countries, especially Denmark, have increased their exports to such a degree, that the imports of pork into western Europe from outside sources are no greater than before the war.

The rather gloomy picture of post-war developments in the rye, feeding-grain, and livestock trades, is little changed by developments in the wheat situation. As a whole, the area shows only a 5 per cent increase in its wheat supplies, made up of a 2 per cent increase in domestic production and a 3 per cent increase in imports. To be sure, a 50 per cent increase occurred in the wheat production of the countries of northern Europe, and an increase of about 25 per cent in the wheat imports of the Latin countries, but the amounts involved are rather small, and are offset by slight decreases in production in Germany and England, and corresponding increases in imports. It appears that the decrease in the use of rye in the bread diet of western Europe has not been offset by an increase in the amount of wheat consumed, a fact which is only to be explained by a declining per capita consumption of the bread-grains. This conclusion is borne out by the few reliable figures which are available, just as the heavier imports of meat and dairy products seem to support the higher consumption figures given for these products in the case of Germany and England. Unfortunately in the latter case, we have no means of checking the figures given, since domestic outputs are not adequately reported.

I do not wish to be interpreted as saying that the international

trade in bread-grains has about the same characteristics as before the war. I only maintain that the changes which have taken place have originated for the most part in the surplus countries rather than in those countries which rely largely upon foreign sources for their supply of bread-grains; that is, unless you are prepared to say that the apparent downward trend of European bread-grain consumption constitutes the main feature of the world wheat situation. I am not inclined to share this latter view. In the first place, the United States whose exports of wheat loomed so large in the world wheat trade after the war, is experiencing the same downward trend in the consumption of bread-grains as is Europe, except that the downward trend is more pronounced. It would indeed be difficult to say, whether the resistance of the world's largest buyer to the purchase of wheat or the increasing sales pressure resulting from decreasing consumption in the country with the largest exportable surplus, is the key to a proper understanding of the unsatisfactory picture presented by the post-war wheat trade.

The replacement of the leading surplus countries of pre-war times, particularly Russia and the lower Danube, by the countries of the Western Hemisphere, namely, the United States, Canada, Argentina and Australia, was certain to create economic problems as difficult as the re-establishment of western Europe's position in the world-trade. Witness, for example, the attempt of the North American export countries to substitute flour for grain in their trade with Europe—an attempt which proved a failure. Furthermore there is the ever present possibility that the former surplus countries will stage a come-back, and it seems to me that we are not far from realizing such a possibility.

The probable future development of the grain trade between the countries bordering the Danube, might be mentioned in support of the preceding statement. Up until last year this former surplus area did not contribute in a significant way to the world grain trade. Hungary, Rumania, Jugoslavia, and Bulgaria, though producing in the years 1926-1928 only slightly less wheat than before the war, exported only about one-third as much as before the war. The consumption of wheat in this area was about 25 per cent greater than during the pre-war years. These figures are based, of course, upon corresponding areas, eliminating as far as possible changes in international boundaries. If we set against these figures

the requirements of Austria and Czechoslovakia which form the natural outlet for the surpluses of the lower Danube, it appears that the recent wheat exports of the lower Danube countries were barely sufficient to meet the demand of the upper part of the former Hapsburg Monarchy, whereas before the war about one-fourth of the wheat production of the Danube Basin was exported to foreign markets. The fact that the Danube Basin has practically been eliminated as one of the world's largest wheat exporting areas is accounted for by the increasing consumption of wheat in the industrial area of the West, as well as in the agrarian countries themselves. Increased consumption is a more important factor in the situation than decreased production, which is significant only in the case of Rumania. All of the remaining Danube countries have produced slightly more wheat during the past few years than before the war. Conditions are similar in the case of feeding-grains. Production has about reached the pre-war level, but exports are much smaller than before the war due to increased domestic consumption. The domestic consumption of barley is about 16 per cent greater than before the war while the consumption of corn has increased about 11 per cent.

It is difficult to say, of course, whether or not the increased domestic consumption of grain (except rye) in the Danube countries has reached the saturation point. However, the still precarious financial position of the lower Danube countries will always make for a quick response to slightly improved world-market conditions, particularly since they can easily shift from wheat to corn, or from corn to wheat, in their human diet. The increase in the livestock population may ultimately check the readiness with which their surplus grains flow toward foreign markets. But the experience of the past year during which large offerings of wheat and corn were made from the lower Danube area indicates that too much stress ought not to be placed upon the importance of the livestock industry as a channel through which the surplus grain production of this area is likely to be absorbed.

The development of western Europe's trade in agricultural products during the post-war period cannot yet be described in terms of a well defined trend. Neither are there definite signs of a new course in governmental policy. England and the northern countries of Europe still adhere to the principle of free trade, under which it has been possible for the northern countries to maintain, and

in some respects even strengthen their position in the world's trade in livestock products.

On the continent, however, there was and still is much drifting along in matters of agricultural tariff policy. In most cases, the protective measures of the governments, now applied in an astonishing variety of ways and pursued with a vigor unknown before the war, arose out of emergencies such as the overproduction of rye, or the threat of imports of Polish hogs into Germany, or the temporary surplus of wheat in France. The haste and zeal with which the Continental governments acted during such emergencies should deceive no one as to the fundamental lack of a clear cut agricultural policy with definite objectives. It would seem that nearly all of the many governmental regulations relative to trade in agricultural products must be considered as temporary measures taken to meet temporary conditions. A literal interpretation should not be placed upon the slogan of agricultural self-sufficiency under which the majority of the foregoing measures were passed. Complete self-sufficiency could only be accomplished in one of two ways. Either the industrial capacity of Continental Europe must be greatly reduced, or still higher tariff walls must be built up around *all* agricultural products. I venture to say that a reduction in Europe's industrial output, desperate as such a measure seems, would fit in much better with certain definite trends in the world's industrial organization, than would a general increase in the tariff on all agricultural products. Granting for the sake of the argument, the efficacy of a tariff policy along the lines mentioned in promoting agricultural self-sufficiency, it must be recognized that such a form of self-sufficiency could be attained only at the cost of practically destroying Continental Europe's ability to export manufactured goods to the industrial markets of the world. In order to insure the production of sufficient quantities of agricultural products to meet her needs, it would be necessary to increase the price of foodstuffs to a point where, under the present organization of Europe's industry, it would be impossible for her to compete abroad. It is impossible for Europe to reconcile the policy of a high protective tariff on *all* classes of agricultural products with attempts to maintain a large industrial output, to keep employed her millions of workers, and last, but not least, to meet her reparation payments. Assuming that the structure of Europe's political economy remains unchanged,

different from the record clips of the last few seasons, since the seasonal production does not show a great variability. The ratio of the price of merino to crossbred wool was lowest in 1928-29. This ratio has increased somewhat during the last season and will continue to do so for a number of seasons. The production of crossbred wool is increasing relative to that of merino wool. The probable production in the future will depend upon whether the increase in crossbred wool production will be more than the decrease in merino wool production.

If the regularity of the wool production cycle continues, within about five or six seasons the third minor peak, which characterizes a relatively high proportion of crossbred to total wool will be reached. Actual and relative prices of merino wools will increase and be particularly high at that time.

There are some indications which need not be elaborated here, that the present cycle has been overextended and that certain forces were favorable which led to the abnormal increase in wool production which would otherwise not have eventuated. It is probable that the abnormal price situation during and after the war had much to do with this. If this contention is correct, then the rate in the decrease will probably be greater than would otherwise be the case.

The phenomenal increase in the production of merino wool has not been due to the expansion of new areas or to the increased production in semi-arid regions, but it occurred in areas where competition from other agricultural enterprises was potentially the greatest. Under the present price situation these areas are likely to show the greatest change in production, within the next few seasons.

WORLD PRODUCTION AND PRICE OF MERINO AND CROSSBRED WOOL

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THE purpose of this paper is to indicate the trend in the number of sheep in the world as related to the total and to the qualitative production of wool, and the trend in and the existing relation between the actual and relative production and prices of merino and crossbred wool since 1888 and finally on the basis of the foregoing analysis to conclude with a few remarks on the probable future trend and outlook of the sheep and wool industry.

By world production of wool is implied the total production in 10 important wool producing countries. These countries comprise Australia, New Zealand, Union of South Africa, Argentina and Uruguay in the Southern Hemisphere and the United States, Canada, the United Kingdom, France and Germany in the Northern Hemisphere. The production of wool in these countries constitutes more than 75 per cent of the total world production inclusive of carpet wool and more than 90 per cent exclusive of carpet wool production.

The world production of carpet wool has not been considered mainly because of the fact that in many respects it can be regarded as a separate commodity and as distinct from merino and crossbred wool, in that it is used largely in the manufacture of carpets and rugs, and does not enter into the manufacture of clothing materials to any extent, and also because of the fact that data relating to world production of carpet wool are very incomplete and are largely made up of a series of estimates, which if included in the total world production estimate, would tend to overshadow existing cyclical fluctuations and production and price relationships.

THE PRESENT SITUATION

The 1929-30 wool season, which has just ended has been a disastrous one to all those concerned in the industry and in only a few instances since 1888 has a depression of like severity been experienced.

The losses sustained by the principal wool producing countries, because of the depreciation in the value of the commodity, have

been unparalleled. The countries that are predominantly merino have suffered the most, since the price of merino wool declined much more than the price of crossbred wool.

The factor which has led up to the present production-price situation is not one of annual production since the total production of wool in the world is not subject to wide annual fluctuations. The cause will largely have to be looked for in the cumulative effect of a consistent increase in wool production for a number of seasons in which the rate of increase in production was greater than the rate of increase in consumption.

This was essentially the development during the past five or six seasons during which period the trend in the actual and relative prices of wool was generally downward and in which the last or the 1929-30 season proved to be the most reactionary and disastrous in its effects.

The present world wide depression affected wool prices adversely, as it did that of other commodities. The main cause of the depression in the wool industry and of the abnormally low prices for wool, however, was primarily due to a periodic over-production of wool, in which the production for the last few seasons constituted the probable termination of the peak of the wool production cycle.

TREND IN WORLD SHEEP NUMBERS AND ITS RELATION TO THE SHEEP CYCLE AND WOOL PRODUCTION

The long-time trend in the number of merino and crossbred sheep in the world since 1886, as shown in figure 1, was slightly downward. The decline is attributable to the persistent decrease in the number of sheep in the Northern Hemisphere. The number of woolled sheep in the world was highest about 1910 when it reached 344,200,000 head, but it did not differ from the number during the peaks of 1892 and 1928 by more than 22,000,000. The lowest number was reached in 1922 when there were 266,000,000 sheep or 19,800,000 less than the former low point in 1902.

The trend in the number of sheep in the Southern Hemisphere was slightly upward. In 1892, 66.0 per cent of the total number of sheep in the world were in the Southern Hemisphere; in 1910, 69.4 per cent; and in 1928, 72.0 per cent.

The cyclical movement in the number of sheep closely corresponds to that of most of the 10 countries, although the trends in

Table 1. Estimated Number of Sheep in 10 Important Wool Producing Countries of the Northern and Southern Hemispheres and the Estimated World Total, 1886-1930*

Year	Southern hemisphere	Northern hemisphere	World total
	(millions of sheep)	(millions of sheep)	(millions of sheep)
1886	174 4	120 3	294 7
1887	186.8	116 8	303.6
1888	188.5	114 0	302 5
1889	196 0	112 5	308.5
1890	209 9	115.6	325.5
1891	224 2	115 7	339 9
1892	224.9	115 7	340 6
1893	223 1	114 9	338 0
1894	224 7	110 7	335 4
1895	217 0	107 8	324 8
1896	214 5	104 4	318 9
1897	206 9	102 2	309.1
1898	202 0	103 0	305 0
1899	194 1	104 7	298 8
1900	192 1	108 9	301 0
1901	195 3	109 5	304 8
1902	178 0	107 8	285 8
1903	181 3	104 8	286 1
1904	192 3	100 5	292 8
1905	205 6	98 7	304 3
1906	218 7	100 1	318 8
1907	227 9	102 6	330 5
1908	233 6	104 9	338.5
1909	238.1	106 9	345.0
1910	239 0	105.2	344.2
1911	232 1	103 8	335 9
1912	221 3	97 7	319 0
1913	216 4	93.1	309.5
1914	200 8	88 3	289 1
1915	184 9	84 9	269 8
1916	190.4	84 0	274 4
1917	197 7	82 0	279 7
1918	200.6	83.8	284.4
1919	189 0	84 0	273.0
1920	186.5	82.9	269.4
1921	191.9	82.1	274.0
1922	186.9	79 1	266.0
1923	189 4	79.2	268.6
1924	202 8	80 7	283.5
1925	219 8	82 7	302 5
1926	226.6	85 3	311.9
1927	226 9	87 9	314 8
1928	232.0	90 1	322.1
1929	—	92.3	—
1930	—	—	—

* The countries included are Australia, New Zealand, Union of South Africa, Argentina, and Uruguay in the Southern Hemisphere, and the United States, Canada, the United Kingdom, France, and Germany in the Northern Hemisphere.

the individual countries were dissimilar. The trends and cyclical fluctuations in Australia and the United States were approximately identical with the trend and cyclical fluctuations of the world. In the Union of South Africa and New Zealand the trend was decidely upward but a more or less distinct cyclical movement could nevertheless be established, while the trend in the River Plate and in the European countries was downward, but a cyclical movement

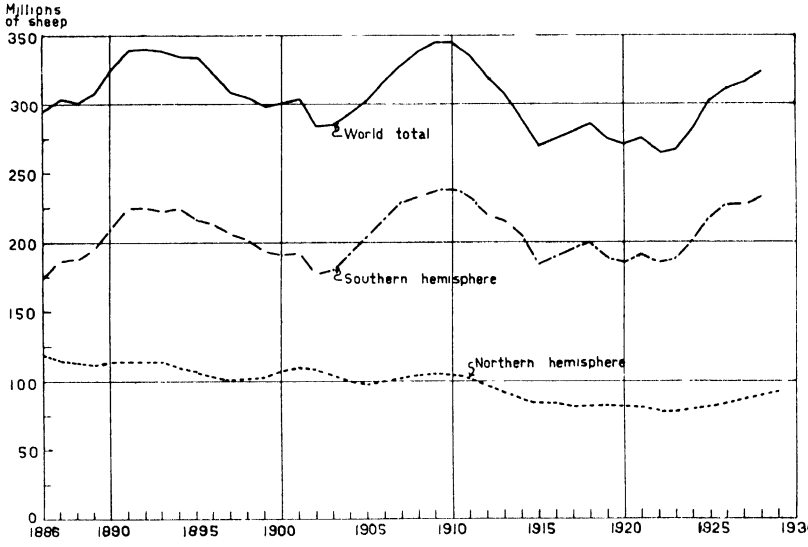

FIGURE 1. ESTIMATED NUMBER OF SHEEP IN 10 IMPORTANT WOOL PRODUCING COUNTRIES OF THE NORTHERN AND SOUTHERN HEMISPHERES AND THE ESTIMATED WORLD TOTAL, 1886-1930

The countries included are Australia, New Zealand, Union of South Africa, Argentina, and Uruguay in the Southern Hemisphere, and the United States, Canada, the United Kingdom, France, and Germany in the Northern Hemisphere.

was also apparent even if it existed in some cases only, in that it arrested a further decline during a period when the world trend was upward.

The net result or the summation of the trends and the cyclical movements in the number of sheep in the different countries indicates that although the total number did not increase or decrease to any extent since 1886 the variations in the total number from time to time nevertheless became more pronounced.

The fluctuation in the number of sheep in the world divides itself into two phases. The first is the phase in which the number of sheep was relatively high and which is characterized by the

peak years of 1892, 1910 and 1928, the time interval between the respective peaks being about 18 years. The second is the phase in which the numbers were relatively low and approximately stationary for about 8 years, which occurred during the periods 1897-1905 and 1915-1923. The time interval between the periods of relatively low sheep numbers, if the years 1901 and 1919 be taken as the median of each stationary period, is also about 18 years.

The peaks and low points in the number of sheep in the world alternated with each other at regular intervals of about 9 years, as follows, beginning with the peak year: 1892, 1901, 1910, 1919, and 1928.

As the average duration of a complete sheep cycle is approximately 9 years there appears to be a paradox in that the complete cycle as exemplified by the world sheep cycle is twice this length, or of 18 years duration from peak to peak, the first cycle running from 1892 to 1910 and the second from 1910 to 1928. The reason for this is explained mainly by the fact that there are two distinct types of wool producing sheep, the merino and the crossbred which, if they could be segregated as to numbers, would clearly indicate the normal behavior of a sheep cycle, and each type of sheep would alternately predominate in a complete 9-year cycle. This is shown in figure 2, which represents the relative production of merino and crossbred wool from 1888-89 to date.

The alternation of the 9-year merino sheep cycle with the 9-year crossbred sheep cycle is not apparent in all the 10 countries, because the persistent upward or downward trend in the number of sheep, or the relatively small importance of the merino and crossbred in some countries would necessarily obscure any existing cyclical movements.

Without analyzing the different factors that affected the number of sheep and the relative importance of the merino and crossbred in the different countries, it is interesting to note that the sum total of these effects resulted in a world cycle which in most respects is comparable to that of the United States and to a lesser extent to that of Australia.

The average weight per fleece has an important bearing on the total wool production and the trend in the average weight will largely determine the trend in the total world production. The sheep has become increasingly productive since 1890. The average

weight per fleece was approximately 5.6 pounds in 1890. By 1930 it had increased to about 7.6 pounds. This is an increase of approximately two pounds in 40 years or one-half pound every ten years.

WORLD WOOL PRODUCTION

The production of wool in the world has been upward and the trend can best be represented by a straight line (figure 2). The

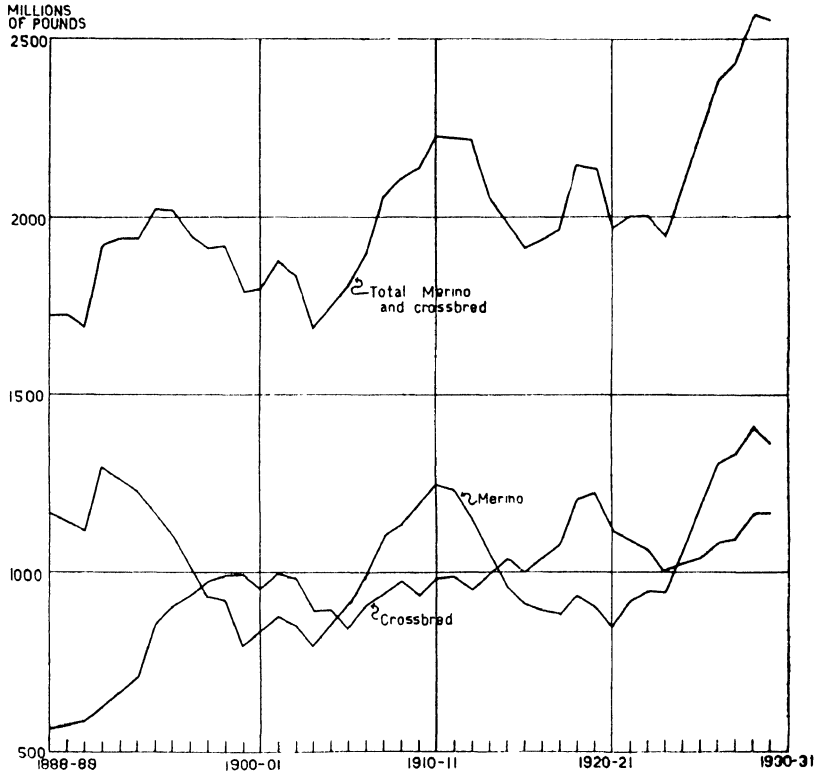

FIGURE 2. WORLD PRODUCTION OF MERINO AND CROSSBRED WOOL, 1888-89 to 1929-30

variation in the total production from time to time is due to a distinct cyclical movement which consists of a major and a minor cycle which are superimposed, so to speak, upon one another.

Since 1888-89 the major cycle has shown three distinct peaks or levels of high production, occurring respectively in about 1894-95, 1910-11 and 1928-29. The minor cycle has two less distinct peaks which alternate with the peaks of the major cycle and occur

in 1901-02 and 1919-20. The peaks of the major cycle as well as those of the minor cycle are about 17 to 19 years apart.

The total production increased from 1,729,600,000 pounds in 1888-89 to 2,528,300,000 pounds in 1929-30, an increase of

Table 2. World Production of Merino and Crossbred Wool, 1888-89 to 1929-30

Season (beginning September 1)	World production of wool		
	Merino	Crossbred	Total Merino and Crossbred
	(millions of pounds)	(millions of pounds)	(millions of pounds)
1888-89	1,161 6	568 0	1,729 6
1889-90	1,149 8	575 0	1,724 8
1890-91	1,110 1	583 9	1,694 0
1891-92	1,294 5	619.3	1,913 8
1892-93	1,268 8	667 3	1,936.1
1893-94	1,228 3	707 8	1,936.1
1894-95	1,165 5	854 7	2,020.2
1895-96	1,110 1	909 8	2,019 9
1896-97	1,012 1	933 5	1,945.6
1897-98	934 8	976 4	1,911 2
1898-99	925 9	990 9	1,916 8
1899 1900	796 0	991.2	1,787 2
1900 01	836 3	956 8	1,793 1
1901-02	875 7	997 4	1,873 1
1902-03	851 6	982 8	1,834.4
1903-04	793 7	895 4	1,689 1
1904-05	853 4	896 6	1,750 0
1905-06	914 4	843 1	1,807.5
1906-07	992 5	903 9	1,896 4
1907 08	1,103 2	949 3	2,052 5
1908 09	1,132 8	972.8	2,105.6
1909 10	1,192 5	939 9	2,132 4
1910-11	1,243 9	981.6	2,225.5
1911-12	1,234 9	983 0	2,217 9
1912-13	1,150 3	963 2	2,113.5
1913-14	1,066 5	993 8	2,060 3
1914-15	956 1	1,033 4	1,989.5
1915-16	914 3	999 8	1,914.1
1916-17	895 4	1,039 9	1,935.3
1917-18	884 4	1,076.0	1,960.4
1918-19.	936 3	1,206 7	2,143.0
1919-20	911 8	1,222.3	2,134.1
1920-21	849 6	1,117.5	1,967.1
1921-22	917 9	1,089.4	2,007.3
1922-23	945 7	1,061.8	2,007.5
1923-24	944 9	998.6	1,943.5
1924-25	1,054 0	1,020 5	2,074.5
1925-26	1,178 9	1,039 3	2,218.4
1926-27	1,306 0	1,078.5	2,384.5
1927-28.	1,331.3	1,095.2	2,426.5
1928-29	1,406.2	1,163.2	2,569.4
1929-30	1,364.1	1,164.2	2,528.3

798,700,000 pounds or 46.2 per cent in 42 years. The long-time increase, however, is brought out more clearly by comparing the different peak periods. The average production per season for the two seasons 1894-95 and 1895-96 was 2,020,000,000 pounds; for the seasons 1910-11 and 1911-12, 2,222,000,000 pounds; and for the seasons 1928-29 and 1929-30, 2,549,000,000 pounds, or successive increases from peak to peak of 202,000,000 pounds, and 327,000,000 pounds, or 10.0 per cent and 14.7 per cent respectively. The average production during the two minor peaks was as follows: During the seasons 1901-02 and 1902-03, 1,854,000,000 pounds, and during the seasons 1918-19 and 1919-20, 2,131,000,000 pounds; an increase of 285,000,000 pounds or 15.4 per cent.

The rate of increase in wool production during any particular phase of the cycle was most marked from 1923-24 to 1928-29. This period constitutes the first half of the third major cycle since 1888 and the production increased from 1,944,000,000 pounds to 2,569,000,000 pounds or an average increase for the 5 seasons of about 125,000,000 pounds. At no time during the last 42 years and probably at no time before then has wool production increased at such a rate during a five year period.

The production for the 1929-30 season was somewhat less than the record production of the former season and this strongly suggests that the downward trend in world wool production has already begun.

The major and minor cycles referred to previously as comprising the total wool production cycle are characteristically those of merino and crossbred wool. They alternate with each other at regular intervals. The former is more pronounced and shows greater cyclical fluctuations than the latter.

THE MERINO CYCLE

The trend in the production of merino wool was practically constant throughout the period 1888-89, 1929-30. For the first 20 years, however, it was somewhat downward and for the last 20 years slightly upward. The peaks or high levels of production in the merino wool cycle were concurrent with those of the world cycle except during the peak of the '90's, because of the rapid increase in the production of crossbred wool. The time interval

between the peaks is from 18 to 19 years and they alternate regularly with the periods of low production in 1900 and 1919.

The average production per season for the three seasons 1891-92, 1892-93, and 1893-94 was 1,264,000,000 pounds, and for the three seasons 1927-28, 1928-29, and 1929-30, 1,367,000,000 pounds; an average increase of 100,000,000 or 8.2 per cent in 37 years. During the last 42 years the world production of merino wool fluctuated between 800 and 1,300 million pounds. The increase in world wool production since 1919-20 is solely due to the unprecedented increase of merino wool, since during these 10 years the production of crossbred wool remained constant.

The trend in the relative proportion of merino wool in the world's clip was downward and was most marked from 1890 to 1900. During the seasons 1891-92, 1910-11 and 1928-29 the proportion of merino wool in the total world's clip was 67.6 per cent, 55.9 per cent and 54.7 per cent respectively while in 1899-1900 and 1919-20 it amounted to 44.5 and 42.7 per cent.

The 1928-29 season is the probable termination of the third peak in the merino cycle since 1888 and the actual production of merino wool in the 1929-30 season has decreased about 40,000,000 pounds.

At present the only important merino wool producing countries are Australia, the Union of South Africa, and the United States. In 1929-30 these three countries produced about 92 per cent of the total merino wool production to which Australia contributed 54 per cent, the Union of South Africa 22 per cent, and the United States 16 per cent. In 1891-92 the percentage contribution of merino wool from these three countries to the world total was only 67.6 per cent of which Australia produced 47 per cent, the Union of South Africa 8 per cent, and the United States 13 per cent. The production of merino wool in the River Plate during the 1891-92 season constituted 23.9 per cent of the world total.

The decrease in the actual and relative production of merino wool first became evident in some of the European countries and was due to the increased competition from the Southern Hemisphere. In the early '80's New Zealand began to change from merino to crossbred due to the developing export trade in mutton and lamb.

The relative production of wool in the Argentine underwent a radical change from 1890 to 1900 changing from a merino wool

to a crossbred wool-mutton-lamb basis. Uruguay was the last country to permanently change to an essentially crossbred wool producing country and the change took place soon after 1912.

It is, therefore, evident that although the trend in the world production of merino wool during the last 42 years was practically constant, the trend in the three leading countries was decidedly upward and the production increased from 875 million pounds in 1891-92 to 1,008 million in 1910-11 and to 1,291 million in 1928-29.

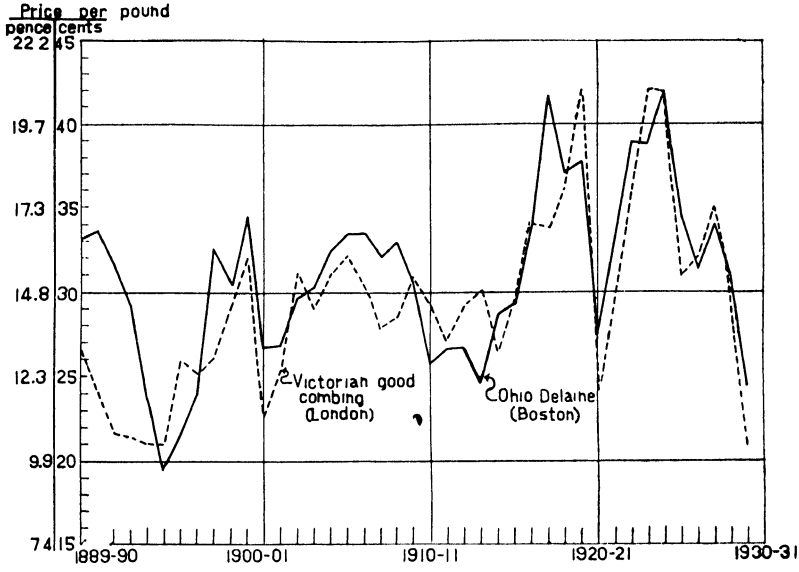

FIGURE 3. DEFLATED AVERAGE PRICES OF MERINO WOOL AT LONDON AND BOSTON, 1889-90 to 1929-30

THE CROSSBRED WOOL CYCLE

The secular fluctuations in the production of crossbred wool are not so evident as in the case of merino wool. The trend in production was positive, and this accounts for a similar trend in the total world production. The production of crossbred wool has doubled since 1890, but the rate of increase was greatest from 1890 to 1900. The periods of relatively high production were from about 1899-1900 to 1901-02 and again from 1918-19 to 1920-21. During this period the average production increased from 982,000,000 pounds to 1,182,000,000 pounds, an increase of 200,000,000 pounds or 20.4 per cent.

ACTUAL AND RELATIVE PRICES OF MERINO AND CROSSBRED WOOL

The trend in merino and crossbred wool prices in London and Boston since 1888-89 was upward, but more so in Boston than in

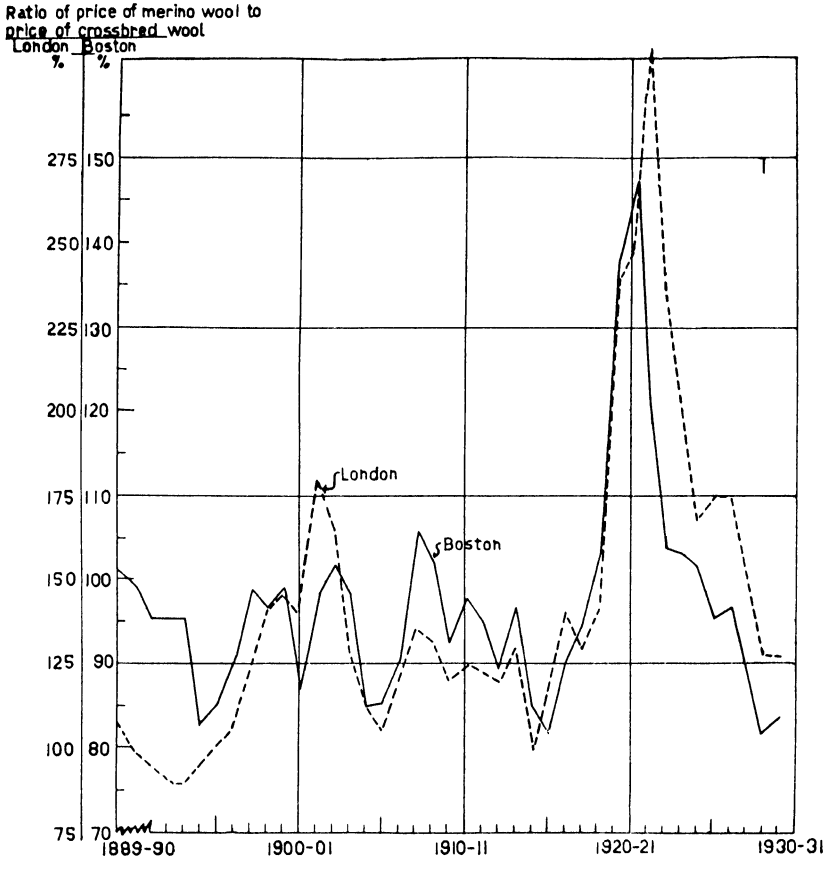

FIGURE 4. PRICE RATIO OF MERINO WOOL TO CROSSBRED WOOL AT LONDON AND BOSTON, 1889-90 TO 1929-30

Based upon average price of Ohio Delaine (Merino) and Kentucky ¼ blood (crossbred) at Boston, and upon average price of Victorian good combing Merino and medium crossbred at London.

London. The trend in crossbred wool prices in London was somewhat down but in Boston the reverse tendency is shown. The trend in the relative prices of merino and crossbred wool in London, therefore, was also up, but no marked trend is observed with

respect to the relative prices of the different grades at Boston (figures 3 and 4).[1]

The respective trends in the relative prices of foreign and domestic wools correspond to the respective trends in the total relative production and domestic relative production of merino and crossbred wool. In the former case there is an inverse relation while in the latter case the trends were neither up nor down.

A general relationship is observed between production and prices and relative production and relative prices. The seasonal variation in actual and relative prices is only partly explained by the effect of the total and relative production of the current and probably the few preceding seasons, since other factors have an effect on price.

The factors other than production that influence price are not treated in the present paper.

The price of wool from 1889-90 to 1894-95 declined and the average price of merino wool at London fell from 27.0 cents to 21.3 cents, and in Boston from 33.1 to 19.5 cents (table 3).[2] The change in the tariff schedule which placed wool on the free list from August, 1894 to July, 1897 was probably the major factor that caused domestic prices to decline more than foreign prices.

The relative price of merino wool also decreased in both countries from 1889-90 to 1894-95. In London the ratio of the price of merino to crossbred wool decreased from 108.7 per cent to 93.0 per cent and in Boston from 101.5 per cent to 83.0 per cent (figure 4, and table 4).

The total world production and the production of merino wool during this period of general price decline was relatively high.

After 1894-95 actual and relative prices of wool increased while actual and relative production decreased. In 1899-1900 a speculative boom was experienced on account of a fear of an actual shortage of merino wool, and merino wool prices rose to extreme levels, but a reaction set in the following season causing all prices to decline. The prices of all grades increased during the next five seasons and the demand for crossbred wool in 1904-05 and 1905-06 caused the relative prices of merino wools to be low. After 1906-07 foreign and domestic prices declined more or less con-

[1] Prices are given for merino wool only (table 3).
[2] Prices in London as given in table 3, converted to cents.

Table 3. Deflated Average Price of Merino Wool at London and Boston, 1889-90 to 1929-30

Season (beginning September 1)	Deflated average price per pound	
	Victorian good combing (London)	Ohio Delaine (Boston)
	(pence)	(cents)
1889–90	13.4	33.1
1890–91	12.1	33 5
1891–92	10.8	31.4
1892–93	10.6	29.0
1893–94	10.5	23.7
1894–95	10.5	19.5
1895–96	12 9	21.4
1896–97	12 6	24.0
1897–98	13.1	32.4
1898–99	14.4	30.6
1899–1900	16.0	34.6
1900–01	11.2	26.8
1901–02	12 7	26.7
1902–03	15.5	29.6
1903–04	14.6	30.3
1904–05	15.6	32.5
1905–06	16.1	33.5
1906–07	15.2	33.5
1907–08	13.8	32.0
1908–09	14.3	32.9
1909–10	15.6	30.5
1910–11	14.6	25.6
1911–12	13.5	26.6
1912–13	14.6	26.7
1913–14	15.1	24.5
1914–15	13.2	28.7
1915–16	14.9	29.2
1916–17	17.0	33.9
1917–18	16.8	41.4
1918–19	18.1	37.1
1919–20	21.0	37.7
1920–21	12.0	27.4
1921–22	14.8	33.1
1922–23	18.5	38.8
1923–24	21.0	38.7
1924–25	20.8	41.9
1925–26	15.4	34.2
1926–27	16.0	31.3
1927–28	17.5	34.1
1928–29	14.6	30.8
1929–30	10.4	24.3

tinuously to the beginning of the war, and the price of merino wool declined more than that of crossbred wool.

During this general decline in prices from about 1907-08 to 1913-14 the total production of wool and the production of merino

Table 4. Price Ratio of Merino Wool to Crossbred Wool at London and Boston, 1889-90 to 1929-30

Season (beginning September 1)	*London*[1]	*Boston*[2]
1889-90	108.7	101 5
1890-91	99 0	99 6
1891-92	96 8	95 8
1892-93	91 6	95 8
1893-94	89.2	95.7
1894-95	93.0	83.0
1895-96	101.1	85.5
1896-97	105 8	91.6
1897-98	120 0	99.1
1898-99	140 3	96 8
1899-1900	145 5	99 6
1900-01	138 8	87 7
1901-02	181.4	98 6
1902-03	166 2	102.1
1903-04	127 7	98 5
1904-05	112 2	85 8
1905-06	105 4	86.0
1906-07	111 6	91.1
1907-08	135.9	106.7
1908-09	132.0	102 7
1909-10	120.0	92.4
1910-11	124.8	98 4
1911-12	124.5	95.6
1912-13	122.4	89 9
1913-14	129.3	97.2
1914-15	99 4	86 0
1915-16	119.1	82.3
1916-17	141.1	90.8
1917-18	128.5	95 1
1918-19	141 4	104.8
1919-20	234.1	139.3
1920-21	245.9	148.0
1921-22	306.5	122.0
1922-23	235.0	104.5
1923-24	196.4	104.2
1924-25	168.9	102.6
1925-26	174.3	96.5
1926-27	174.5	97.8
1927-28	149.1	90 9
1928-29	127.6	82.3
1929-30	126.1	84.9

[1] Per cent which average price of Victorian good combing was of average price of medium crossbred at London.

[2] Per cent which average price of Ohio Delaine was of average price of Kentucky ¼ blood at Boston.

wool was relatively high. At the commencement of the war, relative prices and even actual prices of merino wool decreased, which was due to the greater initial demand for crossbred wool for military purposes. The war caused the price of all grades of wool to

rise to extreme levels. After the war there was a relative shortage of merino wool and a great demand for it for the manufacture of civilian clothes, and this caused prices to rise still further. The large stocks of crossbred wool on hand caused crossbred wool prices to decline. This resulted in the spread between the prices of merino and crossbred wool becoming increasingly greater. The 1919-20 season was a record one with respect to prices but the average prices the following season declined by approximately 45 per cent and continued to decline in 1921-22. The average price of crossbred wool in London during this season was 9.6 cents in terms of the 1913 dollar, or about one-third the average price of merino wool.

After the depression in 1920-21 prices improved and another record season in prices was experienced in 1924-25 which was fully comparable to the high prices of 1919-20. Relative prices from 1920-21 to 1924-25 declined, however, but this was largely due to the relative increase in the price of crossbred wool.

After the 1924-25 season, the trend in actual and relative prices was downward. The price of merino wool in London fell from 42 2 cents in 1924-25 to 21.1 cents in 1929-30, while in Boston it decreased from 41.9 cents to 24.3 cents, or a decline of approximately 50 per cent and 42 per cent respectively. Relative prices for foreign wools decreased from 168.9 per cent to 126.1 and for domestic wools from 102.6 per cent to 84.9 per cent.

Domestic prices are normally above wholesale prices mainly due to the tariff on wool. The price of wool during the last few years has declined much more than wholesale prices. The index number of wholesale prices in 1929-30 was 132 and that of merino wool 117. The index number of wholesale prices in the United Kingdom for the season 1929-30 was 125 and the index number of the average price of merino wool was 96.

Present prices of merino wool in terms of purchasing power are about as low as they ever were, since 1888-89, and in the United States they are lower than that of any other season except during a few seasons when wool was admitted free of duty.

SUMMARY AND CONCLUSION

The trend in the production of wool has already started to go down. This trend is likely to continue for a number of seasons. For the next few seasons world production will not be greatly

different from the record clips of the last few seasons, since the seasonal production does not show a great variability. The ratio of the price of merino to crossbred wool was lowest in 1928-29. This ratio has increased somewhat during the last season and will continue to do so for a number of seasons. The production of crossbred wool is increasing relative to that of merino wool. The probable production in the future will depend upon whether the increase in crossbred wool production will be more than the decrease in merino wool production.

If the regularity of the wool production cycle continues, within about five or six seasons the third minor peak, which characterizes a relatively high proportion of crossbred to total wool will be reached. Actual and relative prices of merino wools will increase and be particularly high at that time.

There are some indications which need not be elaborated here, that the present cycle has been overextended and that certain forces were favorable which led to the abnormal increase in wool production which would otherwise not have eventuated. It is probable that the abnormal price situation during and after the war had much to do with this. If this contention is correct, then the rate in the decrease will probably be greater than would otherwise be the case.

The phenomenal increase in the production of merino wool has not been due to the expansion of new areas or to the increased production in semi-arid regions, but it occurred in areas where competition from other agricultural enterprises was potentially the greatest. Under the present price situation these areas are likely to show the greatest change in production, within the next few seasons.

THE RELATION OF QUALITY TO THE PRICE OF FARM PRODUCTS

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IT IS often said that there can in a truly competitive market be only one price for a commodity at a given time and place. Price as a function of time varies with changes in the volume of the supply on the market and with changes in the aggregate demand curve of the consumers in the various markets, and other causes.

The price research which has developed rapidly during the past few years has naturally followed closely in the footsteps of the economic theory of value. Thus, the most important theories of value are primarily concerned with the relationship of price changes through a period of time to changes in the volume of the supply and in the elevation and slope of the supply-price curve. The price studies of Moore, Working, Ezekiel, Warren and Pearson, Schultz, Leontief and many other statistical economists have been primarily concerned with measuring these relationships.

Differences in price from place to place have received less attention both from the theorist and from the statistician. One of the few studies of this question with which the writer is acquainted is an analysis of intermarket differentials in the prices of watermelons, cantaloupes, and peaches in three eastern United States cities.[1] While little research has yet been done in this field, such studies are likely to provide interesting and useful conclusions.

PRICE VARIATIONS AT THE SAME TIME AND PLACE

Until recently, quantitative price research as well as price theory has been rather closely limited to these two phases: The variation of price from time to time, and from place to place. Does this give an adequate explanation of commodity prices? The answer depends upon the truth or falsity of the original assumption that there is only one possible price for a given commodity at the same

[1] A. S. McLeod, Intermarket Distribution of Perishable Fruits and Vegetables, N.Y. Food Marketing Research Council Report Vol. 1, June 30, 1926.

time and place. If the assumption is strictly true, an explanation of price changes from time to time and from place to place will be an adequate and complete explanation of price behavior. If the assumption is not true, further analysis is needed to explain the variation in prices occurring at the same time and place. A few facts might not be out of place at this point. Recent studies of the prices of certain fruits and vegetables in Boston, Massachusetts, have indicated that the following ranges in price between different lots of a commodity at the same time in the Boston wholesale market are not unusual: Potatoes from $1.75 to $3.25 per hundred pounds; McIntosh apples from $1.00 to $3.00 per bushel; asparagus from $3.00 to $12.00 per crate; and tomatoes from 50¢ to $2.50 per bushel. If we consider potatoes, McIntosh apples, asparagus and tomatoes as commodities, it is evident that there is a wide variation in prices in the same market at the same time. In many cases, this variation in prices is greater than the usual variation in average prices of the same commodities from month to month or from year to year. The theorist sidetracks this fact by defining the word "commodity" in such a way that all units must be of identical quality. Such a definition is valid enough for the purposes of analysis. Yet, it rules out of consideration an element of prices which is important. It should also be noted here that no two carloads of apples or potatoes are, in fact, identical in quality.

What causes this type of price variation? The causes fall into two groups. The first group of causes includes all factors determining the bargaining ability of different buyers and sellers, such as the size and regularity of the buyer's purchases, credit terms and many other complex factors. The second group of causes includes all differences in the characteristics of the goods themselves. This complex group of factors is usually called "quality" although the word quality is also often used in more limited senses. As used in this paper the word "quality" refers to any characteristics, such as size, shape, color, firmness and amounts of damage by various insects and diseases, which vary from one lot of a commodity to another.

STUDIES OF QUALITY-PRICE RELATIONSHIPS

We are here concerned with the relation of quality to the prices of agricultural products. A number of studies of such relationships have recently been made. Benner and Gabriel and also Yount have studied the relation of retail egg prices to quality.[2, 3] Kuhrt has determined the relation of wheat prices to protein content, test weight, dockage and other quality factors.[4] Studies of prices and quality of about ten fruits and vegetables have either been completed or are being completed by the writer and by Kroeck.[5] Studies of cotton quality and prices are being made by Campbell of North Carolina and work on this subject has also been done by Youngblood and others of the Bureau of Agricultural Economics. Cornell University is planning a series of quality-price studies covering the most important agricultural products of New York State.

These studies are concerned with the variation which exists in the prices of a commodity at the same time and in the same market. They attempt to measure the relationship of such price variation to differences in quality. It should, perhaps, be noted in passing that such an analysis does not deny the existence of price variation at the same time and place due to factors other than quality (such as differences in the size and terms of individual purchases). The existence of variation in prices due to such other causes need not in most cases hinder us greatly from determining the average relationship of prices to various qualities.

METHODS OF COLLECTING AND ANALYZING DATA

The methods used in all these studies are practically the same. A trained inspector works with a group of producers or dealers

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[2] C. L. Benner and Harry S. Gabriel, Marketing of Delaware Eggs, Delaware Agricultural Experiment Station Bulletin No. 150, 1927.

[3] H. W. Yount, formerly of the Massachusetts Agricultural College. This study has not yet been published.

[4] W. S. Kuhrt. A Study of Farmer Elevator Operation in the Spring Wheat Area. U. S. Bureau of Agricultural Economics Preliminary Reports (mimeographed) 1926 and 1927.

[5] Frederick V. Waugh, Quality Factors Influencing Vegetable Prices. Journal of Farm Economics, April, 1928.

Frederick V. Waugh. Quality as a Determinant of Vegetable Prices. Columbia University Press, 1929.

Julius Kroeck. McIntosh Apple Study. Mass. Dep't of Agriculture Bull., 1929.

Frederick V. Waugh, C. M. White and M. R. Hersey, Market Preferences and Premiums for Maine Potatoes. Maine Development Commission Bulletin, 1930.

for a period of time—preferably for at least one marketing season. He makes careful and detailed inspections of a large number of samples of wheat, cotton, potatoes or asparagus. After each sample has been sold, the actual selling price is determined. When a sufficient number of records of quality and prices is available they are tabulated and analyzed to determine the average relationship between each quality and price. Such an analysis can be made by simple averages of prices received or paid for various qualities, or net relationships can be determined by multiple correlation methods.

The method can be illustrated from a study which is now being made of market preferences and premiums for Maine potatoes.[6] A potato inspector is visiting about thirty-five wholesalers and jobbers in Boston and New York. During the past season he inspected one thousand lots of potatoes (car lots in the wholesale markets and smaller lots in the jobbing markets). The inspection records go into considerable detail showing with respect to each lot of potatoes the percentages of various diameters, lengths, weights, shapes and amounts of various defects; also the color of skins, variety, origin and all other information which might indicate desirable or undesirable quality. About forty statements of quality are recorded for each car. To correlate with these qualities we have jobbing prices in lots of one to five 100-pound bags, wholesale prices in lots of over five bags, and prices to shippers. These data have been partially analyzed, using both simple averages and multiple correlation methods.

Before making the analysis of prices it was necessary in this case—as in most others—to make allowance for the seasonal variation in prices due to the supply situation. This was done by expressing each actual price as a deviation from the top of the quoted daily range of U. S. No. 1 potatoes according to the government market report. Such an adjustment rather effectively eliminates seasonal changes in the general level of potato prices in the market and limits the study to an analysis of factors carrying individual lots to sell above or below the quoted price.

The next step was to average the adjusted prices received for

[6] This study is being made by the Maine Development Commission cooperating with the U. S. Bureau of Agricultural Economics, the New England Research Council, the Maine Department of Agriculture and the University of Maine. It was started in October, 1929 and will be continued until about March, 1931.

potatoes of different sizes, colors, and so forth, in order to find the simple relationship of each of these factors to prices in the jobbing market, prices in the wholesale market, and prices returned to shippers in Maine. After studying these simple averages, certain correlation problems were analyzed to determine the net relation of certain qualities to prices.

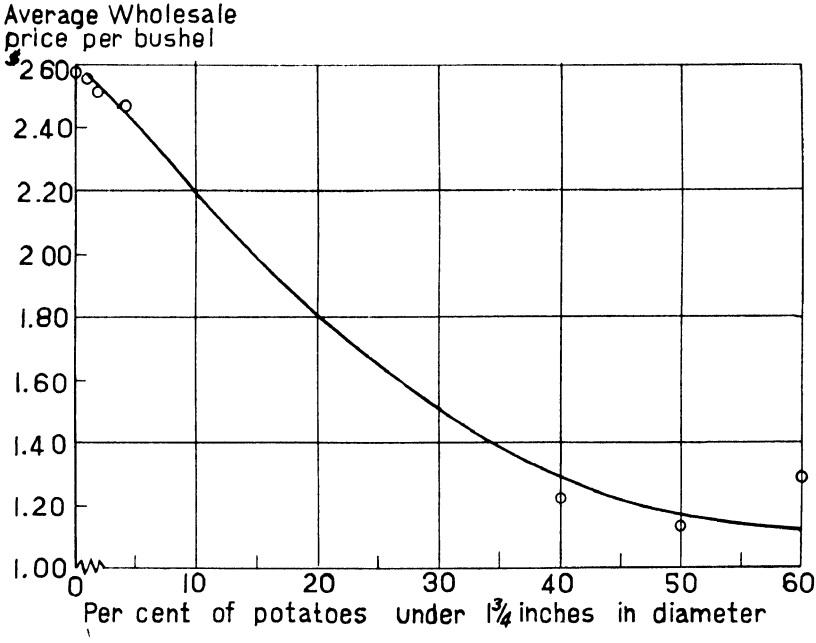

FIGURE 1 RELATION OF THE PERCENTAGE OF POTATOES UNDER 1¾ INCHES IN DIAMETER AND THE CARLOT WHOLESALE PRICE PER BUSHEL IN THE BOSTON MARKET

PRELIMINARY RESULTS OF THE MAINE POTATO QUALITY STUDY

The simple average prices paid last season in the Boston wholesale market for potatoes with varying size, color and amounts of bruises are shown in figures 1 to 3.

Average wholesale prices for cars of potatoes with 0 per cent, 1 per cent, 2 per cent, and so forth, under 1¾ inches in diameter are shown in figure 1. Cars with no undersized potatoes sold at an average (adjusted) price of $2.59 per hundred pounds; cars with 1 per cent under 1¾ inches sold at an average of $2.57; 2 per cent undersize at $2.52; 4 per cent undersize at $2.47; 40

per cent undersize at $1.22; 50 per cent undersize at $1.17; and 60 per cent undersize at $1.29. It is quite apparent that potatoes under 1¾ inches in diameter are undesirable in the Boston wholesale market. Even a small percentage of this size evidently has a depressing effect on prices. Cars of "seconds" with 40 per cent to 60 per cent under 1¾ inches in diameter sold at only about one-half the price of cars with from none to 4 per cent of this size.

Potatoes from 1¾ inches to 2¼ inches in diameter appear to be sold readily in the Boston wholesale market without any de-

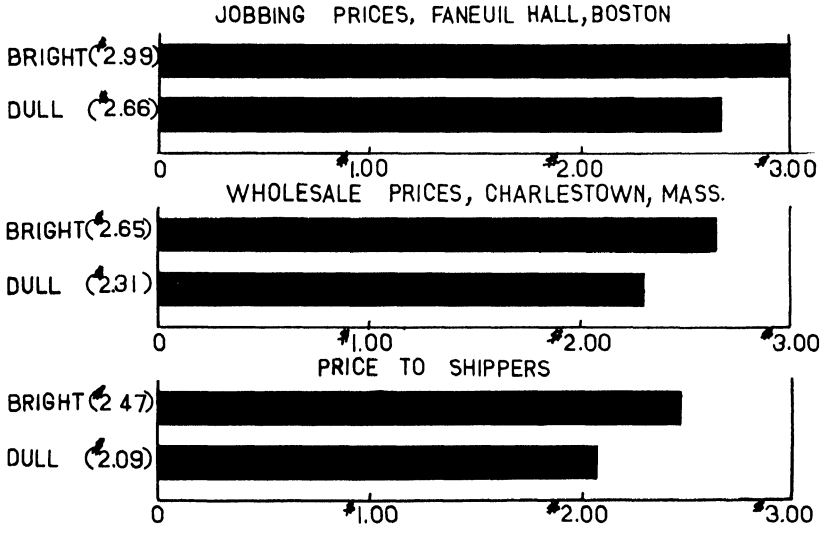

FIGURE 2. PRICES RECEIVED IN THE BOSTON MARKET BY JOBBERS, WHOLESALERS, AND SHIPPERS FOR BRIGHT-COLORED AND FOR DULL-COLORED POTATOES

cided reduction in price except in case 40 per cent or more of the potatoes are of this small size.

The prices received in the Boston market by jobbers, wholesalers and shippers for bright potatoes as compared with prices received for dull potatoes, are shown in figure 2. The premiums paid for bright potatoes average 33 cents per hundred pounds in prices to jobbers, 34 cents in prices to wholesalers and 36 cents in prices to shippers.

Average Boston wholesale prices for cars of potatoes with varying amounts of bruises, or mechanical injury, are shown in figure 3. Cars with 1 per cent bruises sold for an average price of $2.66

per 100 pounds; 2 per cent bruises for $2.62; 3 per cent and 5 per cent bruises for $2.55; and 6 per cent to 10 per cent bruises for $2.42. Additional bruises (more than 10 per cent) caused a sharp drop in prices: 11 per cent to 20 per cent of bruises averaged only $1.81. Beyond 20 per cent of bruises causes a further moderate decline in prices; cars with 31 per cent to 60 per cent of bruises averaged $1.57.

It might be noted in passing that the relationship of bruises

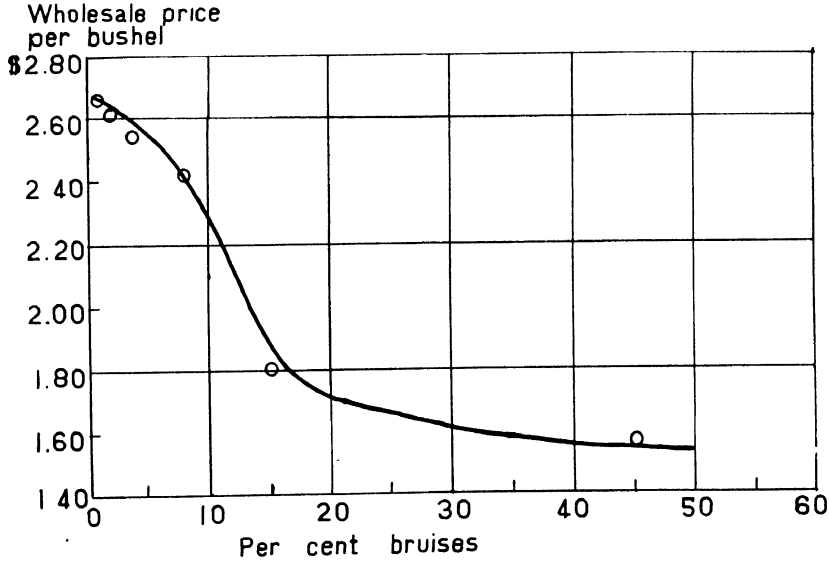

FIGURE 3. RELATION OF THE PERCENTAGE OF POTATOES SHOWING BRUISES OR MECHANICAL INJURY AND THE CARLOT WHOLESALE PRICE PER BUSHEL IN THE BOSTON MARKET

to price is typical of relationships between most defects and prices of agricultural products. The curve is relatively flat at each end and steep in the middle indicating that the market will take a small percentage of defects at practically no reduction in price; beyond a certain point prices fall sharply with any increase in defects until a low level is reached; beyond this point further defects have little influence on prices. The shape of this curve has a decided bearing on grading policies.

The average prices received by shippers in six different producing regions in Maine and New Brunswick, Canada, compared with

the average color and the average percentage of bruises on the potatoes inspected from these regions, are shown in figure 4. Dull color and a high percentage of bruises brought low average prices in west central Aroostook and in central (or southern) Maine. High color and few bruises account for the fact that New Brunswick potatoes brought a substantial premium in the market. In general, it will be seen that the average prices received for potatoes from these six producing sections were closley related to the average color and the average per cent of bruises on the potatoes shipped from these sections. The coefficient of correlation is $R_{1.23} = 0.927$.

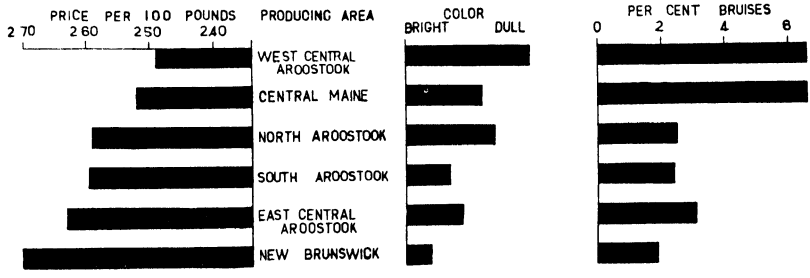

FIGURE 4 RELATION OF THE AVERAGE COLOR AND THE AVERAGE PERCENTAGE OF BRUISES OF POTATOES INSPECTED IN SIX DIFFERENT PRODUCING REGIONS, AND THE AVERAGE PRICE PER BUSHEL RECEIVED BY SHIPPERS

RESULTS OF MULTIPLE CORRELATION ANALYSIS

The next step in the analysis was to find the net relationship of a few of the more important qualities to prices. This was done by multiple correlation methods. The correlation results in the Boston wholesale market will illustrate the conclusions. The quality factors selected for analysis were:

X_2 The percentage of potatoes under 1¾ inches in diameter.
X_3 The percentage from 1¾ to 2¼ inches in diameter.
X_4 The percentage of misshapen potatoes.
X_5 Color (coded as follows: bright = 1; fairly bright = 2; dull = 5).
X_6 The percentage of bruises.

The dependent variable, X_1, was the logarithm of the wholesale price in Charlestown. The correlation is based on 596 records covering potatoes from Maine and New Brunswick, Canada.

The correlation coefficient, $R_{1.23456} = 0.938$. When corrected by B. B. Smith's formula for the number of observations and independent variables this coefficient is unchanged in the third decimal place. In this type of price analysis there is practically no limit to the possible number of observations making the results much more reliable than the results of most time series. We can certainly conclude that wholesale potato prices in Boston are highly correlated with these five qualities.

Which are the most important? The determination coefficients are as follows:

Percentage under 1¾ inches, $d_{12\ 3456}$	0.290
Percentage 1¾ to 2¼ inches, $d_{13\ 2456}$	.0.021
Percentage misshapen, $d_{14\ 2356}$	0.025
Color, $d_{15.2346}$	0.134
Percentage of bruises, $d_{16\ 2345}$	0.410
Total, $d_{1\ 23456}$	0.880

It appears that variations in the amount of bruises accounted for 41 per cent of the squared variation in prices; variations in the per cent under 1¾ inches in diameter accounted for 29 per cent; and variations in color accounted for 13 per cent. The other two qualities were relatively unimportant.

The regression coefficients show the net increase or decrease in prices which accompanied increases of one unit in each of the quality factors. In non-technical language this means the "net influence" of one per cent of undersized potatoes, bruises, and so forth, on prices.[7] These regression coefficients show that in the Boston wholesale market each one per cent of potatoes under 1¾ inches in diameter tended to be accompanied by (or caused), a drop in price of 2.67 cents per 100 pounds. Each one per cent of potatoes from 1¾ to 2¼ inches reduced prices by 0.23 cents per 100 pounds; one per cent misshapen, reduced prices by 0.46 cents; one per cent of bruises reduced prices 2.23 cents; and dull color reduced prices 23.64 cents below the price for bright color.

[7] Since price cannot be considered as influencing quality, we can for practical purposes consider that the relationships measure the influence of quality on price.

PRACTICAL APPLICATION OF RESULTS

These results can be used in a number of practical ways which cannot be fully discussed in this paper. The most important result is to focus the attention of the grower, the shipper and the technical production expert, on certain possible improvements in the processes of production and marketing. It has, of course, always been known that bruises, small potatoes, and dull colored skin were undesirable, but no reliable, definite estimates of their influence have been available. We now know that last season these three factors accounted for 83 per cent of the variation in prices in the Boston wholesale market. It is possible to control all these factors to some extent. Particularly is it possible to reduce the percentage of bruises or mechanical injury by better methods of handling potatoes. Bruises accounted for 41 per cent of the price variation in Boston and were the most important of the qualities studied. Each one per cent of bruises reduced prices about 2¼ cents per hundred pounds. What can be done about it?

First, we must note that there is a great deal of variation in the percentage of bruises from farm to farm, from storage house to storage house, and from one producing region to another. These variations are caused both by variations in natural conditions—such as the stoniness of fields, and so forth—and also by variations in methods of digging, picking up, storing, grading and loading potatoes. The next step, therefore, is to go into the producing region and study the technique involved in reducing bruises. How can the operations of digging, picking up, storing, grading and loading be done in such a way as to result in fewer bruises? Also, how much more will these methods cost than the methods now in use? Can growers and dealers get fewer bruises by practical, inexpensive methods? These questions are being studied this fall by a survey now under way in the fields and storage houses in Maine.

The grower controls size within certain limits, both by proper production practices and by grading. The study indicates that the present minimum size for U. S. No. 1 grade (1¾ inches in diameter) is satisfactory for the Boston market, but possibly rather low for the New York market. In both markets there might be some advantage in barring from the No. 1 grade, cars with more than 25 per cent or 30 per cent under 2¼ inches in diameter.

The premium of almost 24 cents a hundred pounds for bright colored potatoes suggests the need for methods of cleaning potatoes. If such methods can be devised they are likely to be profitable.

RESULTS OF OTHER QUALITY STUDIES

The potato quality study has been discussed at some length to give an idea of the purposes, methods, and results of this type of research. Results of a few other studies might be interesting.

A study in Boston a few years ago showed that the market paid an average premium of 38½ cents a dozen bunches for each inch of green color on asparagus. This was by far the most important quality factor influencing Boston prices. Since the study was made, production experts have demonstrated methods which local growers can use to produce "long green" asparagus without great additional expense.[8] Growers in Middlesex County, Massachusetts, have during the past two years changed their production methods to take advantage of the market premium for green color.

A study of prices of hot house cucumbers indicated that the Boston market paid a high premium for long, slender cucumbers. The premium was great enough to induce growers near Dighton, Massachusetts, to adopt a new variety of cucumber and certain new production practices in order to produce the proper length and shape. These growers are now getting a substantial premium.

A study of McIntosh apple prices in Boston showed that the market paid high premiums for well-packed fruit. Apples of average quality when "jumble-packed" brought $1.95 a bushel; layer-packed brought $2.29, and wrapped layer-packed, in the northwestern apple box, brought $2.58. Such information can and is readily used by growers.

RESULTS GIVE CHECK ON GRADE REQUIREMENTS

In addition to suggesting ways in which quality may profitably be changed by production methods, studies of quality can provide a useful check on grade requirements. A set of grades for a commodity should be based on qualities which cause differences in market prices. Fancy grade should bring higher prices than No. 1;

[8] V. A. Tiedjens, W. O. Whitcomb and R. M. Koon; Asparagus and its Culture; Mass. Extension Leaflet, No. 29, 1929.

No. 1 should sell at higher prices than No. 2, and so forth. This subject cannot be at all adequately discussed here, but it should be noted that the United States grades on asparagus and cucumbers have been improved on by local growers' associations shipping to Boston.[9] These associations have a stricter requirement on green color of asparagus and length of cucumbers than is required by the United States grades.

NEED FOR STUDY COVERING A NUMBER OF MARKETS

If such studies are to be used to best advantage as a basis for grade requirements they should be made in a number of important markets rather than in one market. Market preferences vary from city to city and it would be absurd to base a United States grade on a measurement of demand in Boston. An example of this can be seen in the demand for green color on asparagus. Boston pays a large premium for green color; the premium is small in Worcester, Massachusetts, and practically no premium for green color is paid in Springfield, Massachusetts.

Such variation in demand suggests the desirability of detailed descriptive grades in the wholesale markets which would provide in code form the essential information about the quality of potatoes, asparagus, or wheat which was to be shipped. This could easily be done in the case of commodities which are inspected at the shipping point. For example, instead of quoting a car of U. S. No. 1 potatoes, the shipper might use a code to show the color, the percent under 2¼ inches in diameter, and the percent of grade defects. The term U. S. No. 1 might be followed by the statement, "1-10-4," to indicate that the potatoes were bright; had ten percent under 2¼ inches in diameter; and four percent of grade defects. Such a code is universally used in the fertilizer business to show the constituents. It might well be adapted to a description of the quality of fruits and vegetables, cotton, wheat, or other products.

OTHER QUALITY QUESTIONS TO BE STUDIED

Many other questions concerning price differentials paid for quality deserve some study. It would be desirable to study the

[9] Mr Olsen in his talk on Monday evening clearly brought out the relationship of studies of market preferences to grade requirements.

variations in such premiums, not only geographically—from one market to another—but historically, *i.e.*, from week to week and from one season to another. These differentials change with the size and quality of the crop and also with the strength or weakness of the market. In general, dealers are more particular in their preferences when prices are falling than when prices are rising.

The premiums paid for quality also vary a great deal in some cases at different stages in the marketing process. The farmer who sells eggs to the country store, in many cases, gets the going price for eggs, regardless of the quality of his own product, in spite of the fact that when his eggs are sent to the terminal market in the city their price will depend a great deal on how they "candle out." Campbell and Youngblood, in the studies previously mentioned, find that in many cases the cotton grower gets only a small premium for quality in spite of substantial premiums in the central markets.

In the case of the potato quality study mentioned above, the quality of the potatoes has been correlated with the jobbing prices, wholesale prices and prices to the shipper. The results show that in this case the premiums paid in the city markets are reflected back almost fully in the prices returned to shippers. However, no information is available concerning the prices which the shipper pays to the farmer.

Studies of the variation in price differentials for quality at different stages of the marketing process are very important from the growers' point of view. It is not enough for us to demonstrate that the city market pays a premium for high quality food products. Unless the farmer himself gets a premium for producing and marketing products of high quality, he will not be particularly interested in trying to meet the demands of the market. Any system of marketing which pays the farmer a flat price for his commodities regardless of quality, is a poor system.

An aspect of quality which deserves the careful study of the home economist is the relation of market price differentials to "use value," or cooking value. To what extent do market premiums reflect superior qualities of economy in preparation, of taste, of consistency, or other factors representing basic differences in the adaptability of the commodity for consumption? The home

economics department of the University of Maine is making such a study of potatoes to determine the relation of size, shape, defects, and so forth, to both the waste in paring potatoes and the quality of the cooked product.[10]

Before concluding this discussion it might be well for us to note that the distinction between the words "qualitative" and "quantitative" have led many people to think of quality as an indefinite, unmeasurable factor. The fact is, I believe, that all qualities of commodities are tangible, measurable—and, if you please, quantitative factors. Size, shape, weight, color, percentages of defects and many other qualities are easily measured. Mr. Olsen has described measurements of moisture content, sugar content, firmness and other qualities harder to measure. It is possible now to describe almost all qualities in accurate terms. Among the few exceptions—so far as I know—are taste and smell. Even these seemingly intangible qualities must be determined by definite factors such as chemical composition and consistency.[11]

While it may be difficult to find methods of measuring some of these factors in ways simple enough to use in the field or in the market, methods for use in the laboratory should be possible. Meanwhile, before field methods are developed, it is comforting to know that inspectors can be trained to agree almost perfectly with one another in scoring commodities according to taste. Butter graders have standardized the description of taste to a remarkable degree.

CONCLUSIONS

In conclusion we can fairly state that careful studies of price premiums or price differentials paid for quality can give results which are practical and useful. When coordinated with studies of methods of production, harvesting, grading and marketing, they offer a necessary basis for adjusting the quality of production to market demand. In addition to answering such practical questions, I believe such studies can throw some much-needed light

[10] While no results of this study have yet been published, a preliminary report is being prepared on the first phase. The title is "A Study of Factors Contributing to Culinary Waste of Maine Potatoes on the Boston Market" by Myrtle Walker Dow, University of Maine, 1930.

[11] Since writing this statement I find that classifications of both taste and odor have been proposed and the classification of odor has been used in quantitative measurements of perfumes.

on price theory. The theory of value almost disregards quality by treating different qualities of potatoes, shoes or automobiles as separate and distinct commodities. In the case of many farm products, the variation in quality is so great as to be more important than variations in supply and demand conditions from time to time. Yet, we have a price theory largely in terms of changes in these supply and demand conditions and practically no knowledge of the relation of prices to quality. A more useful price theory would be one which accounted for the joint influence of time factors, geographical factors and quality factors. This would be, in effect, a four dimensional analysis with time, place and quality three independent variables at right angles with one another, jointly determining prices.

EFFECT OF CHANGES IN DAILY PRICES ON THE MOVEMENT OF FARM PRODUCE TO TERMINAL MARKETS

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PRICE is generally considered only as a resultant of the interaction of supply and demand forces. Until recently very little emphasis has been placed on price as a causal factor. However, more and more attention is being given the fact that price itself is an important factor governing future supply. Fluctuations in the supply volume of a product, both produced and offered for sale, are partially attributable to variations in the price.

The responses which are made to price stimuli may be classified as either production or marketing responses. The former are reflected in changes in the acreage of crops planted, numbers of animals bred, fertilizing practices followed, and the like. The latter consist of decisions which are made after the product has been produced and is ready for sale. Fluctuations in shipments to the local or central market and changes in the movement of products out of and into storage, are examples.

This paper is limited to some considerations of marketing responses to price. Because of the data available on daily prices and market receipts as well as the limited storage of the product at the market, hogs at Chicago were used in the analysis.

Measurements of the effect of changes in the price of hogs from one day to the next on the number of hogs received at Chicago on subsequent days were made. The hog cycle, seasonal variations, and wide differences in the number of hogs received on different days of the week complicated the problem.

The methodology adopted was briefly as follows (table 1): On the two occasions when the price of hogs declined 40 cents per hundredweight from Saturday to Monday, the number received on Monday was 134,300, and on Thursday 44,300. Thursday's receipts were 33 per cent of Monday's receipts. Similarly, when the price advanced 40 cents, receipts on Thursday were 105 per cent of those on Monday.

For the entire eight-year period, 1921-28, Thursday's receipts averaged 68.2 per cent of Monday's receipts. Assuming this as the normal relationship, receipts of hogs on Thursday were 48

per cent of normal when the price declined 40 cents from Saturday to Monday and 154 per cent of normal when it advanced 40 cents. Or, to put it in other words, Thursday's receipts were 52 per cent below normal in the first case and 54 per cent above normal in the latter.

Plottings of these percentages revealed that the relationships were approximately linear (figure 1). Accordingly, straight lines

Table 1 Effect of Changes in the Price of Hogs from Saturday to Monday on the Receipts the following Thursday at Chicago, 1921-1928

Change in the price from Saturday to Monday (cents)	Number of changes	Total number of hogs received		Percentage changes in the number of hogs received on Thursday		
		Monday	Thursday	Ratio of Thursday's receipts to Monday's receipts	Average ratio for the entire period = 100	Average ratios expressed as deviations from 100
−40	2	134,300	44,300	33 0	48 3	−51 7
−35	5	289,100	143,800	49 7	72 8	−27 2
−30	9	528,700	279,200	52 8	77 3	−22 7
−25	10	587,500	303,600	51 7	75 7	−24 3
−20	22	1,406,000	673,100	47 9	70 1	−29 9
−15	28	1,590,400	867,200	54 5	79 8	−20 2
−10	36	2,060,400	1,207,000	58 6	85 8	−14.2
− 5	38	1,952,100	1,283,400	65 7	96 2	− 3 8
0	27	1,376,100	926,900	67 4	98 7	− 1 3
+ 5	30	1,424,800	1,061,700	74 5	109 1	+ 9 1
+10	40	1,867,700	1,398,700	74 9	109 7	+ 9 7
+15	42	1,790,(00	1,694,600	94 6	138 5	+38 5
+20	27	1,089,400	886,800	81.4	119 2	+19 2
+25	20	677,300	604,900	89 3	130 7	+30.7
+30	11	420,200	317,700	75 6	110 7	+10 7
+35	6	251,400	211,600	84 2	123 3	+23 3
+40	2	78,400	82,600	105 4	154 3	+54 3
Averages for the entire period		49,000	33,400	68 2	100.0	0 0

were fitted to the data by the method of least squares. In addition, an assumption was made that no change in the receipts should correspond with no change in the price. Adjustments were made to meet this assumption.

The relative slopes of the straight lines so fitted indicate the *average* percentage change in the receipts corresponding to a given absolute change in the price. Thus, for example, Tuesday's receipts changed 2.08 per cent; Wednesday's receipts, 4.39 per cent; and Thursday's receipts, 5.63 per cent following a change of five cents in the price from Saturday to Monday (table 2).

For a 40 cent change in the price the percentages were 16.61, 35.12, and 45.04 respectively.

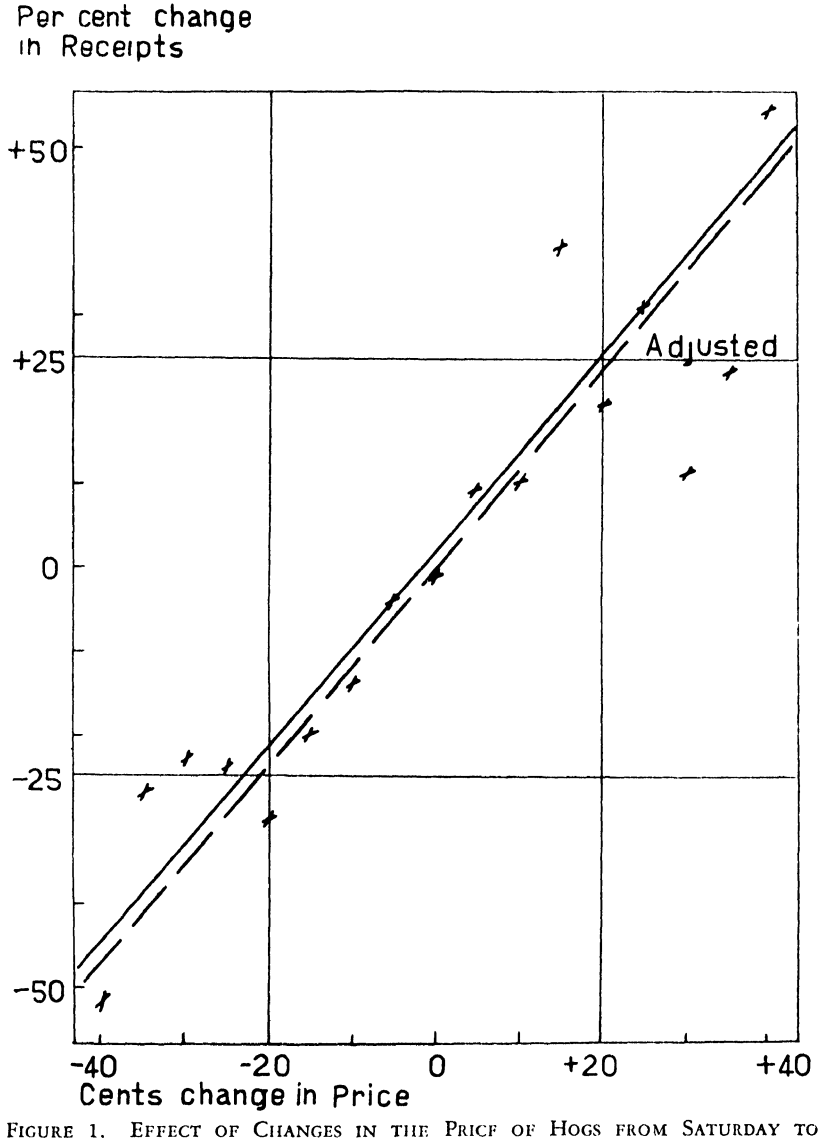

FIGURE 1. EFFECT OF CHANGES IN THE PRICE OF HOGS FROM SATURDAY TO MONDAY ON THE RECEIPTS THE FOLLOWING THURSDAY AT CHICAGO, 1921-1928

Note that the greatest effect of the change in the price was on receipts Thursday, three days later. This time lag maintained for all price changes with the exception of those taking place from

Friday to Saturday. A change of 40 cents, for example, in the price from Monday to Tuesday was followed by a change of 14 per cent in Wednesday's, 31 per cent in Thursday's, and 51 per cent in Friday's receipts.

The reasons for the lack of effectiveness of changes in price from Friday to Saturday are obvious. During this period only 3.5 per cent of the weekly receipts of hogs arrived on Saturday. From the standpoint of prices received, Saturday was typically a poor market. The necessity for cleaning up the supplies for the week-end was an important factor. As a consequence, changes in the prices paid for hogs from Friday to Saturday were not

Table 2. Effect of Daily Changes in the "Average" Price of Hogs on Later Receipts at Chicago, 1921-1928

A change of five cents in the price	Per cent change in receipts					
	One day later	Two days later	Three days later	Four days later	Five days later	Six days later
Saturday to Monday	2 08	4 39	5 63	3 44	1 80	3 10
Monday to Tuesday	1 71	3 93	6 22	5 31	3 93	1 86
Tuesday to Wednesday	1 31	4 36	7 58	4 10	3 00	4 36
Wednesday to Thursday	1 23	5 39	5 40	4 47	3 20	3 95
Thursday to Friday	0 48	3 85	5 74	3 71	3 43	3 88
Friday to Saturday	1 22	2 54	2 61	3 18	3 92	3 71

considered indicative of the general market condition of the coming week.

The effect of changes in the price of hogs on later receipts varied with the season of the year, the phase of the hog cycle, the trend of prices, and other factors. Were this not the case, rather distinct periodic variations similar to cycles of over- and under-production of livestock would be clearly evident.

During the pre-war period, 1910-13, a change of five cents in the price of hogs from Saturday to Monday was followed by a change of 9.9 per cent in Thursday's receipts (table 3). A similar change in the price after the war, during a comparable period, 1921-24, was followed by a change of only 5.4 per cent. The effect in the earlier years was almost twice as great as in the latter. Let it be noted, however, that hog prices fluctuated from day to day one-half as violently before the war as after.

During the four-year period, 1921-24, the number of hogs re-

ceived at Chicago was large and prices were low. In the year 1923 a record total of nearly ten and a half million hogs was officially received at the yards. During the four years, 1925-28, prices were much higher as a consequence of lighter receipts. The first period included the trough of the hog price cycle and the second period, the peak.

Table 3 Relative Effect of Changes in the Price of Hogs from Saturday to Monday on Receipts Tuesday, Wednesday and Thursday at Chicago

A change of five cents in the price	*Per cent change in receipts*		
	Tuesday	Wednesday	Thursday
"Average" prices, 1921 28	2 08	4 39	5 63
"Top" prices, 1921 28	2 35	4 47	5 84
"Average" prices, 1910 13	7 72	8 82	9 92
"Average" prices, 1921 24	1 56	4 02	5 42
"Average" prices, 1925-28	2 94	4 91	5 89
"Average" prices, winter months	2 95	4 75	6 54
"Average" prices, summer months	2 77	4 32	5 78
"Average" prices, prices falling	2 63	4 28	6 01
"Average" prices, prices rising	2 61	5 23	6 01
"Average" prices, advances during rising and declines during falling prices	2 38	3 90	5 27
"Average" prices, advances during falling and declines during rising prices	3 18	5 90	7 61
"Average" prices, large spread[1]	2 41	4 06	4 66
"Average" prices, small spread[2]	4 25	6 16	8 74
"Top" prices, large spread[1]	2 47	4 99	6.03
"Top" prices, small spread[2]	2 83	5 28	7 32
"Average" prices, following price changes in the opposite direction from Friday to Saturday	2 87	5 03	6.84
"Average" prices, following price changes in the same direction from Friday to Saturday	2 73	7 74	10 60
"Average" prices, following price changes in the same direction for two or more days	4 88	5 26	5 11

[1] Difference between "top" and "average" prices 60 cents or more
[2] Difference between "top" and "average" prices less than 60 cents

At the top of the cycle, a change of five cents in the price from Saturday to Monday was followed by a change of 5.9 per cent in the receipts of hogs on Thursday. At the bottom of the cycle, when prices were low, the percentage was 5.4. Price changes were slightly more effective at the top of the cycle than at the bottom. This difference is somewhat more significant when the fact that a five-cent change in the price at an eleven dollar level is smaller in percentage terms, than the same absolute change at an eight dollar level, is considered.

During the winter months, October through March, a five-cent

change in the price of hogs from Saturday to Monday was followed by a change of 6.5 per cent in receipts on Thursday. During the summer, the corresponding percentage was 5.8. The greater influence during the winter than during the summer is attributable to several factors. Of these, an important one is the conflict with farm work in the summer which does not permit the shipment of hogs to market in response to the price factor alone.

The spread between the daily "average" and "top" or highest prices of hogs is a rough measure of variations in their quality. During the off-season of the year when a relatively small number of hogs are marketed and those vary in quality from low-grade breeding stock to good choice hogs, this spread is very large. During the regular marketing season, the differential is much less because the quality of hogs then marketed is fairly uniform.

When the spread between the two prices was small, a change of five cents in the price from Saturday to Monday was followed by a change of 8.7 per cent in Thursday's receipts. When the spread was large the percentage was 4.7. This difference is highly significant. It indicates that the market is followed more closely by producers of a high quality product than by producers of a low quality product. Or, perhaps better, producers generally follow the market more closely when they are marketing a high quality product than when they are marketing one of low quality.

Undoubtedly this spread factor contributes to an explanation of the difference in the effect of price changes on later receipts in the summer and winter, for the months of largest spreads are summer months.

During periods of falling prices, as measured by the net change in the six preceding market days, a change of five cents in the price from Saturday to Monday was followed by a change of 6 per cent in the receipts on Thursday. During periods of rising prices, similarly measured, the effect was exactly the same.

If, however, price advances when the trend is downward and declines when the trend is upward, are taken together, the results are very different. Price changes in the direction opposite that of the trend of prices at the time, were more effective than price changes in the same direction. Price advances stimulated receipts more when the trend of prices was downward than when it was upward. Similarly, declines retarded the movement more when prices were rising than when they were falling.

Changes in the price of hogs on the days immediately preceding the changes under consideration greatly influenced the relationships. When the price changed five cents from Saturday to Monday following changes in the opposite direction from Friday to Saturday, receipts on Thursday changed 6.8 per cent. When the five-cent change followed changes in the same direction from Friday to Saturday, the percentage change in Thursday's receipts was 10.6 per cent. In other words, two successive price changes in the same direction were more effective than single movements.

A change of five cents in the price from Saturday to Monday following changes in the same direction for two or more days was followed by a change of only 5.1 per cent in Thursday's receipts. Whereas two successive price changes in the same direction were more effective than one, three or more were less effective than either two or one. When the price advances rapidly there is some holding back of stocks for further rises. When it declines rapidly there is some shipment to the market for sale before further declines.

In concluding this paper, I wish to emphasize the desirability of a better understanding of the effects of daily changes in prices, on the movement of farm produce to terminal markets. The analysis here presented is but a meager beginning in that direction More refined analyses of wider application should be made.

Alternate under-supplied and over-stocked or glutted markets with violently fluctuating prices are not favorable to a satisfactory marketing of farm produce. Upward trends in the direct marketing of livestock and in f.o.b. sales of fruits and vegetables are surface evidences of a desire on the part of producers to escape fluctuating short-time market prices.

PHILIPPINE AGRICULTURE AND ITS ECONOMIC PROBLEMS

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IT IS impossible to discuss in any degree of detail the problems of agriculture of a country with which you are not very familiar, in 30 minutes. If you have only a limited time at your disposal in a new place or city you probably would prefer to wander around to have a glimpse of some of its interesting features, rather than stay in one place or building to make a more thorough examination of it. So in discussing Philippine agriculture I shall try to take you to its many points of economic interest, even if you don't have more than a passing glimpse of them, rather than use the whole time in examining just a single point. Such a general discussion will probably be of more interest to you inasmuch as tropical and oriental agriculture is quite different from the agriculture of temperate countries in many respects.

THE PHILIPPINES AN AGRICULTURAL COUNTRY

The Philippines, which are as large as Italy in area, and with a population of 13,000,000 people, are essentially agricultural. And, like other oriental countries, agriculture is today the main industry. On the solution of its problems depends the welfare and happiness of its people.

Of the portion of the population engaged in gainful occupations, about half are in agricultural pursuits.

Up to the present time the amount of land in the Philippines under cultivation is only about 13 per cent of the entire area, or 21 per cent of the 44,000,000 acres (18,000,000 hectares) available for agriculture. From the standpoint of national economy, therefore, the development of these vast resources is the biggest problem that faces the Philippines today. To depict to you the extent of these resources, I might mention that one of the 48 provinces, if put under rubber cultivation, would be able to supply all the rubber demands of the United States. Various proposals are being made for the development of these resources. There is a proposal for the construction of a network of roads and railroads and other transportation facilities; for making land surveys

to make disposal of land easy; the placement of migrants from the thickly populated sections to these areas; and for attracting foreign capital. One of the great hindrances toward the carrying out of such a program as has been mentioned is the limited financial resources of the government. I shall not go into this matter any further, except to mention certain precautions which should be kept in mind in carrying out such a program of development, namely, the necessity of a study of various physical and biological conditions and their relation to agricultural possibilities. It is only in this way that such an investment may become safe and profitable, from the standpoint of the country and the individuals who are to settle on this land. Through such a study, it should be possible to map out areas suited to agriculture and thus avoid future abandonment, and to determine the farming types and organization best suited to different areas.

TYPES OF FARMING

What will probably interest you most are the types of farming in the Philippines, which represent in certain ways the state of tropical and oriental agriculture.

At the present time the Philippines grow nine of what may be called standard crops, in addition to a few thousand acres of many others. Of these nine, six crops occupy 99 per cent of the cultivated area. These crops are rice, corn, sugar cane, tobacco, abaca or Manila hemp, and coconuts. Rice, being the principal food of the people, the entire crop raised is used at home. Corn is also consumed locally. The other crop products—sugar from sugar cane, coconut oil and copra from coconuts, Manila hemp, and tobacco are used locally to some extent, with a large portion exported to the United States, Europe, China, Japan, and other eastern countries. It might be surprising to know that the Philippines have trade relations with almost all the countries of Europe.

The six leading crops I have just mentioned are grown in highly specialized regions. The rice regions specialize in rice, the sugar cane regions in sugar cane, and so on. The highest degree of specialization is found in the rice and tobacco regions. For example, the percentages of cultivated area planted in rice in some of the rice provinces are as follows: Nueva Ecija, 95 per cent; Mountain, 94 per cent; Nueva Vizcaya, 90 per cent; Zambales 90 per cent; Rizal, 90 per cent, Bulacan, 90 per cent; and so forth. Specializa-

tion is not only found in the agriculture of the region but a highly specialized farming is followed by farmers in the region. A region may be diversified and yet farming on individual farms may be highly specialized. Results of surveys of 830 farms in 8 different provinces show that in 5 provinces, farmers grow nothing but rice, while in the other three, a secondary crop is planted following rice to the extent of 6.4 per cent of the crop area.

PROBLEMS OF SPECIALIZATION IN AGRICULTURE

From such a state of affairs as I have described arise two very important problems for the Philippines to solve. The first concerns the specialization of its agriculture, and the second, specialization in farming.

The first question that needs to be answered is: Should the Philippines raise only six crops four of which are mainly for export, and then import large quantities of foodstuffs such as rice, meat, milk, eggs, vegetables, and fruits, which may be easily raised at home? After weighing pros and cons, which I do not have time to discuss, it seems that attempts should be made to raise at home the food necessities of the people which may be grown locally, and not to depend upon other countries for the necessities of life. Past experience has shown that when unfavorable conditions occur in those countries, such as poor crops or political troubles, that the people of the Philippines are likely to have to pay exorbitant prices for their products.

PROBLEMS OF SPECIALIZATION IN FARMING

The next question concerns specialization in farming. Is a high degree of specialization in farming the most desirable for Philippine farmers? To diversify, or not to diversify, that is the question. No doubt a certain degree of specialization is desirable because of more desirable conditions of climate, soil, topography, market, and labor for one crop in certain regions than in others. But advantages should be weighted with accompanying disadvantages. Some undesirable results of specialization are: small areas farmed (4 to 10 acres); small hours of labor (700 hours a year); risk in putting all the eggs in one basket; poor utilization of land, labor, and capital; reckless expenditures of incomes when obtained; too much dependence upon the future crop for credit;

purchase of food products which may easily be grown under a less specialized system. It seems that there is yet a wide margin for the Philippine farmer to go toward diversification without reaching the undesirable limit. He should increase the volume of business by increased area, and by adding crop and animal enterprises, and he should raise more of the food products that he needs. In other words, he should keep his labor profitably employed.

In connection with such a diversification program, what is needed is a study of soil, climate, and other physical and biological, as well as economic conditions to determine the adaptability of the region to other crops, and thus arrive at an understanding of the nature and extent of such diversification. All the different factors should be balanced in such a way as will result in the greatest returns to the farmer.

SIZE OF PHILIPPINE FARMS

You have heard much about the small size of farms in the Orient and consequent low income. The average size of Philippine farms is about 8 acres, but 75 per cent of the farms are below 5 acres. Rice farms, which constitute 50 per cent of the cultivated area, average 4 acres, as is also the case with tobacco and corn farms. Abaca and coconut farms are about twice this size, or 10 acres. In sugar cane farming the area is much larger.

An average rice farm, which represents the small-sized Philippine farm, has an investment of about 1,000 pesos or $500. Of this amount, 80 to 85 per cent represents the value of the land. Other items of investment are one or two water buffaloes which act as horse, cow, and steer. The water buffalo is a three-in-one creature. It is the sole source of animal power on farms, it is a source of meat, and it also supplies the milk. Each animal is worth about 140 pesos or $70, or 15 per cent of the farm investment. The remaining 1 to 2 per cent are in equipment consisting of a plow, a harrow, a cart or sled, and some sickles for harvesting. On each farm may also be found 1 or 2 pigs and a few chickens. On coconut and sugar cane farms, the size of business is much larger but still very far from what you usually call a farm in this country where farm capitalization amounts to 10 to 20 thousand dollars, employing in full the whole labor of the family in addition to few months of hired labor.

FARMER'S INCOME

Since the farmer's income measures his economic strength and standard of living, and determines what he can buy and spend for goods, health, education, leisure, and for the improvement of his business, it should be of interest. Again I shall draw my illustrations from rice farming which has probably the lowest income compared with other types of farming. On the average, a rice farmer gets a gross income of about 320 pesos or $160. Subtracting taxes and depreciation, he gets 240 to 300 pesos or $150 for his labor and interest on his investment. His labor returns per hour when computed, are much higher than the wage of agricultural laborers—twice as much in many cases.

You may wonder how a family could live on 300 pesos, especially if creditors take a portion of it, or if a part goes to the landlord as in the case of tenant farmers. But there are other sources of income. Because of specialization, the labor peak of the crop has become the limiting factor in determining the area that a farmer can handle. On the average he spends only 700 hours on his farm per annum. The greatest portion of this occurs during two months of the year, the planting month and the harvesting month. In other words, he actually does only 3 to 4 months of actual work on his farm. To support a family for one year on the income of six months is quite a hard job for any man of average ability, whether he be an American, German, Scotchman, Jew, or Filipino.

This low farm income is supplemented by engaging in secondary, household, or non-agricultural occupations. Of his total working hours per year, only about 60 per cent are devoted to agriculture, while the remaining 40 per cent are devoted to other pursuits. Because secondary occupations cannot be had at all times, the greatest problem of the farmer is how to keep profitably employed. This may be done, it seems, by practising a certain degree of diversification, enlarging his business by enlarging his acreage, and by the addition of other crop and animal enterprises.

PROBLEMS OF TENANCY

Other significant economic problems that affect Philippine agriculture are in connection with tenancy, credit, and marketing. I shall not treat the problem of tenancy, except to mention that about 78 per cent of the farms are operated by owners, and 22 per cent

under some form of tenancy. It is surprising that tenancy should increase when there is an abundance of free land. One of the chief reasons seems to be the gregariousness of the people. They would rather stay with their own people and relatives and rent farms which have been decreasing in size because of continuous subdivision than have better economic conditions by going to other places. In time this will probably change, and then they will leave crowded places and go where they will have better opportunities, economically and socially.

PROBLEMS OF FARM CREDIT

Farm credit is another problem that confronts small as well as large farmers, especially the former. Since specialized farming means that there is but one monetary return during the year, credit is therefore very necessary. Money lenders have taken advantage of this, and have grown rich from lending money at high rates of interest. There are banks, but they are not only rare but give credit only to big-scale farmers. The small farmers depend therefore on store and personal credit. Loans and interest are payable in crop products at harvest time, when prices are very low. Credit is a dangerous tool to those who do not know how to use it. Therefore, the farmer soon accumulates debts and finds it hard to extricate himself from the moneylender's tentacles which have slowly coiled around him. Every year he expects a good crop to pay all debts, but his expectations seldom come true. As a result he finds that at harvest only a portion of his crop is left to him. Under such conditions it is hard for a farmer to raise his standard of living and improve his business. The farmer is as much to blame as anybody else, and only through his education can improvement be possible. We have usury laws against high rates of interest, but all usury laws (like prohibition) are useless if people tolerate old practices.

ATTEMPTS AT COOPERATION

The cooperative idea has recently been introduced in Philippine agriculture, influenced by the progress in the use of cooperative organizations to solve common problems in the United States and Europe. The first effort at cooperative organization was in connection with farm credit, and the second, with the marketing of tobacco.

I have already given you a general picture of the credit problems among small farmers. After much talk and popular discussion of the credit problem, the government began to suspect that with so much smoke there must be fire, and began to investigate. The government found that something was really rotten in Denmark. To remedy the situation, the government passed a rural credit law in 1915, encouraging the formation of cooperative credit associations. The purpose was to "accumulate funds, by means of cooperation, and to encourage thrift, activity, and punctuality in meeting obligations among members." Small farmers whose credit needs are small, usually 100 pesos ($50) or less, are thus given credit facilities. Loans may be made on the personal guaranty of two persons. Loans for productive purposes only are allowed. In 1928 there were 550 cooperative credit associations in the Philippines. The administration is in the hands of members but the government helps in organizing them, supervises their activities, and audits their accounts. These associations have saved members large amounts of money which would have otherwise gone as interest to the many Filipino Shylocks that abound in Philippine rural areas.

Another phase of the agricultural industry in which the cooperative idea has taken hold is in the marketing of tobacco. Before the establishment of these cooperative marketing associations, tobacco farmers were at the mercy of the buyers. The buyers and middlemen fixed prices, for tobacco farmers know nothing of demand or supply, or of market quotations. As these farmers need the money to meet their financial obligations, they are forced to sell at very low prices. Prices were paid without regard to quality. Hence, there was no inducement for the production of a better quality product.

The establishment of cooperative associations in the tobacco regions changed conditions for the better. Better prices were paid according to grade or quality of the product. As a result, farmers now classify their product, and better cultivation has been stimulated. These associations were organized by the Philippine government about six years ago. Government agents assigned to organize them also act as advisers. Being non-stock, non-profit organizations, the working capital comes from commissions which are paid to the association by buying companies which purchase tobacco through the association. Each association elects a mar-

keting committee which locates buyers and arranges prices according to quality. Funds obtained from commissions are used to pay for the services of officers and the surplus is utilized in various ways to help farmers. Some associations use a portion of it for loans to members. Some have established stores where members may buy supplies at cost. It seems that cooperative associations have an important place in various phases of the agricultural industry, and such associations should be encouraged where needs for them exist.

OTHER AGRICULTURAL PROBLEMS

So far, I have called your attention, to some of the more important problems that confront Philippine agriculture. There are many others, but I do not have time to discuss them. But there is one important problem which I should not omit (just one more American minute, Mr. Chairman), and that is the low degree of efficiency of production in Philippine agriculture compared to the other tropical and oriental countries producing similar crops. Our yields per hectare are low. We have yet a long way to go toward improved methods and practices in selecting proper varieties of crops, in the use of improved seed, in the increased use of fertilizer, in giving attention to control of pests and diseases, in better cultivation, in the use of improved breeds of animals, and in the use of better feeding and management practices.

In spite of the handicaps that farmers have to face, agriculture in the Philippines has made tremendous progress. In the last twenty years, the cultivated area has increased 50 per cent; value of production, 200 per cent; and yield per hectare, 30 per cent.

HOPE FOR THE FUTURE: RESEARCH AND EDUCATION

What has been done to remedy the various ills that besiege Philippine agriculture? Not much, compared to the magnitude of the problem. It seems that the hope for the future lies in research, and in the scientific study and investigation of the various problems affecting agriculture, both biologic and economic, and in the discovery of the proper remedies. Then, the dissemination of these facts and remedies to the people. We are beginning to see that "Uncontrolled Nature demands a fearful toll from ignorant farmers," and that only an intelligent and trained farmer can avoid making farming the "greatest gamble on earth."

Whether we want to admit it or not, the fact remains that

in the agricultural industry, competition is growing keener and keener and the Philippines are feeling its effect more and more. This growing rivalry is demanding more and more of the talents of the contending parties. The conflict may be local, or it may be national, as when the Middle West forces New York out of grain farming, or when Wisconsin dairy products, California eggs, and Washington apples, force New York producers to mobilize their forces. The conflict may also be international. It is a conflict in which there is no such a thing as an armistice. Every market is a "no-man's-land," as products are bought on the basis of quality and price and not on the basis of who produced them. It is a conflict with research and education as the important weapons, and tariff as easily-made fortifications. Laboratories and educational institutions are its munition plants and training camps. In this conflict there is also no such thing as armament limitations. The Philippines, for example, cannot have other sugar producing countries stop in their experimentation and education until the Philippines are able to produce sugar with the same degree of efficiency. Countries therefore that provide support for this work forge ahead while those that do not are left by the way side. For the Philippines, therefore, and for any other country for that matter, to keep pace with rapidly advancing countries, greater attention should be given to the development of the sciences of agricultural production and marketing, and to the instruction of farmers in the technique and practices developed by science. Only in this way will the Philippine farmer be able "to overcome the difficulties of his environment so as to compete at least on equal terms of knowledge and skill" with producers in other lands.

TYPES OF FARMING IN CANADA

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THE Dominion of Canada comprises the whole northern half of the North American continent except the United States territory of Alaska, and Labrador, a part of the colony of Newfoundland. It is bounded on the west by the Pacific ocean and Alaska, on the south by the 49th parallel, the Great Lakes, the St. Lawrence river and additional lines set out by the Ashburton Treaty, signed August 9th, 1842, and on the east by the Atlantic Ocean, the gulf of St. Lawrence, the territory of the coast of Labrador, as defined by the award of the Privy Council March 1st, 1927, and Davis strait."[1] The Dominion stretches northward to the polar regions. The total area is officially reported as 3,684,723 square miles, approximately the area of the United States and its dependent territories.

There are five major natural divisions of the Dominion territory. The Canadian or Precambrian shield, covering some two and a half million square miles, includes most of the area north of the St. Lawrence, the Great Lakes, and Lake Winnipeg, and northwest to the Mackenzie River. The Appalachian region, south of the St. Lawrence and east of Quebec, continues in Canada the Green Mountains of Vermont, and the highlands of Maine. The Lowlands of the St. Lawrence, which extend from below Quebec to Lake Huron, constitute a third division between these two previous divisions and the Great Lakes, and support a fertile and diversified agriculture. The Great Plains, with their threefold division into prairie steppes, extend from the southwestern edge of the Canadian shield to the Rockies. The Rockies, or Cordilleras, which constitute the western mountain belt, cover some 600,000 square miles.

HISTORICAL NOTES

Five years after Columbus discovered America, John Cabot discovered Labrador and extended his expeditions along the coast to the north. Labrador was visited by Costereal in 1501 after his discovery of Newfoundland. In 1525, Verazzani explored the

[1] Canada Year Book 1929 page 1.

coast of America from Florida to Newfoundland, and gave the name of New France to the country discovered Jacques Cartier landed at Gaspé Bay in 1534, and took possession of the land in the name of France. After returning to France he came back the following year and explored the St. Lawrence as far as Hochelage (Montreal). In 1541, he made a third trip from France, bringing volunteers to form a colony, which failed disastrously. Little more was heard in Europe of the new country for over half a century. In 1598, attempts at colonization were made at Acadia (Nova Scotia) which were unsuccessful. That year the Marquis de la Roche also landed 60 convicts on Sable Island, a narrow island some 25 miles long about 100 miles southeast of the mainland of Nova Scotia, where they remained prisoners for five years.

A few years earlier (1592), Juan de Fuca discovered the strait which bears his name, which marks the south Pacific limits of the Dominion. This strait separates southern Vancouver Island from the mainland of British Columbia and the State of Washington.

With the beginning of the next century, exploration proceeded apace, and settlements became established at many points. Some of the earliest were at Acadia and Quebec. In 1610-11 Henry Hudson made his famous expedition along the northern coast and explored Hudson Bay and James Bay. British settlement of Nova Scotia began in 1623, very shortly after the arrival of the Mayflower at Plymouth Rock. The charter of the Hudson's Bay Company was granted by Charles II in 1670 and for 200 years all the territory west of the Hudson's Bay was under the control of the company, and operated by Indians and fur traders. As the century progressed, explorations, settlements, and conflicts were numerous. Struggles between French and British continued until 1763, when, by the Treaty of Paris, Canada and its dependencies were ceded to the British.

With the close of the American Revolution in 1775 came a large influx of United Empire loyalists, who settled in Nova Scotia, New Brunswick, the eastern townships of Quebec, and also westward along the banks of the St. Lawrence and the Great Lakes.

In 1811, Lord Selkirk's Red River settlement was founded on land granted by the Hudson's Bay company near the present site of Winnipeg. This settlement was destroyed by the Northwest Company, an active rival of the Hudson's Bay Company, and after being restored was again destroyed. The antagonism of the rival

companies ended in 1821, when the Northwest Company was absorbed by the Hudson's Bay Company.

Confederation of the scattered provinces came through the British North American Act of 1867. In 1871, British Columbia was brought into the Dominion and the transcontinental railway projected, which was commenced in 1875 by the government and subsequently completed in 1886 by the Canadian Pacific Railway Company. Outbreaks of Indians were frequent through the early periods but ceased with the subduing of the second Riel rebellion in 1885. With the building of the transcontinental railway came fairly rapid settlement of the open prairies through grants of free homestead land. At the present time, lands suitable for settlement are confined to northern areas, and few extensive tracts remain unappropriated.

GENERAL REGIONAL NOTES

For the purposes of this discussion of farm type the provinces have been grouped according to their locations. The eastern group, or the maritime provinces, includes Prince Edward Island, Nova Scotia, and New Brunswick. The central group includes Quebec and Ontario. The prairie group consists of Manitoba, Saskatchewan and Alberta. The Pacific province, British Columbia, is considered alone. At the present time, the agricultural significance of the northwest territories is negligible.

The maritime provinces contain only about 2 per cent of the occupied farm land of the Dominion, but in 1921 had 11.4 per cent of the total Canadian population. Over 50 per cent of the potential farm land has been brought into farms. Of the total land area, 61 per cent is estimated to be of potential farm land calibre. Practically all of Prince Edward Island is under farms Nova Scotia and New Brunswick have considerable lands unfit for farming, and of the potential farm land according to the official estimates, about half is still undeveloped.

The agricultural section of the central provinces are found in the lowlands of the St. Lawrence. These extend from the Gaspé peninsula in narrow belts steadily increasing in width for about 650 miles along the St. Lawrence. Around the Great Lakes the area continues some 300 miles to the Ontario peninsula between Lakes Ontario and Huron, and occupies much of the region south of the Ottawa river The agricultural lands of the central prov-

inces are practically all within the Lowlands of the St. Lawrence, with the exception of the clay belts to the north. The official estimate of the potential agricultural lands of this section of Canada is 100 million acres (28 per cent of the total of the

Table 1. Estimated Area of Land, Potential Farm Land, and Occupied Farm Land in Canada, by Provinces, 1921*

Provinces	Total area (millions of acres)	Estimated potential farm land (millions of acres)	Estimated potential farm land Per cent total	Occupied as farm land 1921 (millions of acres)	Per cent of potential farm land occupied in 1921
Maritime					
Prince Edward Island	1 40	1 26	90 0	1 22	96 7
Nova Scotia	13 48	8 09	60 0	4 72	58 4
New Brunswick	17 86	10 72	60 0	4 27	39 8
Total	32 74	20 07		10 21	
Average			61 3		50.9
Central					
Quebec	442 16	43 74	9 9	17 26	39 4
Ontario	234 16	56 45	24 1	22.63	40 1
Total	676 32	100 19		39 89	
Average			14 8		39 8
Prairie:					
Manitoba	148 43	24 70	16 6	14 62	59 2
Saskatchewan	155 77	93 46	60 0	44 02	47 1
Alberta	161 87	97 12	60 0	29 29	30 2
Total	466 07	215 28		87 93	
Average			46 2		40 8
Pacific					
British Columbia	226 19	22 62	10 0	2.86	12 6
Dominion:					
Total	1 401.32	358 16		140 89	
Average			25.6		39.3

* Based on data in table 48 of the Canada Year Book, 1929, page 271

Dominion). Of this area about 40 per cent has already been included in farms.

After leaving the western extremity of the Ontario agricultural region the rough lands of the Precambrian shield occupy some 800 to 1000 miles of Ontario and Manitoba. Beyond this, the Canadian Great Plains stretch some 750 miles, to the foothills of the Rockies, generally increasing in width with the distance

travelled westward. Within the prairie provinces are found some 60 per cent of the potential agricultural land of the Dominion, of which 40.8 per cent had been occupied in 1921.

West of the prairies, in the valleys between the mountain ranges, and on the Pacific coastal plain, British Columbia carries on her diversified agriculture. Official estimates of the agricultural land of this province claim 22.6 million acres, rather more than in the Maritimes, of which some 12.6 per cent had been included in farms in 1921. Official data relating to the total area of land, to the potential farm land, and to the occupied farm land of 1921, by provinces, by regional groups, and for the Dominion, are given in table 1.

GROSS AGRICULTURAL REVENUE

To supplement the foregoing information a statement for 1929 of the gross agricultural revenue of the provinces and regions has been presented in table 2. The general sources from which farm receipts have been derived are indicated.

In the Maritimes, which obtained 6.6 per cent of the gross receipts from Dominion farms, the bulk of the revenue comes from field crops, but the agriculture is diversified and receipts from sales of dairy products, animals, poultry and eggs, and fruits and vegetables are considerable.

The farmers of the central provinces obtained 49.8 per cent of the gross receipts from Dominion farms, of which 47 per cent came from crops, 24.7 per cent from dairying, 14.2 per cent from the sales of farm animals, 7.3 per cent from poultry, and 3.3 per cent from fruits and vegetables.

The farmers of the prairies secured 40.3 per cent of the gross receipts from Dominion farm sales, of which about 75 per cent came from field crops, and 24 per cent from sales of animals and of dairy and poultry products.

To British Columbia agriculture went 3.3 per cent of the agricultural revenue of the Dominion. Field crops brought 36.9 per cent, fruits and vegetables, and poultry and eggs brought 16 per cent each, and sales of farm animals and of dairy products about 14 per cent each of the province's receipts from agriculture. The areas of the principal field crops of each province and region are presented in table 3 to supplement the information given in table 2. The total area of the crops of the prairies was equal to about

Table 2. Gross Agricultural Revenue of Canada, 1929*
(Millions of dollars)

Provinces	Field crops	Farm animals	Wool	Dairy products	Fruits and vegetables	Poultry and eggs	Fur farming	Other	Total
Maritime									
Prince Edward Island	17 0	2 6	0 1	3 7	0 3	1 5	1 5		26 7
Nova Scotia	20 9	4 7	0 4	11 5	3 6	1 9	0 4	0 2	43 6
New Brunswick	23 8	3 6	0 2	8 0	1 0	1 7	1 4	0 2	39 9
Total	61 7	10 9	0 7	23 2	4 9	5 1	3 3	0.4	110 2
Central.									
Quebec	153 7	41 8	1 3	90 0	8 0	16 1	3 0	6 5(1)	320.4
Ontario	241 8	76 0	1 3	115 3	19 2	44 7	1 0	10 1(2)	509 4
Total	395 5	117 8	2 6	205 3	27 2	60 8	4 0	16 6	829 8
Prairie									
Manitoba	88 3	16 5	0 2	17 5	1 5	8 9	0 4	0 8(3)	134 1
Saskatchewan	247 4	25 1	0 2	21 0	1 8	13 5	0 1	0 2	309 3
Alberta	166 5	32 3	0 5	15 0	1 8	11 9	0 4	0 2	228 6
Total	502 2	73 9	0 9	53 5	5 1	34 3	0 9	1 2	672 0
Pacific:									
British Columbia	20 4	7 8	0 3	8 0	9 2	9 1	0 3	0 1	55 2
Dominion									
Total	979 8	210 4	4 5	290 0	46 4	109 3	8 5	18 3	1,667.2

* Based on table 1 in the Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, March, 1930, pages 71–73

(1) Maple products 4 7
Tobacco . 1 2
Honey. 0 5

(2) Maple products . . 1 2
Tobacco . 5 0
Clover grass seed 1 7
Honey 1 7

(3) Honey 0 8

Table 3. Areas of the Principal Field Crops of Canada, 1928*
(Thousands of Acres)

Provinces	Wheat	Oats	Barley	Rye	Buckwheat	Flaxseed	Mixed grasses	Peas and beans	Roots and potatoes	Clovers alfalfa and hay	Corn	Total crop acreage
Maritime												
Prince Edward Island	26 1	164 1	5 2		2 9		23 5	0 2	63 3	254.7	0 6	540 6
Nova Scotia	6.0	109 2	9 4	0 1	7.1		4 5	2 6	46 5	527 6	1 0	714 0
New Brunswick	8 9	209 1	8 9	0 5	42 6		3 1	3 0	66 1	554 9	3 3	900 4
Total	41 0	482 4	23 5	0 6	52 6		31 1	5 8	175 9	1,337 2	4 9	2,155 0
Central												
Quebec	57 0	1,746 0	128 0	12 0	169 0	2 0	119 0	49 0	198 0	4,301 0	112 0	6,893 0
Ontario	803 5	2,660 0	615 4	66 3	271 2	8 0	905 7	160 9	333 9	4,123 6	409 5	10,358 0
Total	860 5	4,406 0	743 4	78 3	440 2	10 0	1,024 7	209 9	531 9	8,424 6	521.5	17,251 0
Prairie.												
Manitoba	2,660 1	1,458 4	1,937 3	120 2	9 9	81 8	10 4	1 3	35 7	410 9	18 5	6,744.5
Saskatchewan	13,790 8	4,358 7	1,621 5	471 1		279 4	21 9	2 5	46 0	456 8	15 0	21,063 7
Alberta	6,706 5	2,340 3	545 5	162 6		6 2	14 1	1 6	39 6	1,896 9	13 5	11,727 8
Total	23,158 4	8,157 4	4,104 3	753 9	9 9	367 4	46 4	5 4	121 3	2,764 6	47 0	39,536 0
Pacific												
British Columbia	59 2	90 8	9 5	6 7		0 7	4 9	3 7	23 7	203 9	67 0	409 8
Dominion												
Total	24 119 1	13,136 6	4,880 7	839.5	502 7	378 1	107 1	224 8	852 8	12,730 3	580 1	59,351 8

* Based on tables 1 and 3, Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, January, 1921, pages 4–25

two-thirds of the area of all crops of the Dominion in 1928. Further statistics of Canadian agriculture by provinces and regions are arranged in table 4. In 1921, in both the maritime and the prairie provinces, over 60 per cent of the total population was rural, and over 50 per cent of that of British Columbia. In the central prov-

Table 4. Statistics of Canadian Agriculture*
(Census of 1921)

Provinces	Per cent of population classified as rural	Number of farms (thousand)	Non-owning operators (per cent total)	Capital per farm	Total area per farm (acres)	Improved area per farm (acres)
Maritime						
Prince Edward Island	78	13 7	2	$ 4,304	89	56
Nova Scotia	57	47 4	2	2,885	100	21
New Brunswick	68	36 7	2	3,596	116	37
Total		97 8				
Average	62		2	$ 3,353	104	32
Central						
Quebec	44	137 6	3	$ 7,969	125	66
Ontario	42	198 1	10	8,540	114	66
Total		235 7				
Average	43		7	$ 8,323	119	66
Prairie:						
Manitoba	57	53 3	13	$12,328	274	151
Saskatchewan	71	119 4	10	13,788	368	209
Alberta	62	83 0	10	11,637	352	141
Total		255 7				
Average	64		10	$12,843	343	164
Pacific.						
British Columbia	53	22 0	9	$ 9,164	130	25
Dominion						
Total		711 1				
Average	50 5		7	$ 9,262	198	99

(Continued on page 801)

inces, the urban proportion of the total population was 14 per cent greater than the rural.

General Summary of the Agriculture of Canada by Regions

The Maritime Provinces

Within the maritime provinces the climate is temperate, with ample precipitation, rather lighter in the summer months than

during the remainder of the year. The growing season is fairly long, starting moderately late in the spring, but usually keeping free from frost until danger of damage to crops from this source is over.

The farms are small averaging about 104 acres per farm, and requiring comparatively little capital. The percentage of tenants

Table 4 (Continued)

Provinces	*Pasture and unimproved land per farm (acres)*	*Crops per farm (acres)*	*Number of horses per farm*	*Number of cattle per farm*	*Number of sheep per farm*	*Number of hogs per farm*
Maritime:						
Prince Edward Island	33	34	2 4	11 0	7	4
Nova Scotia	79	14	1 1	6 0	6	1
New Brunswick	79	34	1 4	5 9	4	2
Average	72	20	1 4	6 7	5	2
Central.						
Quebec	59	43	2 6	14 9	7	6
Ontario	48	41	3 0	13 4	6	8
Average	53	45	2 9	14 1	6	7
Prairie:						
Manitoba	123	110	6 8	12 8	3	6
Saskatchewan	159	149	9 0	9 9	2	5
Alberta	211	103	8 6	16 8	7	10
Average	179	126	8 9	12 2	4	7
Pacific:						
British Columbia	105	16	2 6	1 8	9	3
Dominion						
Average	99	70	4 7	12.6	5	6

* Numbers of livestock based on 1929 totals divided by numbers of farms in 1921.

is low. There were 20 acres of crops per farm in 1921. At that time there were less than two horses per farm, available for farm work. A few cattle and other stock were kept.

The maritime area favors dairying and the production of potatoes, apples, and other fruits, much of which finds its way to the markets of Great Britain. The Annapolis valley of Nova Scotia is one of the most famous fruit producing areas of Canada.

On Prince Edward Island, over 44 per cent of the occupied farm land was in field crops in 1921. Here a specialised agricultural

industry has developed for the production of certified seed potatoes much of which goes to the United States.

At the present time the value of farm lands, with buildings and other improvements, is about $35 per acre. A greater percentage of the potential farm lands of the Maritimes is in farms than is found in any other region of Canada.[2]

In much of this area, the provision of field drainage is necessary. The application to crop land of barnyard manures and artificial fertilizers is the common practice, and occasional treatments with limes and soil corrective are considered advisable in many sections.

THE CENTRAL PROVINCES

The lowlands of the St. Lawrence, on which are located most of the agricultural areas of the provinces of Quebec and Ontario, are favored with a temperate climate, and generally with abundant precipitation fairly evenly distributed throughout the year. The proximity to large bodies of water retards the opening of spring and the approach of frosts and winter. Being located generally near to the densest centres of population in Canada, local conditions have considerable influence on determining the type of agriculture.

Natural and economic conditions favor dairying in a greater degree in this region than in any other Canadian area. In 1929, over 25 per cent of the farm income of these provinces came from the sales of dairy products.

Many varieties of crops are grown readily in this region. The temperate climate and abundant rainfall of many sections produce good pastures and good hay crops. About one-half of the crop land is usually used for hay, which is left down for several years. Corn, mostly for fodder and silage purposes, and roots, have about equal acreage, and together occupied 6 per cent of the crop land in 1928. These crops are primarily used for feeding dairy cattle.

Small grains are usually included in the rotation, frequently for two or more years. Manures are generally applied on the grass lands before plowing the sod. Purchases of commercial fertilizers are general. Lime applications, and similar soil corrective are used in some areas. The provision of field tile drains is necessary through much of this region.

[2] Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, February, 1930, page 45.

Around favored areas, specialized fruit growing businesses have been developed. The Niagara district of Ontario produces excellent apples, peaches, grapes, and many other kinds of fruits favored by the temperate conditions of that area.

A very choice flue-cured tobacco is successfully grown in Norfolk county, Ontario. Other tobaccos are grown more generally in many sections of Quebec and Ontario.

As a general rule, the farms of the central provinces are somewhat larger than those of the Maritimes. The average capital per farm on the 1921 basis, was $8,323, and the crop area per farm, 45 acres. In 1929, the average amount of farm livestock consisted of 3 horses, 14 cattle, 6 sheep and 7 hogs. At that time, the farm lands, with buildings and other improvements, were officially given an average value of $58 per acre, but the range in land values is very great.[1] The fruit lands of Ontario were valued at $147 per acre. Approximately 40 per cent of the potential farm lands of Quebec and Ontario were in farms in 1921 (table 1).

THE PRAIRIE PROVINCES

The farm lands of the prairies are primarily used for grain production, with most of the operations centred on wheat. These areas generally have very fertile soils. The climate is generally more extreme than in the other agricultural areas of Canada. Rainfall is limited, in few areas being as much as 20 inches per year, but the precipitation is usually well distributed during the growing season Occasionally a crop of wheat may receive no rain from seeding to harvest.

The frost-free period is fairly short. In the summer, days are usually hot, and nights cool, favoring the production of high grade hard spring wheat, the major product of the farms of the area.

About 60 per cent of the area producing field crops in 1928, was used for wheat production. Oats were grown on about 21 per cent of the producing acreage, and barley on about 10 per cent. The percentage of land used for crops for hay is small, the acreage in 1928 being only 6 per cent of the total crop area. About two-thirds of this hay was obtained from grain cut for that purpose, or for weed control. Pastures, natural or planted, are generally poor when contrasted with those of more humid areas.

[1] Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, February, 1930, page 4.

To grow a crop of wheat successfully on the prairie plains it is necessary to conserve moisture and to control weeds. The system of farming generally followed throughout this region is to leave the land uncropped for a year, and to plow and work the land sufficiently to keep down the weeds and to retain the moisture. This is generally known as the summerfallow system. In most of the great plains areas the rotations provide for a year of summerfallow followed by one or two crops of wheat and one crop of oats or barley. Certain areas have adopted shorter rotations and summerfallow one half of the land each year.

Barn yard manures are seldom used on the crop land. Chemical fertilizers are being experimented with quite widely, but there is little demand for such supplies at this time on the prairies.

Throughout the grain areas, the farms are much larger than in any other region of Canada. Farms are decreasing in number and increasing in size. The use of expensive machinery of large calibre has increased considerably in recent years. Tractor operations of fields have reduced the numbers of work horses and the numbers of farm hands required. In certain sections the use of the combined harvester-thresher has displaced the binder-thresher method at harvesting. Capital requirements are high on these farms because of the large numbers of acres operated and the heavy investments in expensive machinery and implements. Credit transactions are common, extensive, and protracted.

Land values, including buildings and other improvements, were estimated at about $26 per acre in 1929.[4] The average stock per farm for the prairies consisted of 9 horses, 12 cattle, 4 sheep and 7 hogs. There are many farms on which the animals are limited to the horses required for field work, and the cattle, hogs and poultry for farm family needs. Some farms are operated entirely with mechanical power.

THE PACIFIC PROVINCE

The agriculture of British Columbia is generally divided between the mountain valleys and the coastal plains. The climate is particularly mild where influenced by the Pacific breezes. Rainfall is generally abundant, decreasing with the distance from the ocean

[4] Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, February, 1929, page 45.

and the proximity to the mountains. The summer months generally have the lightest rainfall.

In certain sections near to the largest cities, as in the Lower Fraser Valley, fairly specialized dairy farming predominates. Other valleys such as the Okanagan, and Kootenay valleys, are favored for the production of many varieties of high grade fruits and vegetables, much of which is marketed on the prairie plains. Fruit growing in these interior valleys is dependent on irrigation from mountain streams.

The poultry industry, for which conditions seem to be particularly favorable, has made much progress in the province. A number of extensive cattle ranches, and sheep ranches are located in the hilly dry areas of the province which effectively utilize some lands not suitable for other types of agriculture. These ranges are leased from the government at a low rate per acre, for comparatively long terms.

The coastal cities have developed into popular residential and holiday centres, and draw largely from the prairies. Many who have the means to do so leave the prairie to reside at the coast during the winter months when prairie farm work is slack.

The average area of the many different types of farms of the Pacific province is about 130 acres, of which only 25 acres are improved, and of which only 16 acres per farm are in field crops. From 2 to 3 horses per farm are kept for field work, and about 2 cattle, 9 sheep and 3 hogs. The lands vary considerably in value, depending on the character of the enterprises favored.[5] The general average value of all British Columbia farm lands with buildings and improvements, was $90 per acre, in 1929. A similar estimate for fruit lands was $314 per acre. In this province only about one-eighth of the potential farm land had been brought into farm use in 1921, but there has been considerable development of farms in the lower mainland during recent years.

CONCLUSION

With the exception of the maritime and central provinces there is little uniformity or continuity of agricultural areas. In most cases the agriculture of the Canadian area resembles fairly closely that of the areas of the states adjoining them, of which they are

[5] Monthly Bulletin of Agricultural Statistics, Ottawa, Canada, February, 1930, page 45.

naturally a part. The tremendous geographical obstacles between the areas increases the difficulties of communication, transportation, and distribution. At times the people of the different sections find it difficult to understand each other's problems, both in agriculture and industry generally. Recent depressions have made the problems of each area more acute, and have tended to confine and concentrate the attention of the farmers of each area on their own problems. The barriers between the agricultural and general Canadian economic regions retard the general movement of commodities. Most Canadian agricultural areas produce more than is needed locally, and the surpluses resulting have to be disposed of in outside markets. Recent attempts to distribute farm products have been about as difficult for Canada as for the United States.

TYPES OF FARMING IN THE UNITED STATES

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IN THE brief time at my disposal I shall attempt only to show the nature of the forces that control type of farming in a few localities, and to point out recent shifts in type that have occurred in this country, with a very brief discussion of their causes.

A map showing the percentage crop areas of the New England States shows that the greater part of the crop area—about 70 per cent—is occupied by hay. To understand the reason for this it is necessary to know that cotton, corn, wheat, oats, and hay together occupy 88 per cent of our total crop area. Each of these crops now occupies over 40 million acres. No other crop except barley occupies as much as 7 million acres. Barley, which is a partial substitute for corn in the Northern Plains, now occupies about 13 million acres, and the acreage is increasing.

It is important to remember that normally every crop in the list is produced in excess of the need for it. There are only small possibilities in the way of substituting any one crop for any other at the present time.

Cotton is eliminated from New England agriculture by climatic conditions, in this case, temperature and length of growing season. Corn is greatly restricted by the same set of conditions. The season between frosts is often too short for corn to mature.

Wheat, oats, rye, and barley hardly appear in New England. Crops of this class have benefited more than any other from modern labor saving machinery. Such machinery is not adapted to the small, often rocky, hillside fields of New England. New England farmers can not grow them in competition with the large level fields of the Middle West.

The acreage of fruits, mostly apples, and vegetables in these states is relatively large, nearly as large, in fact, as market conditions permit.

The major portion of New England farm land is therefore of necessity devoted to hay. Hay itself is made economically possible here by the fact that New England farmers have almost a monopoly of the fluid milk trade of many cities. The cows required to produce this milk consume the hay.

So much for crop enterprises. Dairying is, of course, the leading animal enterprise on New England farms. Beef and pork production, except under extremely local and unusual conditions, is eliminated by the high price of concentrated feeds, practically all of which must be obtained from a distance. Sheep have some slight adaptation where large areas of pasture are available.

Poultry occupies a special position in New England agriculture. The New England farmer is in position to deliver eggs in fancy condition to nearby markets and thus get fancy prices for them. Although grain feed is high in price, he can compete with Middlewestern egg producers, who cannot get their eggs to Eastern markets in condition to get fancy prices for them. Poultry and dairying are therefore the animal enterprises commonly found on New England farms.

I shall not take the time to show how the agriculture of all other sections of the United States is determined by various physical, biological, and economic forces. Instead, I shall merely refer to Farmers' Bulletin Number 1289, of the United States Department of Agriculture in which these matters are discussed for each of the various groups of states.

An important determining factor that is hardly perceptible in state averages is soil type. Only two plain cases of soil influence are evident. Wheat occupies a very minor place in Iowa mainly because the soil is better adapted to oats. New Jersey has a larger percentage acreage of vegetables because of the relatively large area of sandy soils in that state. On maps showing crop distribution by counties, the soil looms up as a factor of great importance in determining the kinds of crops grown.

A few words now as to shifts in types of farming in recent years. Practically no farm enterprises maintained their status unchanged during the period between 1909 and 1924. Although several of them (particularly oats, flax, and sweet potatoes among the crops, and beef cattle, and sheep among the animal enterprises) show little or no change in location, they did change their relative status in the country as a whole or in certain localities in which they are best developed. In most cases, however, the changes in these latter enterprises represent mere fluctuations due to fluctuations in prices of the products themselves or of those competing with them for the land.

Such changes as have occurred are due mainly to changes in

economic conditions, particularly changes in prices. The shift in cotton production, which was large, is directly due to price conditions, but the damage to the crop by the boll weevil is a major contributing cause. Although shifts in location or in relative status occurred in the case of practically all enterprises, the outstanding cases are not numerous. The most important are as follows:

1. The westward and northward shift of cotton acreage. The extension of this crop westward and northward is due almost wholly to the high prices of cotton that prevailed during the World War and afterwards. The marked reduction in acreage in the Southeast was due partly to reduction in yield from boll weevil damage and partly to the low prices for the crops of 1920, 1921, and 1926. The low prices of 1920 and 1921 were due mainly to panic conditions in the financial and business world; those of 1926 were due to overproduction from a greatly expanded acreage and an abnormally high acre yield. The westward expansion brought much new land into cultivation in sections that cannot well shift to crops other than cotton.

The decrease in the southeastern states has been disastrous. It has resulted in the abandonment of an enormous acreage of crop land. Farmers in these sections have naturally attempted to find substitutes for cotton, but with only local and partial success. They have increased the acreage of feed crops, such as peanuts and velvet beans, and they have given increasing attention to livestock. In certain localities there has been a striking increase in tobacco acreage.

The first necessity under circumstances like these is a return toward the production of home supplies, a practice which prevailed along the Atlantic Coast in the early days of farming in this country; that is, to the production of food for the farm family, and of feed for the livestock necessary to till the soil and to produce livestock products for consumption on the home farm. There has been a marked tendency of this kind in the section under consideration.

Possible substitutes for cotton as a cash crop are very limited in these sections and in practically all cases are local in their possibilities. The cultivation of tobacco has developed in eastern South Carolina on a considerable scale and more recently on a larger scale in southern Georgia, but the expansion of tobacco

acreage has exceeded the market demand. Fortunately, the tobacco produced in this territory is adapted to the manufacture of cigarettes, the demand for which is rapidly increasing. It is therefore probable that in time there may be a considerable further increase in acreage in part of the territory. But tobacco is not a general substitute for cotton in the section.

Peanuts or soy beans for the production of oil are a possibility, but their utilization for this purpose requires the building of oil mills, and the market for the product is somewhat limited. But there appears to be a possibility of growing these crops on two or three million acres more than are now devoted to them; at least the United States is importing vegetable oils equal to the production of such an acreage devoted to either peanuts or soy beans.

A few very restricted localities have found truck crops a complete substitute for cotton, but the area now planted to such crops over the country generally is so large that the production already often exceeds market demand. It is out of the question for truck crops to become a general substitute for cotton in the southeastern states.

Some serious problems must be attacked and solved before the farmers in this area can make livestock a satisfactory basis for farming. The problems of pastures on low-lying lands has apparently been solved already by the use of a mixture of carpet grass, Dallis grass, and lespedeza; but it must be solved also for uplands if cattle are to become an important item in the local farming.

Another serious difficulty is the production of winter feed for farm animals. The area grows a number of hay crops readily, but the curing of hay is rendered difficult, at least in some years, by the heavy rainfall. Methods of curing hay must be studied.

The problems of proper methods of feeding all kinds of farm animals, and of breeding and selection for improvement, can be learned only gradually, hence time will be required for their solution.

An important class of problems that has received too little attention is that of animal parasites, both external and internal. The fever tick is being gradually eliminated. There is reason to believe that in the not-distant future it will be a thing of the past. But there remain numerous internal and external parasites that

afflict all kinds of domestic animals. Methods of avoiding them must be worked out before a satisfactory agriculture can be built on livestock in the southeastern states.

With the solution of these problems there is reason to believe that livestock farming could be made successful in this area.

2. The enormous extension of wheat acreage that occurred in 1919 was due partly to high prices for wheat, and partly to patriotic motives which resulted in a hearty response to the appeal of the government for increased production as a war measure.

The increase in wheat acreage was practically universal in areas in which wheat is grown. But a large part of the increase was on land newly taken into cultivation, expressly for the purpose, along the western margin of the Plains region.

By 1924 wheat had returned to its normal status in most sections of the country, but the great expansion which had occurred in western Kansas and adjacent portions of Oklahoma and Texas remained, or had been increased. The increase was permanent also in the Northern Plains States except in northeastern North Dakota, where the advent of a serious weed, the sowthistle, had made radical changes in farm practice necessary.

The result of all these changes was a considerable net increase in total wheat acreage in 1924 as compared with the pre-war years.

3. Another important shift concerns the swine industry and two crops, the culture of which is basic to the swine industry—corn and barley. The swine industry has decreased throughout the territory lying south and east of the Corn Belt, but it has developed northwestward and has extended far in that direction. The corn crop attempted to follow, and there has been a marked drift northwestward for this crop. Corn found conditions in the Northern Plains region not wholly to its liking, but the region is eminently adapted to barley, which is an excellent feed for swine, and there has been a very marked expansion of barley in all the states of the Northern Plains region.

4. The decrease in the number of horses, which began about 1918 and is still in progress, has had a depressing effect on the price of the three great feed crops—corn, oats, and hay. Oats are used more largely for horse feed than for any other purpose. The reduction in demand has resulted in continued low prices for this crop. The decrease in the demand for hay to feed city horses and the marked increase in freight rates which occurred during

and after the World War have practically wiped out the commercial hay industry in many mid-western localities where, before the war, it was a major enterprise. The loss in demand for corn, and to a less extent for hay, to feed horses has been partly offset by an increased demand for hogs, cattle, and sheep.

5. Between the Corn Belt to the north and the Cotton Belt to the south is a wide area in which corn is the dominant crop, but which is a deficit corn country. Corn is therefore relatively high priced in this area, thus rendering it poorly adapted for use in meat production.

Lack of other suitable enterprises has led to considerable development of dairying here. The area in question extends from southeastern Kansas to Virginia and Maryland. There is reason to believe that dairying will increase in importance here.

The subject of shifts in farm enterprises is discussed in detail in a recent Preliminary Report of the United States Department of Agriculture entitled, "Shifts in Farming in the United States," a limited number of copies of which are available.

SOVIET STATE FARMS AND SPECIALIZATION IN AGRICULTURE

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THE QUESTION of the organization of large-scale farming in the U.S.S.R. by state enterprises was taken up as a practical proposition in the very first years of the existence of the Soviet régime. In the years 1918-1920 over 3,000 farms were formed of what had remained of the former landowners' estates. After the introduction of the New Economic Policy the majority of the state farms were combined into trusts organized on a regional, republican and federal scale. As the restoration of industry, transportation, agriculture and the general economic structure of the U S.S.R gradually progressed, the state agricultural enterprises grew in importance, both as producers of raw materials, blooded-stock, seed and plants, and as models of large-scale socialistic enterprises with a comparatively high technical level.

The first years of the New Economic Policy saw the inception of vast combinations of large-scale state farms, such as the Sakharotrest (Sugar Trust) and the Gosselsyndicate (State Agricultural Syndicate), the latter combining thirty or forty regional, republican and special agricultural trusts.

During the years 1926-1928, the system of state farms was comprised of the following organizations: (1) Sakharotrest; (2) Ovtzevod (Sheep-breeding Trust); (3) Glavkhlopkom (Chief Cotton Committee); (4) the Kenaf Trust and (5) Gosselsyndicate. The total agricultural area embraced in state farms, whether combined into trusts, or functioning outside the trusts under the control of local land organs and other departments, amounted to about 3 million hectares.

In the year 1928 the state farms produced about 4 or 5 per cent of the total marketable crops of the country. With the beginning of the period of the reconstruction of national economy in general, and of agriculture in particular, the upbuilding of state and collective farms was given an exceptionally strong impetus. In 1928 the foundation was laid, on an enormous scale, for the organization of the system of state grain farms on such free state lands as were suitable for grain production.

In the summer of 1928 the Soviet Government passed a decree

establishing the All-Union Trust of Grain Farms ("Zernotrest"), and at the same time the operations of the state farms, combined into such trusts as the Ovtzevod, the Sakharotrest, the Gosselsyndicate, the Glavkholpkom, the Kenaf Trust, and others, were expanded on a large scale. In 1929 there was created, primarily on free state lands, and partly on already existing state farms, the largest state-owned cattle trust, the Skotovod (Cattle-breeding Trust). Next followed the establishment of the All-Union Hog-breeding Trust (Svinovod), the Dairy Trust (Maslotrest), the Dairy-Truck Trust, and others.

At present the system of state farms comprises the following:

1. The state farms of the Zernotrest (Grain Trust), with a total area of about ten million hectares and with a sown area of about one million hectares (1930).

2. The state farms of the Skotovod (Cattle-breeding Trust), with a total area of about ten million hectares and with close to three million head of cattle (1930).

3. The state farms of the Ovtzevod (Sheep-breeding Trust), with a total area of from three to four million hectares and with one to two million head of sheep.

4. The farms of the Sakharotrest or Soyuzsakhar (United Sugar Industry), with a total area of about one million hectares.

5. The ranches of the Svinovod (Hog-breeding Trust), which are expanding their work of developing big herds, aiming at a total of from 200,000 to 300,000 head of breeding sows.

6. The state farms of the Maslotrest (Dairy Trust), which are being formed partly on new lands and partly on already existing state farms, the latter being organized with a view to specialization.

7. The state farms of the Dairy-Truck Trust, which partly are constituted by farms controlled by regional trusts, and partly are organized on free state lands in close proximity to big industrial centers.

8. The state farms of the Kenaf Trust, with an area of about 50,000 hectares.

9. The state farms of the Glavkhlopkom (Chief Cotton Committee), with an area of 100,000 hectares.

10. The state farms of the Lnotrest (Flax Trust), with an area of 200,000 hectares.

11. The state farms of the Risotrest (Rice Trust), with an area of about 200,000 hectares.

12. The state farms of the Seed Trust, with an area of about 200,000 hectares.

13. State farms belonging to different institutions and organizations and not forming a part of any trust, with an area of about 200,000 hectares.

Thus, the state agricultural enterprises of various types of production embrace an agricultural area of from 25,000,000 to 27,000,000 hectares.

The development of state industry on a great scale and the simultaneous rapid growth of large-scale farming have given rise to a number of problems, both scientific and practical in character, in regard to the organization of agricultural enterprises. The evolution of agriculture in the principal countries of the world in the course of the last centuries, just as the evolution of other branches of national economy, clearly illustrates the dependence of the organization of farming, first upon the social-economic relations prevailing in a given country; second, upon the general technical level and, in particular, upon the improvements in machinery and implements that industry makes available to agriculture; and third, upon the level of agronomic knowledge in the fundamental branches of agriculture. From the point of view of these three primary forces, which determine the character and the scope of agricultural enterprises and of agriculture as a whole, conditions in the Soviet Union are exceptionally favorable for agriculture. The social-economic system prevailing in the U.S.S.R., with the land nationalized and agricultural economy operated in accordance with a general plan, is more propitious for the organization of very large and specialized enterprises in all branches of agriculture than any other system known in history. The most important of these favorable conditions may be summarized as follows:

1. The rational organization of agricultural territory, unrestricted by private ownership of land and the resulting claims of the owner.

2. The great possibilities available under a system of planned economy for the mobilization of state funds for large-scale agricultural enterprises.

3. The training of an adequate personnel of experts in accordance with a plan.

4. The adaptation, under a general plan, of the construction of agricultural machinery to the needs of large-scale specialized agriculture.

5. The direct interest of the working class in the development of state agricultural enterprises as well as of enterprises in other fields of national economy.

The modern technical achievements in regard to power, machinery and implements that are available to agriculture (the internal combustion engine, the steam engine, the electric motor, the combine, tractor-drawn attachments and so forth), as well as the progress attained in scientific knowledge of plant, fruit and garden culture and animal husbandry, permit the organization of large specialized agricultural enterprises of the type of production units in industry. The basic problems of organization of agricultural enterprises of the state-owned type—problems relating to the type and scale of farming—are as follows:

1. The basic principle of organization of state farms in all branches is specialization. The main lines of production of the state farms and their territorial distribution are determined by the leading central organs (People's Commissariat for Agriculture and the various trusts). The deciding factors in this respect are:

(a) The requirements of national economy for the products of agriculture (raw materials, grain, animal products, and so forth).

(b) The productivity of labor and production costs (including transportation costs).

2. The size of agricultural enterprises is determined in each specialized type of farming by such a rational organization of the basic means of production as will result in the lowest expenditure per unit of production and in the highest productivity of labor. In other words, the deciding factors in regard to the size of a given agricultural enterprise are, the level of technical development and the nature of the principal means of production to be used, which afford the basis for the enterprise. Neither rent nor private ownership of land, which determine the type and size of the farm units under capitalist conditions, enter into consideration in the conditions prevailing in the U.S.S.R.

For the group of state farms controlled by the Grain Trust in 1929, the average size of a farm was 56,100 hectares (the aggregate area of the 121 state grain farms was 6,792,000 hectares); 73 per cent of all these farms had an area of over 40,000 hectares each. In individual instances farms of the Zernotrest group reach as high as 100,000 hectares and more, as, for instance, the "Gigant" (Giant) farm which now embraces an area of 170,000 hectares, of which 120,000 are under cultivation.

Farms on a similar scale are being organized in Kazakstan, in Siberia, in the Lower Volga Region and elsewhere. It has been proved by experience gained since the very first year of the operation of state farms that, all other conditions being equal, the cost of production per unit is lowest on the largest farms. In 1929 the cost of production on the "Giant" farm, with an area of 130,000 hectares, was estimated at 5.24 rubles per centner (1/10 metric ton) of winter wheat, with a yield of 10.06 centners per hectare; the cost of spring wheat was 5.51 rubles per centner, with a yield of 9.10 centners. On an experimental state farm, with an area of about 50,000 hectares, the total cost of production of spring wheat was estimated at 7.09 rubles per centner

The basic principles underlying the organization of state grain farms are as follows:

Every state farm has a centralized group of farm buildings conveniently located with reference to means of communication, railways, waterways, and so forth, and to the entire agricultural area of the farm. This central group comprises, as a rule, a machine repair shop for major repairs on tractors and attachments, vehicles, and other implements, a fuel and lubricants base, garages, machinery sheds for storing tractors, automobiles, and other heavy machines and implements, dwellings for workers and directing technical personnel, and so forth.

The area of a state grain farm is divided into sections of 6, 10 or 12 thousand hectares each. All the machinery required for work in each section—tractors, attachments, combines, and trucks—is located within the sections, as well as a supply of fuel and oil, light summer dwellings, seed storage granaries, carts and tents. Upon the termination of all the agricultural operations in the section the tractors and other machinery and parts that are in need of capital repairs are transported to the central inspection and repair shops. Implements and machines not in need of major repairs

remain in the section under cover until the following agricultural season.

The sections in which the various agricultural operations, such as plowing, sowing or harvesting, are carried on are divided either into permanent squares of 4 square kilometers or 400 hectares each, or else, much more commonly, these subdivisions are established only for the various successive operations such as, plowing, sowing and harvesting. The square serves as a basic accounting unit for all farming operations and as a unit for supervising the work and for observing the condition of the crops.

The organizational basis is centralized direction in regard to organization and technique; a central office with an accounting and bookkeeping apparatus; a central, well-equipped repair shop (with assembly, machine, forge and foundry departments); and a highly qualified engineering, agronomical and clerical staff concentrated in the central office of the farm The problem of this office is to plan all agricultural operations, to allocate the work among the various sections, to assure the necessary repairs and the high quality of performance of all means of production, to provide for technical instruction, control and supervision of all operations, and to maintain connections with the trusts. The actual operations are carried on in the several sections which are connected with the central establishment by telephone and automobile communication.

With this system of organization the expenses of maintaining a well-equipped repair shop with a highly qualified engineering and technical staff, a central office, a highly qualified personnel of supervisor-agronomists, headed by a director, are the smallest per unit of production on the larger grain farms; and the capital investment required per unit of agricultural area is likewise considerably lowered on these farms. On the large grain farms all capital investments, including implements, buildings, roads, and irrigation, amount to only 40, 50 or 60 rubles per hectare of farm land.

Besides, this system assures a more rational utilization of the highly qualified engineering and agronomical personnel. The costs of transportation are cut down to a minimum by (a) decentralization of the actual farming operations in the several sections; (b) cutting down the transportation of implements to the central establishment, inasmuch as current repairs are done on the

spot in traveling shops; (c) the establishment of telephone connections between the several sections and the central office.

The marketable portion of the crop is often transported directly to the nearest railway station or port, where grain elevators are provided for the purpose, without touching at the central establishment.

Thus, the main factors in determining the most economical size of the state-owned types of agricultural enterprises are the means of production (tractors, machines, implements, shops and the extent of their utilization, buildings and general equipment) and the organization of the personnel, especially of the engineering and agronomical staff.

The lower the outlay of an enterprise for investments in basic capital and for labor maintenance, the more rational is the latter. The production outlays have proved lowest and the degree of utilization of mechanical power, implements and buildings highest on the largest state farms. It should be observed, however, that the most economical size of a grain farm can not be determined as yet, though there can be no doubt that with a developing technique, with accumulated experience, with the training of an adequate personnel, with improvements in means of communication and their development, the most economical size of a state farm will be far in excess of the biggest grain farm now in existence.

Of the Ovtzevod (Sheep-Breeding Trust) farms there were in 1929, 63, with a total area of 3,302,300 hectares, the average size of each farm being about 52,000 hectares and the average number of sheep from 10,000 to 20,000. The total number of sheep in 1929 on all these farms was 1,200,000. During the current year this number will be at least doubled.

The principle of centralized farms, subdivided into sections, is practiced also on the state sheep-breeding farms. An extensive system of cattle-breeding farms has been organized, chiefly to produce meat animals. In a short time this system has grown to about one hundred farms which will have 3,000,000 head of cattle towards the end of the current year (1930). These are also being organized on the principle of large-scale farming, each farm occupying an area of 50,000, 100,000, 150,000 hectares or more, and subdivided into sections.

The large dairy farms which supply Leningrad, Moscow, Nizhni

Novgorod, Kharkov and other industrial centers with milk are organized as large milk factories with purchased supplies of feed, and as many as 1,000 to 2,000 cows are concentrated on a single farm. The dairy farms which were established on the estates formerly owned by the big landlords and which have been in existence for over ten years, are mostly small, with an acreage of 500 to 2,000 hectares per farm, and with from 100 to 300 dairy cows each. The total number of dairy cattle on these farms in 1929 was 100,000. Notwithstanding the small size of these state farms, their lack of specialization, and their scattered location throughout the country, they have almost tripled the productivity of their dairy herds as compared with that of the dairy cattle of individual peasants. On practically all of these state farms the average annual yield per cow has reached 2,700 to 3,000 kilograms of milk, and some farms have attained much better results. The cost of milk production on these farms amounts to 8 or 10 rubles per centner, which is approximately from one-half to one-third that of the individual farmer. The success of these small state dairy and cattle farms is due mainly to an increase in the area sown to feed crops (forage, grasses, and root crops) to improved rations (such as wider use of concentrated feeds), to rationalized methods of general care, and to herd improvement.

This experiment with small state farms tends to show the opportunities presented by large dairy farms with one, two, or several thousand head of dairy cattle. By means of a general mechanization of the basic processes of the dairying economy—the preparation of feed, the feeding, handling and milking of the cows—it is possible to reduce operating expenses greatly and to improve considerably, labor productivity. On the existing comparatively small farms, the average number of cows per worker is 7 to 10, whereas on the large, mechanized farms it is possible to triple and even quadruple this ratio, and it can be done without any considerable intensification of the work but mainly as a result of mechanization and rationalization.

The organization of these large-scale dairy farms, which are equipped for the distribution of fresh milk as well as for the production of butter, cheese, and other dairy products, was started by the Soviet Government in 1929. During the current year a number of large dairy farms are being organized under the direction of the Dairy and Dairy-Truck Trusts. As a result of the organi-

zation of these farms, much experience will be gained with regard to these special types of large-scale state economy.

In 1929 the United Sugar Industry of the Soviet Union (Soyuzsakhar) had under its control 190 farms with a total area of about 1,000,000 hectares and an average acreage of 5,000 hectares per farm, including ten farms with an average of 10,000 to 20,000 hectares each. All these farms naturally employ intensive methods of cultivation, 20 to 28 per cent of the total acreage being devoted to sugar beets, and are combined with the breeding of dairy and meat cattle and with the production of sugar at their own sugar mills. The total capital investment in the farms of the Sugar Trust, exclusive of the sugar mills, amounts to between 150 and 250 rubles per hectare under cultivation.

The rapid growth of state economy (state farms) in all the major branches of agricultural activity, combined with the collectivization movement, raises numerous scientific and practical problems concerning the organization of large agricultural enterprises. In addition to the purely technical questions of acreage, labor force, mechanization, power, machinery and methods of production, there is also the extremely important and involved economic question as to the most rational territorial distribution of the various branches of agriculture and the most effective specialization of agricultural production.

SPECIALIZATION IN AGRICULTURE IN THE U.S.S.R. AND ITS TERRITORIAL DISTRIBUTION

On the basis of the great successes achieved in the industrialization of the country and the socialization of peasant economy and the development of state farms connected with these successes, agriculture in the U.S.S.R. is rapidly developing its productive forces in the direction of the more rapid extension of grain production, both for domestic consumption and export, the extension of the production of industrial crops, such as sugar beets, flax, hemp, cotton, kendyr, kenaf, sunflower, soy beans, and so forth, the development of animal breeding and the production of fruits and vegetables.

Comparative statistics of the areas sown to the most important industrial crops in each of the last four years, and in 1913, afford an adequate idea of this development (table 1).

The sown area under cotton has thus increased two and half

times during the last few years; that under the oil seed crops (sunflower, hemp, and so forth) has more than doubled; that under sugar beets has gained 79 per cent; the area sown to tobacco has increased by 50 per cent, while the total area under industrial crops has increased by 80 per cent. These figures throw light upon the nature of the shiftings and improvements, fostered by the

Table 1. Area Under Major Industrial Crops in U.S.S.R. in 1913 and in Each of the Years, 1927-1930, Inclusive

Crop	Year				
	1913	1927	1928	1929	1930
Cotton					
In thousands of hectares	701 0	753 2	917 4	1,061 3	1,767 0
In percentages	100 0	107 4	131 0	151 4	252 1
Sugar beets					
In thousands of hectares	621 0	720 0	855 0	876 0	1,114 0
In percentages	100 0	115 8	137 5	140 9	179 1
Flax					
In thousands of hectares	1,857 0	1,580 0	1,733 6	2,054 7	2,090 6
In percentages	100 0	85 0	93 0	110 0	112 5
Hemp, sunflower, and other oil seeds					
In thousands of hectares	2,229 0	3,995 0	5,179 0	4,951 0	4788.8
In percentages	100 0	172 2	232 4	222 1	214 3
Tobacco					
In thousands of hectares	66 6	82 7	79 7	85 6	98 9
In percentages	100 0	125 3	120 8	129 7	149 8
Total industrial crops					
In thousands of hectares	5,475 0	7,131 5	8,767 5	9,025 7	9,856 7
In percentages	100 0	131 2	160 1	164 8	180 0

policy of the Soviet Government, that have taken place in agricultural production in the U.S.S.R. since the revolution.

In 1930 the area sown to grain approached the pre-war level. In 1913 the area sown to all grain crops within the present confines of the U.S.S.R. was 102.7 million hectares, and in 1930 the area under all grain crops was 102.1 million hectares.

The increase in production of the chief branches of agriculture organized on a socialist basis requires enormous accumulations of capital within the industry itself. The process of socialization of agricultural production creates favorable conditions both for such accumulations and for increased production.

The development of agricultural socialization and the use of power implements creates huge possibilities for the reclamation of new arable lands and for the better utilization of the land under cultivation. The area sown to hay and root crops is constantly increasing, and meadows and pastures are being improved. In 1927, for instance, there were 3 million hectares under cultivated grasses and in 1929 the area increased to 5 million. There are also great possibilities for future progress, both as regards quality and quantity, in truck gardening, and in the cultivation of melons, grapes and fruits.

If we add to this the necessity for a maximum expansion in the near future of animal husbandry (hog raising, poultry, sheep and cattle breeding), we have a complete picture of the important changes now taking place in all branches of agriculture in the U.S.S.R. All this is transpiring on the basis of a gigantic development of collective and state farms, and involves a huge reconstruction program requiring enormous investments in the main branches of agriculture and for the construction of industrial plants serving agriculture—oil seed factories, packing houses, linen mills, potato flour mills, sugar factories, and so forth—and for transportation facilities.

Along with the reorganization of agricultural production, there is also taking place a reorganization in the field of agricultural scientific and experimental work and of agricultural education, both lower and higher. With the reconstruction of agriculture proceeding at such a tremendously rapid pace, both as regards its social forms (collective and state farms), and its production and technical methods, there arises a question of great complexity and importance, namely, what kind of crops to raise and where to raise them.

The U.S.S.R. cannot develop the various branches of agriculture in an haphazard manner without a unified national economic plan. A very carefully planned coordination of the various branches of agriculture as well as a coordination of agriculture and industry is imperative. The development of industry in the old and new industrial centers will in a great measure determine the development of agriculture.

In some cases, the development of industrial crops (sugar beets, potatoes, flax), will determine the location of industrial plants utilizing these crops as raw materials. The question of mapping

out in the most rational manner zones for the main branches of agriculture already requires at least a partial solution, even at the present stage of agricultural development in the U.S.S.R.

With the introduction of new industrial crops and with greatly increased plantings of the old ones (flax, cotton, sunflower, sugar beets, corn, potatoes, and others), with the necessity for a rapid development of the basic branches of animal husbandry, and with enormous possibilities for raising the economic importance of our outlying regions (Central Asia, Siberia, Far East, and the northern regions) the problem of a rational distribution of crops as to localities assumes primary economic importance. Such an allocation will serve as a planning base for a rational social distribution of labor among the various regions of the Union. This will serve as the main basis for specialized agricultural production.

Agriculture in the U.S.S.R. had comparatively little of either technical or social division of labor. Specialization of production hardly touched agriculture.

Although capitalist methods of marketing of agricultural products were developed to a considerable degree before the revolution, and although these methods were to some extent restored during the New Economic Policy period, the character of agricultural production remained to a considerable degree primitive, due to the small size of the basic mass of peasant households, the heritage of pre-revolutionary feudal relationships and the resulting backwardness of our technique, and to a number of other causes.

During the period of the industrialization of our national economy and of the extensive social, organizational, and technical reconstruction of our agriculture in the direction of a radical remodeling of the basic mass of our poor and middle peasant households, by way of socializing the means of production, of organizing large socialized farms and of developing state farms in all the main branches of agriculture, the problem of specialized agricultural production appears as one of the main prerequisites for the development of our productive forces on the basis of socialist construction, and as a problem requiring immediate solution.

Socialist reconstruction, overcoming the backwardness of technique and organization, introduces extensively a system of division of labor, planned on a national scale on the basis of a single national economic plan, and creates all the necessary conditions for a high degree of specialized production.

Specialization in agriculture must be regarded as a method of adapting agriculture to the types of industry in the various regions, and as a way of concentrating the means of production through the introduction of intensified methods of work. Specialization as a process develops irregularly and depends upon the degree of socialization, upon the state of development of the productive forces, upon the technique and organization of production, and also upon the growing and changing needs of the population. At the same time, specialization in agriculture, based upon a rational division of labor between the various regions and also within the region, serves as a strong stimulus for the development of the productive forces of agriculture, and as a necessary prerequisite for a rapid introduction of the latest achievements of science and technique.

The problem of specialization in agriculture in the U.S.S.R. is at the present time of paramount importance. Through specialization, on the basis of socialization, it is possible to overcome in the shortest time the backwardness of technique and organization, and to advance rapidly the development of the productive forces. At the same time, the introduction of a more perfected technique into agricultural production inevitably spells specialization of production. High technique in any branch of agriculture (grain crops, industrial crops, dairy and beef cattle, hog raising, poultry, and so forth) requires specialized machines and implements, special buildings, groups of agricultural and technical specialists, and in each branch, rational standards of production, adapted to the leading branch of agriculture and to the technical methods used.

The primitive diversified type of farming is being overcome by high technique. Without inter-regional specialization, and without specialization within the region, it would be difficult to establish a proper proportion among the various branches of agriculture and to solve the problem of the most expedient way of making investments for equipment, from the point of view of satisfying the demands of the national economy, as well as from the point of view of returns on investments. All these considerations demand a thorough-going rationalization of agricultural production in the direction of eliminating small-scale farming, and of specialization in accord with economic and natural conditions. The rational utilization of enormous natural possibilities under a variety of economic conditions can be properly organized only through

the wide introduction of inter-regional division of labor and specialization of production. In other words, the transition in agriculture from small-scale to socialized production, organized on the basis of the latest achievements of technique and science, must proceed under the slogan of specialization of agricultural production. This will make it possible to assimilate in a comparatively short period the advanced technique in the field of agricultural production and, at the same time, will serve as a new stimulus to agricultural science, machine-building, engineering, and in general to scientific and technical advancement.

Specialization in agriculture under conditions of capitalist economy, as an expression of the uncontrolled social and technical division of labor, proceeding under the influence of technical development, of higher productivity of labor, and of the expansion of national economy, is characterized by a natural confinement of certain branches of farming to definite localities. This localization proceeds in an uncontrolled manner under the pressure of the laws of capitalist economy—rates of profit, scale of wages, and so forth. The recognition of the definite types of specialized farming which have thus been formed, and the combining of production units within the regions, constitutes the zoning problem under conditions of capitalism.

Specialization in agriculture, as a progressive principle for the development of productive forces, proceeds under conditions of capitalism in an elemental manner and only by overcoming obstacles inherent in capitalist economy, such as the instability of the market and private ownership of the means of production and of land. Under the economic conditions of the U.S.S.R., specialization of production in agriculture finds a favorable ground for its development. For this reason, specialization must find most extensive application in the reconstruction of agricultural production.

The nationalization of land, the socialization of the basic means of production, the leading rôle of the proletariat in a socialized and planned industry, are the basic factors which offer exceptional opportunities for a rational organization of the entire system of agricultural production as a sector of national economy.

The main prerequisites of specialization of production in agriculture in the U.S.S.R. are:

1. A considerable degree of socialization of agriculture.

2. A high technical level of socialized agriculture. The new technique, in the form of internal combustion engines, complex machines and implements, electro-technical power, chemical fertilizers, and plants for the working up of agricultural raw materials, must find wide application in large-scale socialized agriculture. The popularization of the achievements of technique and science in the field of agriculture, plant propagation, and animal husbandry, will also be of great importance.

3. Agriculture is a part of the national economy, and is most closely bound up with socialized industry.

One of the main questions in connection with the problem of specialization, the question of correlating the various branches of agriculture, will be more or less satisfactorily solved only in the course of a few years. In solving this question we must take into consideration, in the first place, the demands to be made upon agriculture by our national economy during the next few years and, in the second place, the present condition of agricultural productive forces and the possible rate of development in the coming period, considering the conditions of our national economy. Under such conditions it will be possible to solve the problem of correlating the various branches of agriculture for a definite time period (3-4 years) and also of their geographical distribution.

The criteria for a rational distribution of the various branches of crop raising, animal husbandry, poultry husbandry, vegetable gardening, and fruit culture are: the productivity of labor, cost of production and of marketing (transportation).

The distribution of the basic branches of agriculture geographically with a consideration to the question of maximum productivity of labor and lowest production and marketing costs, means the solution of the problem of inter-regional distribution of labor, which is the chief purpose of specializing production by regions. Thus, the question as to where, what, and in what quantities to produce, *i.e.*, the question of a rational geographical distribution of the basic branches of agriculture, is the main problem in specializing agricultural production. Upon the solution of this problem, with the present state of socialization and with the present level of technique, depends the creation of a rational system of agriculture as a part of our national economy.

Specialization of agricultural production will take an important place among the various measures for the socialist reconstruction

of agriculture. A rational distribution of the branches of agriculture alone should be greatly profitable to our national economy. The realization of higher agro-technical achievements as applied to a rational zoning of agriculture will produce a considerable increase in the productivity of labor and in the marketable agricultural surplus.

It is self-evident that the geographical distribution of the basic branches of agricultural economy not only establishes an inter-regional division of labor for the immediate future, but also predetermines a number of general lines of development of the productive forces for a more extensive period. Every future has its beginnings in the present. From this point of view, the present specialization of farming along the line of inter-regional division of labor will have its significance for a much longer period. This must be all the more emphasized, since the distribution of the basic branches of agricultural economy in a considerable measure predetermines the location of the industrial establishments for working up agricultural raw materials subject to losses in weight (sugar beets, potatoes, dairy products, flax, oil seeds, and so forth), which could not be transported to other districts in a relatively short period of time.

The specialization of agricultural production in geographical sections, in accordance with the distribution of the most essential branches of agriculture best adapted for one or another part of the Union, provides the foundation for establishing agricultural regions.

From this point of view, an agricultural region is considered to be a part of a planned and organized economy embracing a definite territory which, in accordance with its economic and natural conditions, is fulfilling the economic functions, on the basis of the socially planned division of labor, of producing agricultural products at the lowest cost and with the greatest productivity of labor. With such an understanding of an agricultural region, it will be necessary in the first stage to map out a relatively small number of region-zones all over the Union, taking into consideration their basic economic and natural conditions. Agriculture, being a branch of national economy which is called upon to convert the sun's kinetic energy into potential energy of organic substances, depends on natural conditions, such as climate, soil, flora, and fauna, inasmuch as the latter affect the degree of productivity

of labor and the cost of production, with a given level of technique.

Within the boundaries of this small number of region-zones, there will be required the establishment of a basic inter-regional division of labor in the earliest stage, taking into consideration, as far as it is possible, the impending changes in economic development (electrification, industrialization, transportation, and so forth). In accordance with this, for the mapping out of the basic agricultural zones and the distribution of the main branches of agriculture, the most important methodological premises are:

(a) The social-economic nature of the national economy of the U.S.S.R.

(b) The leading part played by socialistic industry, which basically predetermines the development of the productive forces of the entire national economy, and of agriculture as a portion thereof.

(c) The maximum utilization of the production possibilities in the direction of raising the quantity and quality of agricultural products with an increasing productivity and a reduction in costs.

(d) The greatest satisfaction of the requirements of the national economy as regards grain, technical cultures, animal husbandry, gardening and horticulture, both for domestic consumption and for the needs of export.

(e) An appraisal of the probable progress in the reconstruction of the national economy during the coming few years, and of the basic general lines of development of the productive forces of the national economy of the Union, in accordance with the basic energy resources of the country.

On the basis of the foregoing, the method of mapping out the basic agricultural regions may be conceived as a method of planning production, originating from the tasks of the national economy, and with considerations of a national economic character. The criterion of a rational distribution should be such a disposition of the basic branches and cultures of agriculture as will result, from the point of view of the national economy, in the minimum production and transportation costs with the maximum productivity of labor. As one of the methods of checking the reasonableness of the accepted plan for the distribution of agriculture may be taken the estimated surplus agricultural production in comparison with the planned gross production, on the one hand, and the re-

quirements of the national economy for agricultural products on the other.

In addition to the specialization in agricultural production, which is finding expression in a regional division of labor and is dictated by considerations relating to the national economy as a whole, it is necessary to have in view specialization by types of production within the various regions.

Inter-regional specialization is based upon certain types of agriculture which are the leading ones in the respective regions. It is obvious, however, that each region may have, in addition to the leading type of production, other forms of farming which are of secondary importance there. These are carried on in farm units of various types, which differ among themselves both in regard to the form and extent of specialization (production of a given type of farming, single type of farming, or single crop) and in regard to their technical level. Thus, for instance, in the main grain regions of the southeast, there are found, alongside mixed grain and exclusively grain farms, also mixed and exclusively cattle farms, and combined cattle and wool-producing farms. Within each of these types there may be differences not only in regard to the nature of the predominating crop but also in regard to technical methods and to farm organization.

This is quite natural and unavoidable, inasmuch as there are economic and natural differences within the large agricultural regions as they have been mapped out for the purpose of inter-regional division of labor. Besides, the very variety of the existing social forms of farming—state farms, collective farms, and individual peasant holdings—also results in considerable differences. As a rule, each one of these social types of farming will differ from the other in regard to scale of production, technical standards, and degree of specialization.

In the first stage of specialization in agriculture, the differences in types of production will reflect the differences in social forms of farming and in economic and natural conditions.

Great variations in the economic and natural conditions within the large regions are bound to bring about a future subdivision into secondary regions. Together with the growth of socialization of agriculture, the differences in production types according to size of farms and degree of technique, which are conditioned at present by the social system, will to an ever-greater extent give way to dif-

ferences which are dependent on various economic and natural conditions. This is evident, since large-scale socialized farming should produce socially-necessary products at least cost, taking into consideration transportation expenses, with the greatest productivity of labor, and with the highest returns on the investment. Socialized economy must orientate itself in accord with these standards. Consequently, in the proximity of big industrial centers and large cities, specialization in agriculture, as a rule, will develop in the direction of the production of perishable products which can be shipped only a short distance (vegetables, sweet milk, potatoes, and so forth) to satisfy the local demand.[1]

In the measure that the socialized sector of agriculture expands, the technical division of labor will have to be extended within the sector among the separate specialized types of enterprises.

The type of such a technical division of labor may already be noted in the largest state grain and cattle farms. The grain farm, organized on the principle of exclusive specialization in grain raising, turns over its by-products (straw, chaff, and inferior quality grain) to the state cattle farm, which has feeding points on the territory of the grain farm. In like manner it is possible to conceive of a coordination, on the principles of a technical division of labor, between a grain farm and a poultry farm, which would utilize the grain for the fattening-up of the poultry for market.

The organization of the main branches of agriculture in each region on the basis of highly specialized production, the establishment of mutual relations as between the separate specialized farms on the basis of a technical division of labor, the construction of plants for the working-up of agricultural raw materials—these constitute the basic prerequisites for the advent of very large agricultural-industrial combines. The latter are organized on the basis of a coordination of a number of branches, which are in their turn organized on the principle of a highly specialized production. Each branch, depending on the kind of production, is organized on the basis of greatest efficiency. The concentration of specialized

[1] In agricultural production much attention is directed to the specialization of the existing means of communication—railroads, waterways, and highways. However, changes in the production map of the Soviet Union will inevitably necessitate the construction of new means of communication In view of the existence of enormous unused land reserves well-suited for agricultural purposes and as a prerequisite for their utilization, there must take place a rearrangement of regions. This will lead to augmenting the importance of outlying regions and sections of the Soviet Union which have been made little use of, agriculturally and industrially.

farms around power-supplying centers and industrial establishments constitutes a gigantic step toward the establishment of agricultural-industrial combines, and, simultaneously, toward the elimination of the conflict between town and village.

Summarizing the general concepts of specialization in agriculture under conditions in the U.S.S.R. one can formulate the following theses:

1. At the foundation of specialized production in the various regions lies the rational allocation of the various branches of agriculture, founded upon socially planned division of labor in agricultural production, in accord with the condition of national economy, with natural conditions, and with the present level of technique.

2. Specialized production according to regions is based on the leading agricultural branches and crops and the subordination of supplementary branches and crops, to them.

3. Within the regions, specialized production is in accord with the prevailing types of farm production.

4. As regards certain special branches and crops, it will be possible to conduct the farms on the basis of specialization in a single branch or one special crop. Among such branches may be included, fruit raising, truck gardening, viticulture, cotton raising, tea plantations, kendyr fields, large-scale poultry farms, dairy and hog farms which have to obtain feed elsewhere, sheep farms, cattle and grain farms.

In connection with specialization in agriculture there inevitably arises the question of a more rational distribution of the agrarian population. The distribution of the rural population in the past was determined by special economic and natural conditions, with technique at a low level. The new technique, with the socialized forms of farming and with the present social-economic conditions in the U.S.S.R., will call for a redistribution of the population in accord with the rational allocation of agricultural production, and not vice versa.

In accordance with the condition of the national economy, specialized production makes a number of demands in the way of industrial establishments for the working up of agricultural raw materials, transportation, mineral fertilizers, and various means of production.

On the basis of the plan, briefly outlined above, the entire Soviet Union is divided into nine regional zones, according to the basic trend of agriculture in each respective zone.

These zones and the branches of agriculture to be specialized in are as follows:

1. Northern Zone—Deer raising and trapping of fur-bearing animals are the main lines of agriculture in this zone, which covers enormous stretches of the Siberian tundras.

2. Lumber Zone—Lumber industry and general agriculture, the latter holding a subordinate position.

3. Flax and Dairy Products Zone—This covers a considerable section of the non-black soil belt of the European part of the Soviet Union; the zone includes the southern part of the Northern Region, considerable sections of the northwestern and western territories, and the Ivanov Industrial and Nizhni Novgorod Regions. The basic function in national economy assigned to this zone is that of producing flax and dairy products.

4. Dairy-Vegetable-Potato Zone—This includes, (a) the large industrial regions near Leningrad; (b) a considerable part of the Central Industrial Region; (c) the industrial areas of the Urals; (d) the Donetz Basin and Dnepropetrovsk. The task of these regions is to supply the principal industrial areas of the country with dairy products, vegetables and potatoes. Of course, in addition to the above-mentioned regions specializing in dairy farming and the raising of vegetables and potatoes, near each important industrial center, dairy and vegetable farms will be established. In connection with the rapid industrialization of Siberia, dairy-vegetable-potato sections will also be developed there. As a first step, it is necessary to form dairy and vegetable farms in the Kuznetz coal basin.

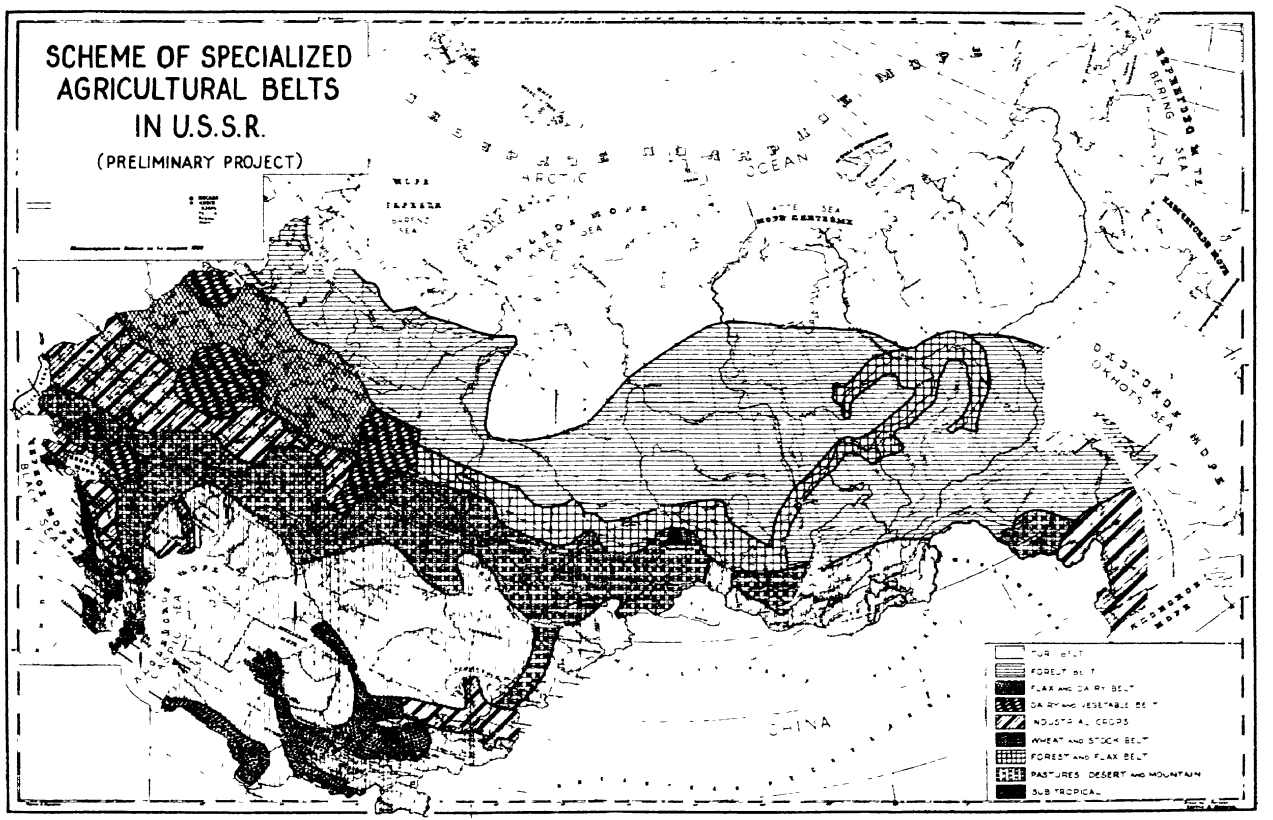
5. Technical and Southern-Technical Cultures Zone—The chief regions embraced in this zone are, the wooded steppes of the Ukraine, the southern part of White Russia, the Central Black Soil Region, the northern section of the Middle Volga Region, and some districts of the pre-Urals. In addition it includes the following sections of the Soviet Union: The Black Sea coastal plain of the Ukraine, the northern part of the Crimea, the North Caucasian belt of adequate rainfall, the Akhtuba region (at the mouth of the Volga), the Far-Eastern coastal territories, a part of southern Ka-

zakstan and the Kirghiz Autonomous Soviet Socialist Republic. All these sections of the Soviet Union are mainly engaged in the raising of the following industrial crops: Sugar beets, hemp, soy beans, kenaf, sunflower seeds, and so forth. Fruit and vegetable raising is also carried on to some extent. The territories included in this zone are, with few exceptions, known for their relatively rich soil, sufficiency of precipitation, and warm temperature, which make these lands the most favorable for agricultural development in the entire Union. Naturally, therefore, we have here great prospects for an increase in agricultural production, especially of industrial crops and also for the development of animal husbandry.

6. Wheat and Stock Zone—This is a large zone including the following: The Ukrainian steppes, a considerable portion of the Northern Caucasus (deficient in rainfall), practically all of the Middle and Lower Volga Regions, the wooded steppe and steppe regions of the Urals and Siberia, Northern Kazakstan, and part of the Far Eastern Region. The major portion of this zone consists of steppe areas which are either arid or deficient in rainfall. This zone, where the leading rôle is taken by grain culture (wheat and sweet corn), animal husbandry (cattle, hog and sheep raising) likewise has enormous significance. The Ukrainian steppe and the Middle Volga Region, because of the extent of grain culture, offer very favorable prospects for the raising of beef cattle and hogs; the Lower Volga Region, Kazakstan, and the steppe lands of Siberia offer good possibilities for the raising of beef cattle and sheep. The wooded steppe belt, in addition to grain raising, has favorable conditions for the development of dairy farming. Of the industrial crops in this wheat and livestock zone the leading position is occupied by the sunflower, while in the steppe portion of the Ukraine the leading culture is the soy bean.

7. The Lumber—Flax—Butter Zone—This zone embraces the forest area of the Urals and Siberia. Besides this the zone includes also a fairly large territory in the Yakut Soviet Socialist Republic along the Lena River and its tributaries. The combination of natural and economic conditions, after the land has been cleared of timber, gives this territory great possibilities for the extension of flax culture and the development of dairy farming.

8. Desert-Pasture and Mountain Cattle Zone—This covers the arid pasture-lands of Central Asia, Kazakstan, the Kirghiz Autonomous Soviet Socialist Republic, the Tadzhik Autonomous Soviet


SCHEME OF SPECIALIZED AGRICULTURAL BELTS IN U.S.S.R.
(PRELIMINARY PROJECT)
ARCTIC OCEAN
BERING SEA
OKHOTSK SEA
CHINA
FUR BELT
FOREST BELT
FLAX AND DAIRY BELT
DAIRY AND VEGETABLE BELT
INDUSTRIAL CROPS
WHEAT AND STOCK BELT
FOREST AND FLAX BELT
PASTURES DESERT AND MOUNTAIN
SUBTROPICAL

Socialist Republic, the Turkoman Soviet Socialist Republic, Uzbek Soviet Socialist Republic and mountain pasture-lands on the borders of Persia, Afghanistan, China, and Mongolia. This enormous belt—still largely unavailable for agricultural purposes because of insufficient precipitation and its mountainous condition—has immense areas, which have been utilized as yet to a very small extent, suitable for the raising of beef cattle, sheep, and goats on an extensive scale.

9. Sub-tropical Plant Zone—Tea, cork, tobacco, ramie, citrus fruit (tangerines, lemons, oranges) grapes, and cotton. This zone includes the southernmost part of the Crimea, the Black Sea coast, the Lenkoran region, Georgia, Armenia, Azerbaidzhan, Daghestan, Central Asia, the cotton regions of Turkmenistan, Tadzhikistan, Uzebekistan, and the Kirghiz Republic. These regions, most favorable for the cultivation of southern and sub-tropical industrial crops, fruits, and grapes, represent only about 2 to 3 per cent of the arable land of the Soviet Union Naturally, they must be utilized to the utmost extent along the lines of industrial crop production. All grain cultivation in these regions is being reduced to a minimum, and the raising of sub-tropical plants, fruits, and grapes is taking its place.

The demarcations of these zones have been determined, on the one hand, by the task of apportioning certain definite quantities of foodstuffs, raw materials, and agricultural exports for the Soviet Union as a whole, and, on the other hand, by the suitability of each of these regions for the raising of definite, socially-necessary agricultural products at the lowest cost of production and transportation and with a view to attaining the highest possible technique in large-scale socialized agriculture and specialized production.

It is necessary briefly to examine these enumerated zones from the point of view of inter-regional division of labor and the resultant specialization in production.

On the basis of the projected apportionment of our arable land, crops, livestock, and poultry, and on the basis of preliminary estimates we get the following:

1. Wheat production (spring and winter). About 83 per cent of the total commodity production (regional surplus) comes from

the Wheat-Livestock Zone. This shows that the raising of this leading grain, both for domestic consumption and for export, falls largely to the following regions: The Ukrainian steppe, the Lower Volga Region in part, the Middle Volga Region, the southeastern part of the Central Black Soil Region, the Northern Caucasus, Siberia, the Urals, the northern part of Kazakstan, and the Far Eastern Region in part.

2. Flax Fiber—About 80 per cent of the total commodity production (regional surplus) is derived from the Flax-Dairy-Oil Seed Zone. Thus, commodity production of flax is concentrated in the non-black soil belt of the European U.S.S.R. and in Siberia.

3. Cotton Fiber—The major part of the total commodity production falls to Central Asia, in part to Transcaucasia, and to such new regions as the Northern Caucasus and the southern part of the Ukraine.

4. Hemp—Commodity production of hemp is confined largely to the south of our Western Region and to the northern part of the Ukrainian forest areas, in part to the Central Black Soil and the Middle Volga Regions. Taken together, these three regions, situated in the Industrial Crops zone, supply all the hemp for the market.

5. Sunflower Seeds—The commodity production of sunflower seeds is concentrated in the Ukrainian steppe, the Northern Caucasus Region, the Lower Volga Region, the southeastern section of the Central Black Soil Region, and partly in Siberia.

6. Soy Beans—Commodity production of this new crop, which has great possibilities, is concentrated in the Northern Caucasus in districts of sufficient precipitation, the Ukrainian steppe, and in the Far Eastern Region. These are the most favorable regions for its cultivation. According to the control figures, 80 per cent of the total commodity production of soy beans is to be derived from these regions.

7. Sugar Beets—The predominant portion, about 90 per cent, of sugar-beet production falls to the northern wooded steppe, black soil belt of the Ukraine and the southwestern part of the Central Black Soil Region.

8. Meat—Commodity production of meat in the main (about 85 per cent) falls to the Northern Caucasus, Siberia, Kazakstan, the Ukraine, and the Far East.

9. Eggs—The major part of the commodity production of eggs is confined to the Ukrainian steppes, the Northern Caucasus, and Transcaucasia.

10. Milk—The major part of the commodity production of milk is confined to the regions of the Flax-Dairy-Oil Seed Zone of the non-black soil belt of the European U.S.S.R. and Siberia. To these regions fall approximately 72 per cent of the total commodity production of milk. These regions are destined to become the principal regions for butter production.

Broadly generalizing for the purpose of defining the basic features of the inter-regional division of labor among large sections of our agricultural economy, the following regions of the Soviet Union may be said to stand out more or less prominently: The vast sparsely-populated tundras in the northern part of European and Asiatic U.S.S.R. are devoted to deer-raising, fur-trapping, hunting, and, in part, to fishing. The large forest tracts which are found in the southern stretches of the tundras, both in the European and Asiatic section of the Soviet Union, constitute, in the main, lumber regions where agriculture is practiced only in scattered points principally along the river banks. The rôle played by agriculture in these regions is relatively small. Its function is to furnish the lumber industry with commodities which can only be shipped a short distance and, in part, with fodder. The non-black soil belt of the European part of the Soviet Union is largely the producer of dairy products, flax, potatoes, in some parts pork, while in the industrial regions large quantities of vegetables and berries are produced.

The wooded steppe and steppe belts, taking into account the conditions of national economy in their sum total, are confined in the main to the production of industrial crops (sugar beets, sunflower, soy beans, and so forth), grain raising (wheat and sweet corn), and in part to animal husbandry—mainly hogs and poultry. In the localities where industry is developing we find the growth of dairy and truck farming.

The wooded steppe and steppe belts have tremendous potentialities for fruit growing. The coast line of the Black Sea, Crimea, and some parts of the Ukrainian steppe offer good prospects for the development not only of fruit growing but also of viticulture.

That part of the Northern Caucasus which has sufficient rainfall constitutes a region for industrial crops, cattle and poultry raising.

The southeastern regions of the Soviet Union and Kazakstan are chiefly devoted to grain raising but also to the raising of beef cattle and sheep.

Transcaucasia and the irrigated regions of Central Asia are regions of industrial crops (cotton, kendyr, kenaf, and so forth), of subtropical plants in Transcaucasia, and fruit growing. In Transcaucasia, in the mountainous parts of Georgia, Azerbaidzhan, Daghestan, and Armenia, Alpine milch cows and sheep for wool and mutton are raised.

The wooded sections (urman) of Siberia are used for the production of flax, oilseeds, and grain; in the wooded steppe sections of Siberia for that of grain and oilseeds; in northern Kazakstan and in south-western Siberia for that of grain, meat, and wool.

In the Far Eastern Region along the shores of the Pacific Ocean (Khabarovsk and Vladivostok region) the chief products are grain (rice), soy beans, and dairy products; in the Blagoveshchensk region, grain, oilseeds, meat; in the Transbaikal and the Buryat Mongolian Republic, meat, wool, grain; in the sparsely-populated Yakut region along the Lena River, meat, oilseeds, and grain for local consumption; in the southern mountainous borderlands in the Asiatic part of the Soviet Union, meat, cheese, wool, and in certain localities, furs.

This summary outline of the basic branches of agriculture carried on in each of the large sections of the Soviet Union gives an idea of the above-mentioned inter-regional division of labor in Soviet agriculture, which would seem to be a more or less rational solution for the immediate future.

On the basis of the territorial division of labor there will take place also a process of specialization in agriculture in accordance with the leading occupations of the different regions.

Thus, the distribution of the basic branches of agriculture among the various parts of the Union is being brought about with a consideration of the national economic requirements and conditions, the distribution of industries, transportation, and so forth, and the inherent conditions of the land—climate, and soil. It is self-evident that the efforts toward agricultural specialization for the time being must aim to solve the immediate problems of the rationalized

territorial distribution of the basic agricultural pursuits, in accordance with the above enumerated factors. The next stage in the solution of the problem of specialization in agriculture is connected with the projecting of the organizational-production forms of economy (state farms and collectives) adapted to the selected areas. This part of the undertaking must naturally take as its starting point the local tasks assigned for each region and the tasks imposed on the region from the point of view of the national economy.

RESULTS OF FARM MANAGEMENT RESEARCH IN THE NORTHEASTERN UNITED STATES

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FARM management differs from the natural sciences in that it can not be studied in the laboratory or on sample plots. It must be studied in the actual operation of real farms. These individual farms differ so widely that large numbers of them must be studied in order to find enough farms similar in any one character to make a significant group. The farm management survey is the most practicable way of getting detailed business information on the operation of large numbers of farms at reasonable cost. It is now generally understood that in farm management studies a large number of observations is more important than extreme accuracy in individual observations.

The usefulness of accounts as a method of studying farm management problems is unquestioned. For the individual farmer accurate accounts are the most useful means of studying his business. From the standpoint of research, however, the very high cost of such investigations when large enough numbers of farms are obtained to make the results useful, makes it advisable to limit them to problems which can not be studied satisfactorily by the survey method.

The primary object of farm management research is to determine facts and principles that will aid individual farmers in working out the most profitable organization of their farms. In attacking this problem there are two possible points of view:

1. How to organize the most profitable business on a particular farm without changing the area.

2. How to organize the most profitable farm business for a particular farmer assuming that he can change the area of his farm or move to a more desirable farm if the possibilities of his present business are too limited.

Both points of view are important and should be given careful consideration. However, in the opinion of the writer, greater emphasis should be placed on the second, namely, how to organize the most profitable business for a particular farmer. Before attempting to work out the most profitable combination of enterprises for a given farm it is important to find out if the farm is large

enough to permit of economical operation, if the type of farming is adapted to the physical and economic situation, and in some cases, if the land is productive enough to be farmed at all.

Economic conditions affecting agriculture are changing constantly. Every such change makes necessary, changes in farm organization. For example, high labor costs have stimulated the use of brains and machinery in order to save labor. Intelligent planning of work and the use of machinery have made it possible for one man or one family to raise more crops and care for more animals. This calls for larger farm businesses in order to permit of efficient operation of the machinery. From 1918 to 1928 there was an average increase of 17 acres per farm in the average size of 514 farms in Livingston County, New York.

The rapid growth of cities has made necessary far reaching changes in farming and farm organization. In regions adapted to their economic production, the resulting increase in the acreage of intensive vegetable crops usually makes smaller farms desirable. Because of these and other conflicting forces the size of farms is unstable all over the world.

While farmers tend to adjust their farm businesses to changing economic conditions, there is a long lag in adjustment because of custom or habit or uncertainty as to the permanence of the change. Through research and education in farm management the necessary adjustments may be hastened with a corresponding reduction of suffering and financial loss. The fundamental problem of farm management is, and will continue to be, that of adjustment of farming to changing economic conditions.

The data obtained in farm management studies are also of value in furnishing facts on which public policies may be based. It is important to consider how national policies on taxation, land, and credit affect the individual farms of which agriculture is composed. Lack of knowledge or consideration of farm management principles has resulted in great loss and suffering, especially in national land policies. The tendency of governments seems to be to divide the available land by the number of people in order to determine the best size of farms. Millions of dollars have been wasted by governments in creating farms of uneconomic size which disappeared as fast as they were created. In the United States, a similar mistake was made in dividing up public lands into 160-acre farms regardless of rainfall, topography or soil. In the drier

regions, years of slow starvation and great economic loss resulted before farms gradually were combined into areas adapted to economical operation.

Economic theories are intended to apply to farming as well as to other industries but it is impossible to give the specific application of these principles to a given farm situation without statistical research. Farm management research contributes to economic theory by showing the application of the economic principles affecting financial success in farming to the region studied under existing conditions.

It has sometimes been assumed, erroneously, that the conclusions of one farm management study would be applicable to any farming region at any time. Even if the region and the sample included in the study have been selected intelligently, the resulting conclusions can be expected to apply only to the particular type of farming area studied under conditions existing at the time of the study. Changes in yields or prices of products or in prices of cost goods may alter relationships and conclusions before the study has been completed.

Knowledge of price trends and cycles and of the principles governing the movements of prices has been of great value to farm management workers in their attempts to show the application of farm management principles under changing economic conditions. Even with these aids it is desirable to repeat surveys at intervals of five or ten years. With types of farming that are subject to wide fluctuations in yields and prices from year to year, successive annual surveys for several years may be necessary to give a sound basis for conclusions.

The trend of farm management research has been from the general to the specific. It is not enough to know that high production per cow results in increased average incomes of dairy farmers. What rates of production are most profitable in a cheese factory region or in a Grade B or a Grade A market milk region? How can these rates of production be obtained most economically in any given dairy region? The combination of the typical farm management survey with an analysis of the cost of production of the dominant enterprise has been of great value in answering these and other similar questions. Both the enterprise study and the study of the farm as a business unit are needed in order to give a clear understanding of the principles of successful farm management.

In any useful analysis of a farm enterprise, its relationship to the farm as a whole must constantly be kept in mind. In dairy, poultry, potato, fruit or other farming areas having one enterprise of outstanding importance, this combination of an analysis of the farm as a unit and of the dominant enterprise is one of the most valuable types of farm management study yet devised.

The improvement of statistical technique has been one of the most important factors in the improvement of farm management research in recent years. These improvements include a better knowledge of the principles of sampling, greater accuracy in individual survey records, and the use of correlations in analyzing the results. Correlation analysis has been of value in giving a more trustworthy measurement of the relative importance of different factors affecting incomes and especially in indicating which of two associated factors is the more important causal factor.

In studying the farm as a business unit one of the first steps is to obtain a satisfactory measure of business success. "Labor income" was originally devised as a measure of the comparative financial returns of farm operators. It was used in order to determine the most successful farmers in a region so that the causes of their success might be analyzed.

There is no one measure of financial success in farming that is best for all purposes. Rather are there many measures for many different purposes. A safe general rule is to show the net financial returns in terms of the most important factor in production from the standpoint of the particular study.

From the standpoint of national welfare one of the best measures of financial success in farming is "returns per worker" including the operator, family labor and hired workers. It is computed by deducting from farm receipts all farm expenses except those for hired labor and family labor. From this result is deducted a charge for the use of capital and the remainder is divided by the average number of workers employed on an annual basis, including the operator.

In thickly populated countries where land is the limiting factor of production, returns per acre may be the best measure of financial success. If land is variable in productivity this measure should be used with care. Where capital is the most important factor in production, per cent return on capital may be used.

The writer believes that the farm operator should be the unit

of farm management study in the United States and that the primary object of farm management research should be to show how farm operators should organize their business operations so as to yield the greatest continuous profits. If this principle is accepted, the best measure of financial success for most farm management studies in the United States will be the income accruing to the farm operator after deducting all other expenses and a charge for the use of capital; in other words, either labor income or labor earnings. A corresponding measure for the interpretation of enterprise cost accounts would be "returns per hour of labor." In regions where the operator's capital is more important than his labor and management, the per cent return on capital may appropriately be used.

BUSINESS FACTORS AFFECTING FINANCIAL SUCCESS IN FARMING IN THE NORTHEASTERN STATES

One of the most important factors affecting financial success in farming is the size of the farm business. In discussions of this factor it is important to distinguish between the size of the farm (area) and the size of the farm business. While with similar farms there is a relationship between the area of the farm and the size of the farm business, there are many exceptions. Many vegetable or poultry or fruit farms have a relatively large business on a small area of land. On the other hand in dairy farming or livestock producing areas a relatively small business is often found on farms of large area. Unless farms are uniform in type and in the proportion of wasteland, woodland and cropland, the total area of the farm is an unsatisfactory measure of the size of the farm business.

SIZE OF THE FARM BUSINESS

There are many measures of size of business such as total acres in the farm, total farm capital, total receipts, total acres of crops, number of cows or hens or other important livestock, acres of fruit or potatoes or other dominant crop, number of work animals or power units, average number of men employed on an annual basis, and productive man work units.

While any one of these measures may be useful in a particular case, the best general measure of size of farm business is productive man work units. A productive man work unit is the average amount of productive work accomplished by a man in one day.

The total productive man work units of a farm business represent the number of days of income-producing work actually accomplished on the farm at the average rate of work in the region.

The relation of size of business, in terms of man work units, to labor income in a dairy and crop growing region in Livingston County, New York, is shown in table 1. As the size of the farm business increased there was a corresponding increase in the average labor income of these farm operators. While individual groups showed minor variations from this trend, the general relationship is clear.

The results of this table agree in general with the results of most

Table 1. Relation of Size of Business to Labor Income*

(514 Farms, Livingston County, New York, 1928)

Total productive man work units per farm		*Crop index*	*Labor income*
Group	*Average*		
Smallest .. 5%	111	90	$ 10
Next 10%	184	92	143
Next 15%	275	94	133
Next 20%	366	100	261
Next 20%	481	100	463
Next 15%	630	102	452
Next 10%	870	102	1,138
Largest . 5%	1,324	93	1,044

* Warren, S W Unpublished data.

farm management studies with normal relationships between the price of farm products and the costs of labor and other items of production. Under normal conditions, within limits, moderately large farm businesses return larger average labor incomes to their operators than small ones. Under normal conditions there is little difference in the risk of loss between moderately large and small farm businesses, but the chances of making a large income or a large loss are much greater with a moderately large farm business.

The most important reason for the larger average labor incomes of the moderately large farms is greater efficiency. The relation of size of business to labor efficiency in the same area is shown in table 2. More than twice as much productive work was accomplished per man in the group of farms with the largest businesses as in the group with the smallest businesses. This principle has

been repeatedly demonstrated by farm management studies in many different areas. As the size of the farm business increases there is a rapid increase in the efficiency of man labor, horse labor, use of machinery, and use of buildings within the size limits in most farming regions. The moderately large farm businesses also have an important advantage in buying and selling.

Another reason for the larger average labor incomes of moderately large farms, under normal conditions, is the direct effect of volume of business. Even if costs of labor and other factors of production did not decrease with increasing size of business, a

Table 2. Relation of Size of Business to Labor Efficiency and Labor Income*

(514 Farms, Livingston County, New York, 1928)

Total productive man work units per farm	*Number of farms*	*Average productive man work units per farm*	*Work units per man*	*Labor income*
Less than 200	54	144	125	$-86
200–299	77	246	176	108
300–399	103	340	196	140
400–499	89	446	234	497
500–599	60	546	249	486
600–699	36	633	264	329
700 and over	95	979	300	998

* Warren, S W Unpublished data

larger number of units of products sold with a given profit per unit would result in a larger number of dollars for the operator.

The effect of size of business on labor income in a good year and in an unfavorable year in a dairy region in Chenango County, New York, is shown in table 3. In this table, size of business is measured by total capital per farm. In 1925, a favorable year, the larger farm businesses showed much higher average labor incomes than the small ones; in 1922, a very unfavorable year, the larger farm businesses showed larger average losses than the small ones. In both years the larger farms were more efficient in the use of labor and other factors of production. In 1922, a very unfavorable year, prices of farm products were so low that the larger volume of business of the moderately large farms resulted in larger losses to the operators in spite of their greater efficiency.

On the average for the five-year period, 1921-25, the moderately large farms showed somewhat higher average labor incomes than the small ones. This period included two or three years of such unfavorable farm prices that the effect of the greater efficiency of the moderately large farms was partially obscured by the losses resulting from a larger volume of business.

In table 4 is shown the relation of size of business to labor income on fruit farms in Niagara County, New York, on good and on poor soils. This table includes average incomes on both types of soils for the 13-year period, 1913 to 1925 inclusive. Since the farms are uniform in type, total acres per farm has been used as a measure of size of farm business.

Table 3 Relation of Size of Business to Labor Income*

(Dairy Farms, Chenango County, New York, 1921–25)

Capital per farm	*Labor Income*		
	1922	1925	1921–25
$15,000 or less	$ 179	$1,130	$534
$15,001 to $25,000	43	1,993	600
More than $25,000	686	3,657	724
Average	32	1,676	580

* Neethling, J C Economic Studies of Dairy Farming in New York IX. Cornell University Agr Exp Sta bul 483: 59 1929.

The Dunkirk soils are well-drained, fertile soils well-adapted to the production of fruit. On these soils the moderately large farms showed considerably higher average labor incomes over this period of years than the small farms.

The Clyde soils are found adjacent to the Dunkirk, but they are poorly-drained and not well-adapted to fruit production. A smaller proportion of the farm area was devoted to apples on the Clyde soils. On these soils over the same period of years moderately large farms showed greater average losses than small farms. In this case, in spite of the fact that the larger farms on the Clyde soils were more efficient in the use of labor and other factors of production than the small farms, yields were so low that the larger farms had greater losses.

In this area the Clyde soils are recognized as less productive than the Dunkirk soils and farm values are lower. However, the farm values on the poorer soils are not accurately adjusted to the dif-

ference in productivity. The results of these studies show that over this 13-year period a farmer could better afford to pay the going market price for a farm on the Dunkirk soils than to have a farm on the Clyde soils given to him without cost.

In table 5 is shown the relation of size of business to labor income in Livingston County, New York, with high and with low yields, using production index as a measure of yields. The production index is the weighted average rate of production of crops and animals combined on a percentage basis in terms of the average of the area.

Table 4. Relation of Size of Business to Labor Income*

(Fruit Farms, Niagara County, New York, Average 1913-25)

Total acres per farm	*Acres of bearing apples*	*Value of farm per acre*	*Labor income*
	Clyde Soils		
Less than 60	3 3	$205	$131
60 to 99	6.4	173	— 20
100 or more	12 0	158	—276
Average	5.2	182	41
	Dunkirk Soils		
Less than 60	7 8	$431	$429
60 to 99	13 1	293	767
100 to 199	21 4	286	896
200 or more	31 0	202	1,056
Average	14 8	292	719

* Scoville, G P, Spencer, Leland, Rasmussen, M P, Harriott, J F, and Oskamp, Joseph The Apple Situation in New York Cornell Ext bul 172: 9 1928.

In this region, with a very low production index, the large farm businesses had greater average losses than the small ones. With average or better yields, large farm businesses had much higher average incomes. While in all cases the moderately large farms were more efficient in the use of labor and other factors of production, with very low yields the relation of costs of production to prices received was so unfavorable that this factor more than obscured the favorable effect of greater efficiency.

During the period of rising prices from 1910 to 1920, farm management studies tended to over-estimate the importance of size of business as a factor affecting the incomes of farmers. When prices are rising, farmers obtain fortuitous gains because they usu-

ally sell on a higher price basis than that existing when their costs were incurred. Under such conditions the effect of mere volume of business is over-estimated and some large farms are able to show satisfactory incomes in spite of inefficiency in production.

In periods of falling prices such as from 1920 to 1930, farm management studies tend to under-estimate the importance of size of business as a factor affecting the incomes of farmers. Under such conditions farmers sell their products on a lower price basis than that on which their costs were incurred. Since wages lag and remain relatively high when prices are falling, the unfavorable relationship of costs to prices of farm products, results in a tend-

Table 5. Relation of Size of Business and Rate of Production to Labor Income*

(329 Farms, Livingston County, New York, 1928**)

Production index	Labor income	
	Total productive man work units below average	*Total productive man work units above average*
Below 80	$-361	$-840
80–99	234	285
100 119	651	1,270
120 and over	1,021	1,931

* Warren, S. W. Unpublished data.
** Includes only farms having 6 or more cows

ency toward greater losses on the moderately large farms. In very unfavorable years the losses due to this effect of volume may offset the advantage of greater efficiency in production of the moderately large farms.

The most serious common weakness in the business organization of farms in the northeastern United States is too small size of business. Many farm businesses are so small that the gross income is not large enough to permit of a satisfactory standard of living, even if there were no expenses. This is primarily the result of a lag in the adjustment of size of farm business to the use of labor-saving machinery. The use of this machinery has enabled farmers to perform their work in less time but the business has not been enlarged to enable them to use the time saved in a profitable manner. While the operators of the small farm businesses may be

busy, they are not busy at productive work as is shown by comparisons of labor efficiency of these farms with moderately large farm businesses.

A comparison of small and moderately large farm businesses is not one of family farms and farms employing large gangs of labor, but a comparison of farms having approximately the same labor force with partial and with full employment as is shown in table 8. The operators of the very small farm businesses get incomes consistent with the small amount of productive work accomplished. Similarly, the operators of moderately large farms get incomes consistent with the larger amount of productive work accomplished.

The larger average incomes of the moderately large farms have sometimes been ascribed to differences in the ability of their operators. The primary reason is one of physical obstacles and not mental limitations. Under normal conditions it is much easier for a farm operator of average ability to make a good income with a moderately large business than with a small business because he can produce more products at a lower cost per unit. No evidence has ever been presented that indicated a close correlation between the size of the farm business and the ability of the operator.

There is no definite answer to the question "How large should a farm business be?" The solution to this question depends upon the experience of the farmer, his financial situation, the relation of labor and other costs to the value of products produced, and many other factors. In starting farming it is usually wise to begin with a medium sized business and then increase as financial resources and experience justify.

In general terms the best size of farm business for the northeastern United States is one employing from two to four or five men, including the operator. Such a business usually requires from $20,000 to $40,000 capital, or even more. The area of such a farm will vary widely depending on the type of farming. It should be large enough to permit of the efficient use of well-established labor-saving machinery. In any region, the minimum size of business for any farm that is worth operating is enough income-producing work to keep the available labor force profitably employed.

There are many ways of increasing the size of a farm business and the best method for any particular farmer depends upon many

factors. In the northeastern United States it is frequently possible to increase the size of a farm business without increasing the total area, by increasing the acreage of intensive crops that are adapted to the region or by increasing the number of productive livestock. If a greater area is needed, more land can usually be obtained by renting, even by a farmer with limited capital.

RATES OF PRODUCTION OF CROPS AND ANIMALS

It has long been recognized that yields of crops and rates of production of animals have an important effect upon farmers' incomes. The relation of production index to labor income is shown

Table 6. Relation of Rate of Production to Labor Income*

(329 Farms, Livingston County, New York, 1928**)

Production index	*Number of farms*	*Total productive man work units per farm*	*Labor income*
Less than 70	22	495	$-689
70- 79	39	565	-508
80- 89	43	617	-173
90- 99	63	614	560
100-109	66	561	901
110 119	46	611	1,073
120-129	23	687	1,456
130 and over	27	572	1,763

* Warren, S. W. Unpublished data.
** Includes only farms having 6 or more cows

in table 6. As the production index increased the average labor income increased rapidly and consistently, from $689 for the group of farms with the poorest rates of production to $1,763 for the highest group.

The average size of the farm business in terms of man work units is also given for each group of farms. The irregular variation in average size of different groups indicates that this factor is not associated with rate of production and that the differences in average labor incomes of the different groups are primarily due to differences in rates of production.

The relation of production per cow to labor income in a dairy region is shown in table 7. On the average of the five-year period, 1921 to 1925, there was a steady and striking increase in average labor income with increases in the production of milk per cow.

The higher average labor incomes of the farms with high rates of production are due to the fact that within the limits of ordinary farm practice, higher yields of crops and higher rates of production of animals are usually obtained at a lower cost per unit. Good rates of production are an important means of obtaining efficiency of production of crops and of animal products.

The relation of the rate of production to labor income is often mis-stated in order to emphasize the importance of this factor. Advising farmers to "keep fewer and better cows" or to "raise fewer acres of crops with better yields," is spoiling good advice with bad. It is not necessary to have an inefficient-sized farm business in order to obtain good rates of production of crops and of animals. In general, the moderately-large farm businesses obtain at least as good yields as the small ones as was shown in table 1.

Table 7. Relation of Production Per Cow to Labor Income*

(Dairy Farms, Chenango County, New York, 1921–25)

Production of milk per cow (pounds)	*Average production per cow*	*Per cent income from crops*	*Labor income*
Less than 6,000	5,000	18 0	$ 106
6000 to 7,500	6,800	15 8	769
More than 7,500	8,700	15 4	1,177

* Neethling, J C Economic Studies of Dairy Farming in New York IX. Cornell University Agr Exp Sta bul 483: 44 1929

Rates of production obtained by farmers are dependent on prices and costs as well as on knowledge of how to increase production. The importance of this statement is recognized by farmers, but often is not recognized by persons carrying on experiments with crops and animals, the expenses of which are borne by governments.

With staple extensive crops, the limit of profitable yield is usually not more than 50 per cent above the average of the region. With intensive crops the limit of profitable rates of production is higher—perhaps double the average of the area. Since the environment of animals can be controlled more closely than that of field crops, the limit of profitable increase of production of animals is usually approximately double the average rate of production of the area.

Where crops are raised for seed or pure-bred animals are being tested for production, the profitable limit of the rate of production is the approximate limit of physical capacity. In such cases the unit price of the product depends partly on the yield and since higher yields mean higher prices per unit, higher rates of production are justified.

Farmers generally recognize the limits to profitable production that are set by costs and prices as is shown by table 6. Only 27 farms in this area obtained rates of production of crops and animals averaging 30 per cent or more above the average of the region. There is no danger to an individual farmer in too high rates of production provided they are obtained economically. In general, very high yields mean increased costs per unit.

The primary production problem of the individual farmer is how to get good rates of production economically. When costs are relatively higher than the prices of farm products, as during the period from 1920 to 1930, the importance of good rates of production is increased. However, under such conditions it is more important than usual to obtain good rates of production economically. The most important single means of achieving this aim is to keep only good animals and farm only good land.

LABOR EFFICIENCY

The relation of labor efficiency to labor income in a dairy and crop growing region is shown in table 8. In this region the average labor income increased rapidly with increases in the productive man work units per man. While labor efficiency has always been important on American farms, in periods of falling prices, when wages are relatively high, the importance of this factor is greatly increased.

As the average labor efficiency of these farms increased there was a corresponding increase in the average size of the farm businesses. The differences in labor income between the different groups are therefore partly the results of labor efficiency and partly the result of the greater efficiency of the larger farm businesses in other factors of production. The close association between these two factors indicates that one of the most important factors in labor efficiency is a moderately large farm business. Moderately large farm businesses make it possible to keep the available labor force profitably employed. In this area the group of farms with

highest labor efficiency accomplished more than three times as much income producing work per man as the group with lowest labor efficiency.

There are many other ways of promoting labor efficiency such as planning work, use of machinery and convenient arrangement of the farm fields and the farm buildings. Much labor can be saved by knowing how and when to spray or to control weeds and by doing this work in the proper manner and at the proper time. The importance of labor-saving machinery is too well recognized

Table 8. Relation of Labor Efficiency to Labor Income*

(514 Farms, Livingston County, New York, 1928)

Productive man work units per man	*Number of farms*	*Total productive man work units per farm*	*Man equivalent*	*Labor income*
Less than 150	77	218	1.9	$-395
150–199	124	348	2.0	45
200–249	133	477	2.2	440
250–299	96	622	2.3	505
300–349	51	734	2.3	1,318
350 and over	33	892	2.3	1,479

* Warren, S. W. Unpublished data

to need discussion. Much labor can be saved by a good farm layout and by conveniently arranged buildings.

BALANCE OR ORGANIZATION OF ENTERPRISES

The term "balance" refers to the organization of the enterprises of a farm business so as to return the largest average labor income to the operator.

On most farms a considerable number of crop and animal enterprises are well enough adapted to the physical and economic situation to permit of their profitable production. In deciding on which enterprises to include and the sizes of the various enterprises, many factors must be considered, such as labor distribution, use of untillable pasture, rotation, fertility maintenance, use of by-product feeds, risk, and many others. The best balance of the enterprises of a given farm represents the most profitable adjustment of the enterprises to these important factors.

In the early days of farm management research the opinions of

research workers were influenced by the commonly-accepted opinion that farms should be diversified. Much time was spent in working out measures of diversity and in attempting to find a relation between diversity and labor income. Failure to find a definite relationship led eventually to a more thorough analysis of the problem of the organization of the enterprises of farms and resulted in discrediting the diversity myth.

There is still a wide-spread popular belief that diversity is a panacea for all the ills of agriculture. This is usually interpreted to mean that the farmers in a region should raise less of the profitable product in which they tend to specialize and more of some relatively unprofitable product.

In general, diversity lessens risk. It may result in a better distribution of income. However, these are only two relatively minor factors in the consideration of a complex problem. Specialization is an important means of obtaining greater efficiency in production. The importance of this factor has increased with the development of specialized labor-saving machinery.

The degree of specialization that is most profitable for the farmers in any given region depends largely on the relative profitableness over a series of years of the enterprises that are adapted to the region. Where two or three non-competing enterprises are of approximately equal profitableness narrow specialization will not often be found. Where one enterprise is very much more profitable than any other, advice to diversify at the expense of the dominant enterprise will usually receive from farmers the attention that it deserves.

In table 9 is shown the relation of sales of crops to labor income on some dairy farms in Chenango County, New York. As shown by this table, the dairy farms that obtained a considerable percentage of their income from the sale of crops made higher average labor incomes over the period 1921 to 1925 than did the farms selling only milk.

Similar results have been obtained in practically all farm management studies of dairy farms made in the northeastern United States. Since the dairy enterprise does not provide full profitable employment for the labor force during the summer months, it is possible to increase the farm income by producing some profitable cash crop, in addition to forage for the cows, without much increase in expense. Where possible, the addition of an-

other source of income to dairy farms in this area usually results in an increased labor income to the operator.

The trend of northeastern agriculture is toward increasing specialization. Narrow specialization in one single product is not often most profitable because of the difficulty of keeping the labor force profitably employed throughout the year with one enterprise. The tendency of northeastern dairy farms is not toward general diversification, but toward specialization in two or three products such as milk and cabbage, or milk and potatoes, or milk and eggs or other similar combinations.

The returns per hour of labor of some of the important enter-

Table 9. Relation of Sales of Crops to Labor Income*

(Dairy Farms, Chenango County, New York, 1921-25)

Per cent of income from crops sold	*Average per cent of income from crops sold*	*Labor income*
10 or less	4	$ 228
11 to 25	17	579
More than 25	40	1,220

* Neethling, J C Economic Studies of Dairy Farming in New York IX Cornell University Agr Exp Sta bul 483. 50. 1929

prises on New York farms are shown in table 10. These results are taken from farms keeping complete cost accounts in cooperation with the New York State College of Agriculture. While these farms are larger and more efficient than the average, the returns per hour from the different enterprises indicate the approximate relative profitableness of these enterprises with usual yields under New York conditions.

These enterprises show a wide variation in returns per hour of labor. In general the grain crops give a very poor return for labor with average yields under New York conditions. The crops showing relatively high returns per hour of labor are, in general, the bulky and perishable products that are best adapted to a farming region near consuming centers.

The results given in table 10 indicate the relative profitableness of these enterprises with average yields under New York conditions. Farms obtaining high yields of oats or buckwheat or any other crop with reasonable costs would usually obtain better re-

turns per hour of labor than those shown in this table. With very low yields, the returns per hour of labor would usually be less. The returns per hour of labor to be expected from these enterprises on any given farm would thus depend in part on their relative yields on that farm.

While relatively unprofitable enterprises can seldom be eliminated from a farm business, it is possible to emphasize the profitable enterprises that are adapted to a given farm by producing as

Table 10. Returns Per Hour of Labor on Some of the More Important Enterprises on New York Farms*

Enterprise	Average		
	7 years 1914-20	5 years 1925-29	1929
Alfalfa	$ .97	$ .81	$ .64
Apples	—	.83	.83
Buckwheat	.07	— .37	— .10
Cabbage	.51	.61	.81
Corn for grain	.14	— .14	— .11
Cows	.33	.48	.53
Hay	.88	.05	.09
Oats	.01	— .21	— .73
Potatoes	.55	1.25	1.47
Poultry	.67	.49	.53
Wheat	.57	.19	— .21

* Harriott, J. F. Results of Farm Cost Accounting on Selected Farms in Various Parts of New York—Preliminary Statistical Report. Cornell University Agr. Exp. Sta. mimeographed report. 1930.

If the total charges except those for man labor are deducted from the total returns from any enterprise, the remainder (labor returns) represents what the farmer has as pay for the labor on that enterprise. Dividing this remainder by the hours of man labor on that enterprise gives "returns per hour of labor."

large a proportion of them as possible and by giving them first consideration in planning work.

It is seldom wise to vary the balance of the enterprises of a farm widely from year to year in an attempt to adjust to temporary price fluctuations. The greatest value of outlook information to a farmer is in warning him of the danger of jumping in or out of production of a given enterprise because of a temporary price situation. In general the wisest procedure is to plan the combination of enterprises that will be most profitable over a series of years, making such minor modifications in this program from year to year as seem to be warranted by changing economic conditions.

SUMMARY

The relative importance of different business factors affecting labor incomes of farmers in a dairy region is shown in table 11. The three factors considered are capital—a measure of size of business—per cent of income from crops, and cost of producing milk. In this table the relative importance of these factors on labor income is measured by their percentage determination of labor income. The percentage determination of each of these factors indicates its effect on labor income, holding other factors constant.

Table 11. Percentage Determination of Labor Income by Various Factors*

(Dairy Farms, Chenango County, New York, 1921–25)

	1922	1925	*Average* 1921–25
Capital	2	9	—
Per cent of income from crops	1	31	17
Cost of producing milk	24	9	18
Total	27	49	35
Average labor income	$32	$1,676	$580

*Neethling, J. C. Economic Studies of Dairy Farming in New York. IX. Cornell University Agr. Exp. Sta. bul. 483: 37. 1929.

In 1922, a year of very unfavorable prices of cash crops, the most important of these factors affecting labor income was the cost of producing milk. In 1925, a year of favorable crop and milk prices, the percentage of income from crops was the most important factor, but capital and cost of producing milk were of considerable importance. On the average of the five-year period, cost of producing milk and per cent of income from crops were of almost equal importance, while capital had a negligible effect.

It should not be assumed from table 11 that size of business as measured by capital was not an important factor affecting the labor income of these dairy farmers during this period. As previously stated, the most important effect of a moderately large business is to increase efficiency in production. In this table the effect of size of business on the cost of milk production is

eliminated since the percentage of determination of capital is the effect of this factor holding other factors constant. Since the period 1921 to 1925 included several unfavorable years, size of

Table 12. Relation of Cost of Milk Production to Labor Income*

(Dairy Farms, Chenango County, New York, 1921–25)

Cost of milk per 100 pounds	*Average cost of milk per 100 pounds*	*Production per cow (pounds)*	*Labor income*
$2 00 or less	$1 72	7,500	$1,334
$2 01 to $2 75	2 35	6,700	590
More than $2 75	3 41	5,700	5

* Neethling, J C Economic Studies of Dairy Farming in New York IX Cornell University Agr Exp Sta bul 483 40 1929

business did not have an important direct effect on labor income because of the larger volume of business handled.

The relation of cost of milk production to labor income on these farms for the same period, is shown in table 12. Farms with a low cost of milk production had much higher average labor incomes than farms with a high cost.

The cost of milk production is a convenient measure of efficiency

Table 13. Relation of Number of Cows Per Farm to Cost of Milk*

(Dairy Farms, Chenango County, New York, 1921 25)

Number of cows	*Average number of cows*	*Cost of milk per 100 pounds (5-year simple average)*
16 or less	14	$2 61
17 to 25	21	2 57
More than 25	33	2 44

* Neethling, J C Economic Studies of Dairy Farming in New York IX Cornell University Agr Exp Sta bul 483: 41 1929

in dairying, which in turn is affected by several factors. In table 13 is shown the relation of the number of cows per farm to the cost of milk production. Farms with more than 25 cows had a considerably lower cost of milk production than those with a

smaller number. This is another example of the relation of size of business to efficiency.

The most important factor affecting the cost of milk production is production per cow as is shown in table 14. As milk pro-

Table 14. Relation of Production Per Cow to Cost of Milk*

(Dairy Farms, Chenango County, New York, 1921-25)

Production per cow (pounds)	*Average production per cow (pounds)*	*Cost of milk per 100 pounds*
Less than 6,000	5,000	$2 97
6,000 to 7,500	6,800	2 36
More than 7,500	8,700	2 18

* Neethling, J C Economic Studies of Dairy Farming in New York IX Cornell University Agr Exp Sta bul 483: 42 1929

duction per cow increased, the average cost of milk production decreased, the difference between the lowest and highest groups being about 79 cents per hundred pounds.

Production per cow is, in turn, the result of many factors, such as quality of cows, feeding practices, and time of freshening. The relation of season of freshening to production per cow and cost of milk production is shown in table 15.

Table 15. Relation of Time of Freshening of Cows to Various Factors*

(Dairy Farms, Chenango County, New York, 1921-25)

Per cent of cows freshening from September to December	*Production per cow (pounds)*	*Cost of milk per 100 pounds*
Less than 25	5,600	$2 70
25 to 50	6,300	2 70
More than 50	7,200	2 33

* Neethling, J C. Economic Studies of Dairy Farming in New York IX Cornell University Agr Exp Sta bul. 483: 45. 1929

In this region the farms having more than 50 per cent of their cows freshening from September to December had a higher milk production per cow and a lower average cost of milk production than the farms with a smaller proportion of cows freshening during these months.

Although there are many factors that affect the relative incomes of the farmers in any region, the most important business factors are size of business, rates of production of crops and animals, labor efficiency and balance. While mistakes may be made in many other things, farmers whose businesses are strong in each of these factors seldom fail to make satisfactory incomes. It is not enough for a farm to be strong in one factor. In order to obtain a satisfactory income it is necessary to have all of them in proper adjustment.

The 41 Livingston County farms that were above the average

Table 16. Comparison of Good Farms with Average*

(514 Farms, Livingston County, New York, 1928)

	*8 farms 15% above average in four factors***	*41 farms above average in four factors***	*All farms*
Total man work units per farm	862	801	486
Acres operated	221	227	166
Work units per man	311	285	223
Crop index	129	122	100
Pounds of milk sold per cow	7,900	7,005	5,599
Age of operator	42	47	50
Labor income	$2,886	$1,897	$ 386
Labor earnings	$3,438	$2,392	$ 856
Per cent return on capital	11 0	7 3	1 8
Labor returns per man	$1,612	$1,229	$ 573

* Warren, S W. Unpublished data.

** Total productive man work units, work units per man, pounds of milk sold per cow, crop index.

of their region in size of business, labor efficiency, yield of crops and production per cow had labor incomes averaging almost five times as much as the average of the region (table 16). In this same region there were only 8 farms that were 15 per cent or more above the average of the region in the four factors previously enumerated and the average labor income of these farms was $2,886 as compared with $386, the average of the region.

Better-organized farms do not mean an increased total production for agriculture, but fewer farms more efficiently operated. The best way to decrease the total production of agriculture is by ceasing to work poor land and by ceasing to keep poor animals.

The decisions of agriculture are the sums of the decisions of individual farmers. Thus a wise production program for agriculture necessitates a sound basis for the business plans of individual farmers. The primary object of farm management research is to determine facts and principles that will aid farmers in adjusting their farm businesses to changing economic conditions.

RESEARCH INVESTIGATIONS ON THE LIVESTOCK RANCHES OF THE UNITED STATES

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THE western half of the United States, in which livestock ranching, rather than general farming, represents the major agricultural industry, has been somewhat behind the general farming regions of the eastern half of the United States in the development of their research methods in ranch organization and management studies. The investigational work in farm management started about 1910, whereas the ranch management investigations were not started until about 12 years later.

The term "ranch" has been most frequently thought of as a livestock enterprise in the open country where a man's wealth is measured in terms of the number of cattle, sheep, and horses which he possesses, and which are cared for very largely without the use of cultivated crops. Grazing and hay lands constitute the real estate holdings.

This lack of research seems to be due to the following reasons:

1. The ranches are in the western and newer states where little investigational work of any kind has been done, due to the short time that the stations have been in operation and the limited amount of state and federal funds available for such work.

2. The efforts of the agricultural experiment stations have heretofore been directed primarily toward the solution of the problems of the farms, rather than those of the ranches, even in those states where ranching has played, and will continue to play, the leading rôle. This policy of the stations in the past has no doubt been due to the fact that most of the research men doing work in our range states received their training in middle western and eastern universities, and they started the same lines of investigational work in the West that was being conducted in the schools from which they came. The first fifteen bulletins on cattle and sheep from the Wyoming Experiment Station were on the fattening of livestock, a practice that had little or no application in those early days.

3. It is easier to work with the small farmer for he is more dependent upon the agricultural colleges and his neighbors for help. The ranch operators feel that they can get along without any as-

sistance, and that the college recommendations are usually impractical (which has too often been the case). The present calf selling recommendation is an example.

4. Ranching has long been looked upon as an exploitative industry and has been curbed by both state and federal legislation. This has created in the ranchers the spirit of independence and resentment toward state and federal supervision. The above factors have retarded the progress of the research work along the lines of ranch organization and management.

The United States Department of Agriculture Report No. 110 by Barnes and Jardine in 1916, on the Meat Situation in the United States, gives the cost of production of certain outfits. Nothing of value however is given in the way of management.

One of the first careful studies to be made of ranching was that of Director Youngblood and Professor Cox of the Texas Station and appeared as bulletin No. 297. This study, made in 1920, dealt with the factors influencing size, tenure, carrying capacity, improvements, capital, credits, labor, products, and marketing. The study was undertaken to correct the impression that ranching is essentially an exploitative industry, and to aid in placing the industry on a sound economic and social basis, rather than to formulate a set of rules for the guidance of the ranchmen in the everyday problems of ranch management. No attempt was made to correlate certain practices with profitable returns.

In the fall of 1921 the Bureau of Agricultural Economics and the Bureau of Animal Industry of the United States Department of Agriculture began a study of the costs and methods of producing calves on ranches in Texas. Fifteen ranches with 38,511 cows were studied for the years 1920, 1921, 1922 and 40 ranches were studied in 1923. Preliminary reports of the work appeared in 1924, and again in 1925. The work was carried on by V. V. Parr and G. S. Klemmedson, and seemed to be the most complete study of its kind up to that time.

The costs in the above Texas study were divided into (1) net costs which included all cash expenditures, and death loss and depreciation on the breeding herd, (2) interest on owner's equity and value of the owner's labor. The total represented gross cost which was $31.17 per cow and $47.08 per calf on all ranches for the farm year period. The calves weighed 350 and sold for $21.28. The calves sold for less than one-half their cost during the four-

year period. The net costs rather than the gross costs were used in the comparative studies.

The Bureau of Agricultural Economics of the United States Department of Agriculture in cooperation with the Colorado Agricultural College started, in 1922, a study of the costs and methods of cattle production on prairie and mountain valley ranches. These studies were carried on for four years, and the results published in 1928 as bulletins number 327 and 342 from the Colorado Experiment Station.

R. L. Adams of the California Experiment Station made a cost of production study of producing beef in California in 1923-24 He found that the cost of production decreased as the age of the animal increased, up to three years of age. Adams did not attempt to place a value on lands, but used instead the value of hay, pasture, and concentrates. For the above reason his costs were somewhat below the other studies made in the western range states. The cost per pound for calves on the California ranches was 8.8 cents compared to 13.4 cents per pound on the Texas ranches. The calf cost on Wyoming mountain valley ranches is approximately 10.9 cents per pound.

During the summer of 1925 the Bureau of Agricultural Economics and the Bureau of Animal Industry of the United States Department of Agriculture, in cooperation with the Agricultural Experiment Stations in Wyoming, Montana, North Dakota and South Dakota undertook the task of making a study of the cattle industry of the Northern Great Plains, and determining the factors and methods of management that would prove best for the stockmen in that area.

Sixty records were taken in Wyoming and about the same number in each of the other states. Wyoming Bulletin No. 147 on Range Cattle Management, published in 1926, gives the results secured in Wyoming. The other states have not published their findings. The United States Department of Agriculture published the findings for the entire area as Technical Bulletin No. 45.

We used the correlation method of study on the Wyoming records which I believe was the first time that it was used to analyze ranch management investigations. The comparative method of study was used in presenting the results of the investigations to the ranchers at the stock growers conventions.

The factors influencing profits which showed fairly good cor-

relation with the rate of return were (1) per cent of total investment which the operators had in cattle, (2) per cent of calf crop, and (3) the number of cattle handled per man. There was a noticeable correlation between calf crop and the number of cows per bull.

Rate of return on investment, rather than labor income, is used as a measure of successful management, as interest is a greater item of expense than labor on most livestock ranches.

The commonly recommended practice of selling calves and yearlings at prices prevailing at that time was found to be a poor practice, and the same condition holds on most of our northwestern ranches.

A study similar to the above was conducted in the Southwest, in 1926. United States Department of Agriculture Technical Bulletin No. 68 gives the results of this study. New Mexico Experiment Station Bulletin No. 169 also reports on the survey. Similar cooperative studies were made in Utah. The results are given in bulletins number 203 and 204 from the Utah Experiment Station.

A cooperative cost account route was started in the states of Montana, Wyoming, North Dakota and South Dakota, following the first survey. The results of this study are now being prepared for publication.

The states of Colorado and Wyoming in cooperation with the Bureau of Agricultural Economics and the Bureau of Animal Industry of the United States Department of Agriculture started a cost and management study route in southern Wyoming and northern Colorado in 1929. There are eighteen ranches in each of the states and the field man makes the rounds of the ranches each month. We secure, I believe, more detailed information on management practice than has been secured so far in ranch management studies.

We have made five detailed studies of range cattle and range sheep areas in Wyoming. The first range sheep study included 65 wool growers and approximately one-half million head of sheep. The records were taken in 1926 and covered the calendar year of 1925. About one million head of sheep and 100,000 head of cattle have been included in our studies during the last five years.

We do not select certain ranches for our investigational work in a given area. We take all the ranches of the area. When

studying range sheep production we do not include operators who have less than a band—1,200 head of ewes. Some operators run as many as 50,000 head. The average is about 6,000 head per ranch.

Our cost of production and management investigations have not been made for the purpose of determining the cost of production, but rather to determine the factors that influence the cost of production, and how those factors can be changed in such a way as to give better returns to the rancher. In order that we may know which ranchers are the best managers it is necessary to have a measuring stick. We have used, for this purpose, the rate of return on investment. Cost of production is determined in the studies, but it is of secondary importance.

A study or publication showing the average cost of production of wool, beef, or lambs, is of little or no value to the man producing these products. It may be of general interest to him and to the public, but it has no real value to the individual producer because it does not show him the weak points in his operations. In order that cost of production and management studies may be of real value they must show why one man's cost of producing wool is 24 cents per pound and why his neighbor's cost is 40 cents per pound.

In all of our studies on range cattle and range sheep investigations we have made a complete analysis of all factors that are influenced by different management practices, and prepared a detailed statement of all items of expense and receipts for each individual ranch, in order that we may determine just what factors are influencing the profits, and how those factors may be improved so as to give better returns. If after such a study we cannot make specific and valuable recommendations that will result in a more favorable return to the operator, then our studies are not worth while. We analyzed and tabulated the results of each individual ranch in such a way that the rancher can see his items of cost and compare them with those of his neighbors, and with the averages for all ranches included in the study. It enables him to see the weak places in his methods of management.

Our method of procedure has been to first secure the approval of the stockmen of the area in which we are to make the investigation. This is done by attending the county and state association meetings of the livestock men, and presenting the results of a

previous study. We attempt to show them the value of the study when applied to their own ranch business.

Figure 1, showing the purchasing power of beef cattle, sheep and wool over a long period of years, is used to show the stockmen the up and down movements in the prices of livestock and livestock products. The forty-year period from 1890 to 1929 equals 100. This forty-year period is used in order to give a better picture of normal prices. In the use of the 1910-14 period we may secure results that are misleading. For example, the price of wool during the period 1910-14 was lower than in any other five-year period during the last half century.

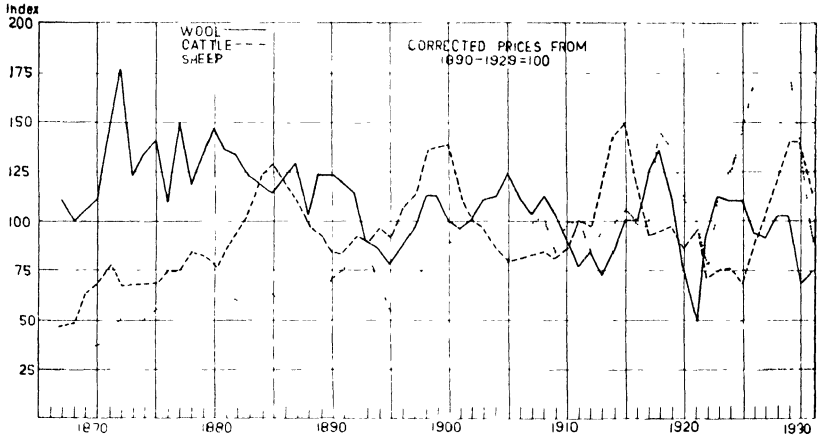

FIGURE 1. PURCHASING POWER OF BEEF CATTLE, SHEEP, AND WOOL, 1867-1931

A careful study of the corrected prices of his products over a long period of years gives the rancher a better idea of what to expect of the future as measured by what has happened in the past. It arouses his interest in economic work and assists us in securing his cooperation in the study of his particular ranch.

We also use a chart showing the numbers, prices, and death losses of range cattle and sheep during the last half century. A precipitation or drought chart is also shown to illustrate the effect of dry years on numbers, prices and death losses of cattle and sheep in the state. This chart brings out the need for better organization and management on the ranches in order to check to some extent these severe losses due to death, forced sales and low prices.

The average investment per ranch and the amount and percentage investment in each enterprise, is shown in table 1. The average investment per ranch was $93,355 with 50 per cent of the total investment in land, 35 per cent of the total investment in cattle, and the remaining amount in sheep, horses, buildings and improvements, machinery and equipment, and feed and supplies.

The per cent of investment in the different enterprises is one of the most important factors in influencing the rate of return on

Table 1. Average Distribution of Investment, 47 Wyoming Mountain Valley Ranches

Item	*Average investment per ranch*	*Per cent total*
Land, 585 acres @ $21 85	$12,782	13 69
Pasture, 871 acres @ $25 81	22,480	24.08
Grazing land, 1,120 acres @ $10 05	11,256	12 06
Livestock.		
Cows, 305 head @ $48	14,640	15.68
Heifers 1 year old, 102 head @ $30	3,060	3 28
Heifers 2 years old, 79 head @ $42	3,318	3.55
Bulls, 16 head @ $96	1,536	1.65
Steers 1 year old, 118 head @ $36	4,248	4 55
Steers 2 years old, 75 head @ $50	3,750	4 02
Steers 3 years old, 30 head @ $67	2,010	2.15
Sheep, 160 head @ $10 90	1,750	1 87
Horses, 32 head @ $56	1,792	1.92
Buildings and improvements	7,126	7 63
Machinery and equipment	2,450	2.63
Feed and supplies	1,154	1 24
Total	$93,355	100 00

investment. The per cent of the total investment which a rancher should have in his producing livestock is about 40 per cent. The above table represents a study of 47 mountain valley ranches and the results from this survey will be used at this Conference to illustrate our methods. I presume that you are interested in methods rather than our findings. Any of our other studies would serve equally well.

Just what value to place on the lands is always a perplexing problem. We take the values that the ranchers give us as a preliminary start. From this we work out from all the records, the average value, and in most cases it has checked rather closely with

the assessed values. If there is any great variation in land values on the different ranches, as shown by the carrying capacity, we correct for those differences.

The values placed on the lands by the owners and by the assessor is somewhat higher than the actual value of those lands when

Table 2. Ranch Statement, Based on Averages for 47 Wyoming Mountain Valley Ranches

Item	*Amount*	
Receipts:		
Cows	$2,836	
Heifers 2 years old	350	
Heifers 1 year old	263	
Bulls	276	
Calves	210	
Steers 1 year old	2,115	
Steers 2 years old	3,152	
Steers 3 years old	1,372	
Sheep	1,062	
Horses	12	
Hay	284	
Miscellaneous	67	
Increase in inventory	1,440	
Total receipts		$13,439
Expenses:		
Livestock purchases	1,618	
Current expenses	6,507	
Unpaid family labor	500	
Total expenses		8,625
Ranch income (receipts less expenses)		4,814
Interest on borrowed capital (interest on $14,000 @ 6.79 per cent)		951
Net ranch income (ranch income less interest)		3,863
Value of owner's supervision		1,538
Net return on owner's investment		2,325
Rate of return on owner's investment ($79,352)		2.93%

measured by their productive power. This holds true in almost all parts of the United States.

The inventories and sales are worked out for the individual ranches, and the average for all the ranches is given in table 2. No increase in cattle inventory due to the upward trend in cattle prices is allowed in this table. If the cattle on hand at the end of the year are inventoried at a higher value due to market changes, the rate of return on the owner's investment would have been

8.4 instead of 2.93 per cent. It seems advisable to give both methods in figuring the rate of return.

Receipts less expenses represent what we call the ranch income and averaged $4,814. From this ranch income we subtract the

Table 3. Cost of Producing Beef on 47 Wyoming Mountain Valley Ranches in 1926*

Item	*Amount*
Expenses per ranch:	
Labor	$2,787
Supplies	978
Feed purchased	610
Leases and fees	365
Taxes	637
Automobile and truck	138
Repairs and buildings	150
Miscellaneous	425
Repairs on equipment	262
Unpaid labor	500
Value of supervision	1,538
Interest (interest on $93,352 @ 6 79 per cent)	6,339
Decrease in inventory of improvements and equipment	446
Total expenses	$15,175
Receipts per ranch:	
Cattle	10,574
Sheep	884
Horses	12
Miscellaneous	67
Cattle increase	575
Total receipts	12,112
Loss per ranch	$ 3,063
Per cent increase in price necessary to cover costs	27 5
Price per hundredweight received for beef, 1926	$6 31
Additional price necessary to pay costs of production	$1.73
Annual pounds of beef produced per cattle unit	287
Annual cost of carrying a cattle unit	$23 07
Cost per hundredweight produced	$8 04

* Average investment per ranch, $93,355 Beginning inventory, 596 cattle units. One cattle unit equals 1 cow, 1 bull, 1 two- or three-year-old, or two yearlings.

amount of interest paid, and we have the net ranch income of $3,863 which is the amount the owner received for his supervision and capital. The net ranch income minus the value of the owner's supervision gives $2,325 or the amount received as a return on

investment. The average operator lacked 3.86 per cent of making a return on his investment equal to the average rate of interest paid on borrowed money.

The expenses and receipts on the average mountain valley cattle ranch and the price that the cattle should have sold for in order to pay all costs of production including interest on investment at 6 79 per cent, and supervision at $2.22 per cattle unit are shown in table 3.

The average price received for beef was $6 31 per hundredweight which included all classes of animals. The price should have been 27.5 per cent more, or $8.04 per hundredweight in order to pay all costs. The price of beef in the fall of 1926 was about normal when compared with the corrected prices for the period 1921-30, or for the forty-year period, 1890-1929.

The annual cost per cattle unit was $23.07 and the pounds of beef produced per animal unit was 287 pounds. Cheaper gains were put on the one- and two-year-old animals than were produced by the cows in the form of a calf.

In order to show the ranchers the importance of the various factors in influencing profits we tabulated a complete business analysis of the 12 best ranches, with the average for the 12, and the same for the 12 ranches with the lowest returns (table 4). The average for all of the ranches in the survey is given on the bottom line.

The 12 best operators were making 5 per cent on their investment whereas the 12 poorest operators showed a loss of 5 per cent. The two groups showed a difference of 10 per cent on the rate of return being made on investment.

The men in the best group had in most cases 500 head or more of cattle whereas the men in the lower group had as a rule outfits that were too small for efficient management.

The labor cost on the better ranches was $3.67 per cattle unit compared to $5.93 on the poorer ranches. The interest charge was very much greater on the poorer than on the better ranches, due to the larger per cent of investment in things other than cattle. The total carrying cost per cow on the better ranches was $21 10 compared to $30.50 on the poorer ranches.

By means of such a chart it is possible to go through a ranch business and point out every strong and weak point in its organi-

Table 4 Factors Influencing Profits on Wyoming Mountain Valley Ranches

Rate of return	Number of cow units	Investment in cattle	Calf crop	Loss on calves	Cows per man	Per cent loss of cows	Cows per bull	Days on winter feed	Land per cow unit	Hay fed per cow unit	Operating expenses per cow unit												Total receipts	Pounds of beef produced per cow unit
											Labor	Supplies	Feed	Leases and forests	Taxes	Miscellaneous	Depreciation	Manager	Interest	Horse cost	Total cost			
Twelve ranches with highest rates of return																								
10.00	535	92.20	76	1.	114	1.9	18	100		1.27	6.40	28	3.37	2 05	.65	1.41	.42	2.75	3.93	.61	21.9	25.8	285
10.00	716	54.03	73	1.9	215	2.	23	115	10.2	.77	.88	.29	.27	.47	.57	1.37	.80	2.42	6.34	1.21	14.6	24.4	309
8.71	936	47.28	73	2.	127	1.9	27	120	1.6	1.52	3.89	1.88		.19	.44	1.17	.98	1.83	6.85	1.55	18.8	31.9	315
5.61	2,180	52.43	66	4.2	142	5.	35	140	18.2	.73	5.45	1.33		.85	.53	.19	.70	1.08	5.56	.38	16.1	23.1	303
5.56	2,963	60.71	69	3.	200	4.	23	155	5.6	1.47	2.67	1 93	.31	.76	1 38	2.57	.45	1.16	6.14	1.37	18.7	24.3	296
5.32	414	35.94	74	3.6	244	1 8	44	90	6.4	1.44	1.69	.64		.23	1.50	.30	.46	3.53	10.26	.84	19.5	26.2	265
4.47	1,323	51.84	68	5.8	181	1.9	20	140	2.5	1.69	4.67	.44	1.17	2 30	.61	.56	1.00	1.74	7.28	1.20	30.0	34.3	330
3.74	1,143	50.18	71	2.5	147	2.8	19	120	12.6	1.34	3.28	3.21	1.27	1.14	.76	.05	.46	2.01	7.42	1.26	20.9	26.0	303
3.19	573	35.00	75	2.8	106	1.8	25	165	5.2	1.34	4.69	1.63	2.05	.43	.54	.05	1.18	2.45	9.69	1.88	24.6	26.7	307
2.96	332	44.48	83	3.8	144	1.9	22	100	5.9	1.80	4.02	.85	5.01	.76	1.04	.12	1.31	3.42	9.26	1.65	27.4	30.3	280
2.86	672	38.40	80	2.1	187	5.	23	155	7.1	1.33	3.08	1.06	.30	.25	.77	1.02	1.91	2.57	7.43	1.13	19.5	24.7	322
2.70	2,132	43.50	82	3.	189	4.	14	150	3.3	1.12	3.35	1 83	2.08		.46		1.39	1.64	8.99	.95	20.7	24.9	294
*5.43	1160	50.57	74	2.9	151	2.8	24	129	6.5	1.32	3.67	1.28	1.31	.79	.78	.73	.92	2.21	7.34	1.17	21.1	26.9	301

Table 4 (Continued)

Rate of return	Number of cow units	Investment in cattle	Calf crop	Loss on calves	Cows per man	Per cent loss of cows	Cows per bull	Days on winter feed	Land per cow unit	Hay fed per cow unit	Operating expenses per cow unit: Labor	Supplies	Feed	Leases and forests	Taxes	Miscellaneous	Depreciation	Manager	Interest	Horse cost	Total cost	Total receipts	Pounds of beef produced per cow unit
Twelve ranches with lowest rates of return																							
—2.49	1,327	42.08	52	1.6	141	2.	22	135	8.5	1.36	6.10	.78	1.49	3.13	.73	.03	.97	1.73	8.57	1.45	25.0	18.5	252
—2.61	263	23.70	72	4.2	69	3.3	22	135	3.8	1.50	8.38	1.48	.12	.71	.71	1.48	3.07	3.18	15.41	2.21	36.8	31.2	334
—2.77	714	17.70			115		20	150	4 3	1.43	7.46	1.99	.84	.18	.95	.05	3.73	2.42	15.87	1.21	34.7	22.0	285
—2.87	349	47.77	56	2.4	103	1.5	28	125	6.5	1.15	5.30	2.03	.44	.09	.64	.34	1.00	3.30	7.43	1.16	21.8	21.1	258
—3.84	337	31.24	77	4.2	125	4.	21	120	2.9	1.31	4.15	1.12		.47	2 04	1.33	1.34	3.45	11.49	.87	26.2	22 9	290
—4.05	449	30.25	52	3.5	103	1.8	31	135	2.6	1.13	4.04	1.37	.75	.16	.69		1.47	3.24	11.43	.90	24.1	16.3	185
—5.17	263	18.03	70	6.4	101	3.6	17	130	17 8	1.27	4.94	2.37	.19	.23	1.31	2 50	2 96	3.20	19.61	1.98	39.3	25.2	325
—6.30	549	22.03	77	3 7	106	1.2	30	105	10.5	1.93	11 10	.60	3 28	.34	1.49	.86	2.40	2.59	16.40	1.55	40.6	25.4	259
—7.29	113	27.04	59		75	4.	25	135	3.2	.90	3.81	1.81	.42	.17	1.25	.73	2.58	6.00	12.82	1.80	31.4	15.4	240
—7.51	163	35.05	50		74	3.	25	120	4.9	1.75	5.95	.36	.22	.27	1.37	.12	2.73	3.93	9.81	3.58	28.3	18.2	240
—8.31	1,484	49 26	53	4.7	175	1.4	27	145	10 3	1 12	3.36	1.46	2.20	.40	.69	1.02	.76	1.59	7.68	.58	19.7	10.0	231
—10.84	336	31.96	62	3.1	86	3.	24	110	8.4	2.11	7.24	1 36	7.14	1.45	.61	2.86	1.44	3.28	10.26	2.58	38.2	20.4	279
**—5.34	529	31.34	61	3.1	106	2.6	24	129	7.0	1.41	5.93	1 40	1.42	.64	1.04	.94	2.04	3.16	12.23	1.65	30.5	20.6	265
***.74	678	37.98	69	3.9	131	2.2	22	130	6.3	1.28	4.74	1.41	.69	.53	.92	.81	1.24	2.22	9 33	1.18	23.1	23.5	287

* Average for twelve ranches with highest rates of return.
** Average for twelve ranches with lowest rates of return.
*** Average for all ranches included in the survey.

zation. One must know the conditions on the ranch, as well as have the figures, in order to give sound recommendations for better organization.

The correlation method used in determining the relative importance of certain factors on the rate of return, is shown in figure 2. There was a correlation of + .545 ± .070 between the rate of return and the per cent of the total investment in cattle.

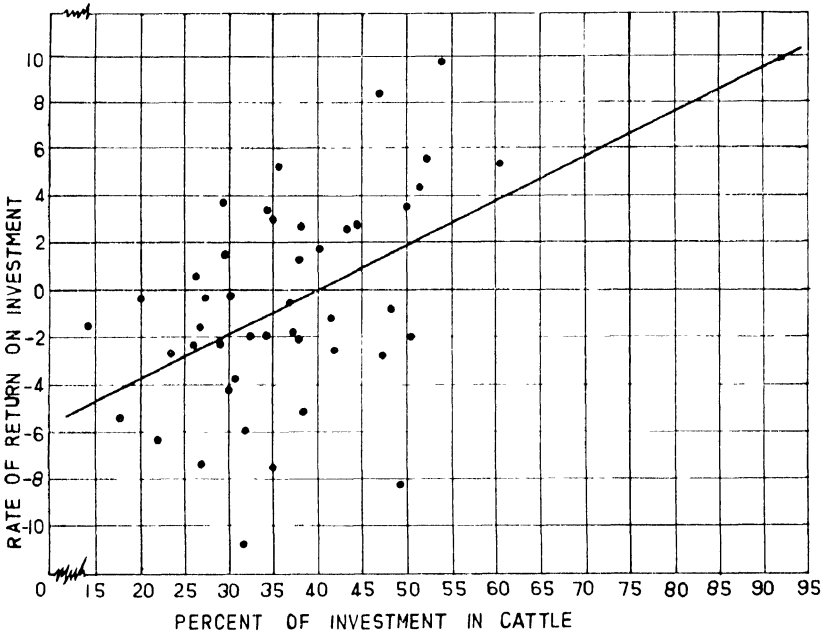

FIGURE 2 RELATION OF PER CENT INVESTMENT IN CATTLE TO RATE OF RETURN ON INVESTMENT

$r_{xb} = + .545 \pm .070$

$\overline{X} = -7.499 + .192B$

In presenting these charts to the stockmen we place these results on a chance basis. In order to have a fair chance for success the operator should have 40 per cent or more of his investment in cattle. Of those who had 40 per cent or more of their investment in cattle, 9 were making a favorable return while 8 were not. Of those who had less than 40 per cent of their investment in cattle, 6 were making a success and 22 were not. The chances were approximately 3 to 1 in favor of the operators who had 40 per cent or more of their investment in cattle.

Rate of return and cows handled per man showed a correlation of $+ .430 \pm .081$. The chances of the men who were handling more than 132 head of cattle per man were 2 to 1 that they would succeed, whereas the chances for the men who were handling less than 132 head of cattle were 3 to 1 that they would not succeed.

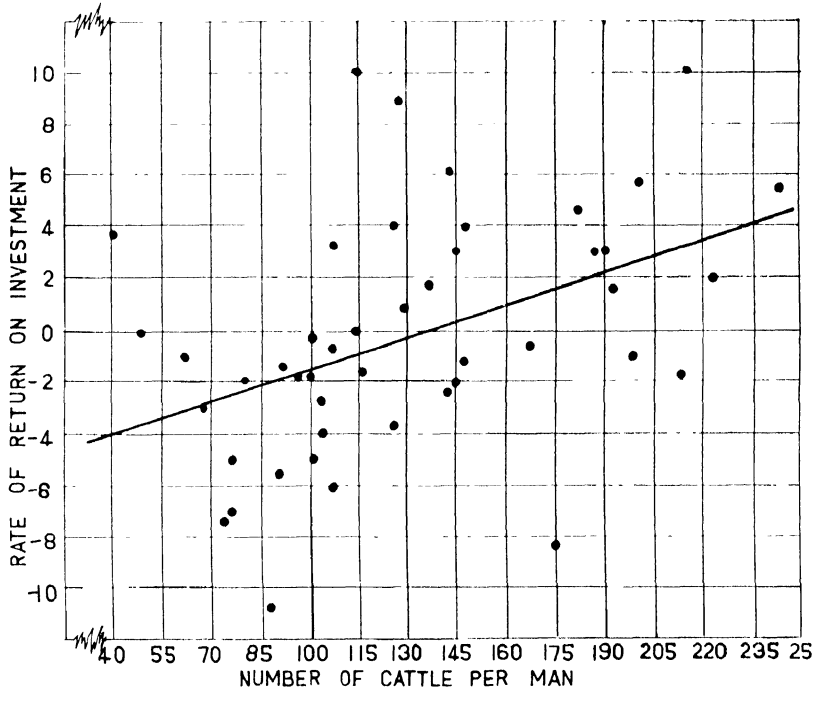

FIGURE 3. RELATION OF THE NUMBER OF CATTLE PER MAN TO RATE OF RETURN ON INVESTMENT

$$r_{xc} = + .430 \pm .081$$

$$\overline{X} = -.5483 + .402E$$

The calf crop was another important factor influencing returns. The correlation between rate of return and calf crop was $+.335$. An 80 per cent calf crop seemed to be a fair goal toward which to strive. A curvilinear correlation fits the chart somewhat better, and shows the point beyond which it is not advisable for the average rancher to attempt to increase his calf crop.

The rate of return and number of cattle per ranch showed a noticeable correlation; 600 to 700 head per ranch seems to be a

Table 5. Coefficients of Gross Correlation Between Various Factors Influencing the Rate of Return on Wyoming Mountain Valley Ranches

Variables correlated	*Size (in cows)*	*Per cent investment in cattle*	*Calf crop*	*Calf loss*	*Cattle per man*	*Cow loss*	*Cows per bull*	*Tons hay fed*
Rate of return	37403	.54525	.33450	−.07074	.43002	.03507	− 07809	−.28626
Size (in cows).		46339	− 14195	07697	.48373	.10340	−.05123	−.24121
Per cent investment in cattle			− 30027	04832	38065	.04426	−.15190	−.16761
Calf crop.				.11095	− 14272	.03713	−.14575	.03295
Calf loss					10186	.23880	− 10162	.33302
Cattle per man						.03366	− 04794	−.26205
Cow loss .							−.12066	−.01817
Cows per bull								−.12924

Table 6. Coefficients of Net Correlation Between Various Factors Influencing the Rate of Return on Wyoming Mountain Valley Ranches

Variables correlated	*Size (in cows)*	*Per cent investment in cattle*	*Calf crop*	*Calf loss*	*Cattle per man*	*Cow loss*	*Cows per bull*	*Tons hay fed*
Rate of return	07303	64142	.68106	− 15583	30315	.00657	.10744	−.12997
Size (in cows)		19611	−.05869	.11037	27980	.06010	− 03402	−.13765
Per cent investment in cattle			− 59695	03351	− 06685	00356	−.23813	.06035
Calf crop				18132	− 25296	−.00293	− 21687	.02158
Calf loss					22186	.24392	−.01161	.36193
Cattle per man						− 05049	04820	−.14799
Cow loss .							− 09860	−.10401
Cows per bull								−.11127

favorable sized unit. This permits of keeping two men the year around, and extra labor at haying, and during other rush periods. In our coefficient of net correlation we find that the number of cattle is not an important factor, due to the removal of the effect of the number of cows handled per man.

Total expenses per cattle unit and rate of return showed a correlation of $+.520 \pm .071$. The lower the expense the better the rate of return. The receipts per cattle unit were not as important in influencing profits as the expenses per cattle unit. The calf

Table 7 Annual Carrying Costs on Wyoming Mountain Valley Ranches

Items	Cows	Calves	Steers			Heifers	
			Yearlings	Two-year-olds	Three-year-olds	Yearlings	Two-year-olds
Feed, grain	$0 32	$0 46					
Feed, hay	8.76	12 50	$5 38	$7.45	$10 61	$5 45	$6 89
Grazing	4 60	6.57	2.41	3.20	4 55	2.28	2 88
Labor, man	4.64	6 63	2 74	3.78	4 32	2.46	3 88
Labor, horse	.60	.86	.36	.50	71	.32	51
Equipment	.68	.97	41	.57	.81	.37	.58
General expenses	1 31	1 87	.75	1 14	1 29	74	1 05
Interest on investment	3 34	4 77	2 55	3 37	4 41	1 89	2 71
Death loss	97	1 30	90	.66	60	.89	1 08
Depreciation	1 55	2.22					
Bull service	1 86	2 66					1 89
Total	$28 63	$40 90	$15 50	$20 67	$27 30	$14 40	$ 21.47

crop is one of the most important factors in increasing the receipts per cattle unit.

The coefficients of gross correlation are given in table 5 and show the correlation between the different variables. Death loss showed almost no correlation during this particular year. During severe winters there is a noticeable correlation.

In order to determine the degree of association that exists between two variables when we eliminate the effects of their common association with the other variables, we have worked out the coefficients of net correlation which are given in table 6. It is interesting to note that there is practically no net correlation be-

tween certain variables that may show a fairly good gross correlation. Rate of return and number of cattle units is a good example of the effect of their common association with other variables When the influence of the cattle handled per man is taken from the size, as measured by the number of cattle, there is practically no correlation between size and rate of return. The ranches running 600 or more cattle are able to make better use of their labor and thereby increase the rate of return. Size itself is of little value except as it influences the ranch organization.

The items of cost in carrying the different classes of animals for one year, are shown in table 7 The annual gains and cost

Table 8. Total Carrying Costs and Gains on Wyoming Mountain Valley Ranches

	Steers				*Heifers*		
	Calves	*Yearlings*	*Two-year-olds*	*Three-year-olds*	*Calves*	*Yearlings*	*Two-year-olds*
Weight	400	565	892	1,150	384	630	847
Total cost	$46 90	$62 39	$83 05	$110 35	$34 90	$49 31	$70 78
Cost per hundredweight	12 73	9 66	9 33	9 60	9 09	7 83	8 36
Annual gain	400	256	236	258	384	239	217
Annual cost	46 90	15 49	20 66	27 30	34 90	14 41	21 47
Cost per hundredweight gain	12 73	6 05	8 76	10 54	9 09	5 86	9 90

per hundredweight gain are given in table 8. The cost per breeding cow was $28.63 and the cost per calf was $40.90. The high cost per calf was due to the low calf crop of 70 per cent. Yearling steers cost $15.50 and yearling heifers cost $14.40. The interest charge is greater and the feed bill is a few cents more on the steers than on the heifers.

The two-year-old steers cost $20 67 and the two-year-old heifers $21.47. The death loss is greater on the heifers and they also have a bull charge. The three-year-old steers cost $27.30. This last group usually receives a little extra feed and care, and many of them go direct to the packing plants.

The total carrying cost for the different classes of animals and the annual gains and weight of the animals are shown in table 8.

The steer calves are given a value of $12 more than the heifer calves. If this differential is not made on the calves, the she-stuff will show a loss, and the steers a gain, later on. The feedlot buyer makes this distinction when he is buying calves.

The steer calves cost $12.73 per hundredweight. The gains can be put on the yearling steers at a cost of $6.05 per hundred and on the two-year-olds at $8.76 per hundredweight. The cost of the gains put on the steers the third year is $10.54 per hundredweight. The yearlings make the cheapest gains. This has led some people to recommend selling calves and yearlings from our western ranches, which is, under average conditions, a poor recommendation.

The cost per hundredweight of the animal up to a certain age, and the selling price of the different classes of animals should be the correct method of arriving at the proper age to sell. The lowest cost of production per pound, total weight, is on the two-year-old steers and the yearling heifers. If prices are as good for those classes as for the younger and older animals, then that is the time to sell.

Our recommendation regarding the age at which to sell cattle on any ranch is to sell at the age at which the cost of production is most nearly reached by the selling price. This explains why the general farmer finds it more profitable to sell calves and why the rancher finds it more profitable to sell older animals. High calf crops and limited pasture favor calves, while low calf crops and abundant range favor older steers.

We have attempted to carry our analysis a little further, and show by the account method whether it is better to follow the practice of selling dry fat cows as well as culled cows each year, or whether the cows should all be kept for breeding purposes as long as they are serviceable. Based on conditions as they exist on Wyoming's mountain valley ranches, there is an advantage in selling dry cows.

The account method has been used to answer the question of breeding heifers to calf as two-year-olds. Recognizing the fact that calving at the age of two years will in many cases check their growth, I have given them the same value at the end of the year as they had in the beginning. I have also allowed for a 5.7 per cent death loss of heifers. Under the above conditions the calves

Table 9 Items of Cost, Necessary Feeding Margin, and Sliding Scale Spread for Lamb Feeding in Wyoming*

Price per hundredweight for feeder lambs	$5.00	$6.00	$7 00	$8 00	$9 00	$10.00	$11 00	$12 00	$13.00	$14.00	$15 00
Value of 60-pound lambs	3 00	3 60	4 20	4 80	5 40	6.00	6 60	7 20	7 80	8 40	9 00
Feed cost per lamb	2 34	2 34	2 34	2.34	2 34	2 34	2 34	2 34	2 34	2 34	2 34
Interest on lamb	08	09	11	.13	.14	.16	.18	19	.21	.22	.24
Interest on feed	06	06	.06	06	.06	06	06	06	06	.06	.06
Death loss @ 3 per cent	.09	11	.13	14	.16	18	.20	22	.23	.25	.27
Man labor	.21	21	.21	21	21	.21	.21	21	.21	.21	.21
Horse labor or truck charge	09	09	.09	09	09	09	.09	09	09	09	.09
Building and equipment charge	04	04	.04	.04	04	04	.04	04	.04	.04	.04
General farm expenses and miscellaneous charges	.04	04	04	04	04	04	04	04	.04	.04	04
Marketing	83	83	.83	83	83	83	.83	83	.83	83	.83
Total charge per head	6 78	7 41	8 05	8 68	9 31	9 95	10 59	11 22	11 85	12 48	13.12
Less credit for manure	33	.33	.33	33	.33	.33	.33	33	33	.33	.33
Cost per head	6.45	7 08	7 72	8 35	8 98	9 62	10 26	10 89	11 52	12 15	12.79
Pounds gain per head	22 5	22.5	22.5	22 5	22 5	22 5	22 5	22 5	22 5	22.5	22.5
Weight of lambs	82 5	82.5	82 5	82 5	82 5	82 5	82 5	82 5	82 5	82 5	82.5
Cost per hundredweight	7 82	8.58	9 36	10 12	10 88	11 66	12 44	13 20	13 96	14 73	15.50
Necessary spread or margin per hundredweight	2 82	2 58	2.36	2 12	1 88	1 66	1 44	1 20	96	73	.50
Feed cost per 100 pounds gain	10 40	10 40	10.40	10 40	10 40	10 40	10 40	10 40	10 40	10 40	10.40
Other costs per 100 pounds gain	2 71	2.84	3 02	3.16	3 29	3 47	3 64	3 78	3 91	4.04	4.22
Total cost per 100 pounds gain	13 11	13 24	13 42	13 56	13 69	13 87	14 04	14 17	14 31	14 44	14 62
Less credit for manure per 100 pounds gain	1 47	1 47	1 47	1 47	1 47	1 47	1.47	1 47	1 47	1.47	1 47
Total cost less credit for manure per 100 pounds gain	11 64	11 77	11 95	12.09	12.22	12 40	12 57	12 71	12 84	12.97	13.15
Marketing costs per 100 pounds gain	3.69	3 69	3 69	3.69	3.69	3 69	3 69	3.69	3 69	3.69	3.69
Total charges less credits per 100 pounds gain	15 33	15.46	15.64	15.78	15 91	16.09	16.26	16 40	16.53	16.66	16.84
Cost per 100 pounds gain, when feeder supplies feed, labor, and equipment and receives fertilizer	11.29	11.33	11.47	11.51	11.60	11.69	11.78	11.87	11.91	12.00	12.09
Sliding scale spread when starting with 5-cent lambs .	7.82	8.70	9 59	10 47	11.35	12.24	13.13	14.01	14.89	15.78	16.66

would cost $6 less per head than the calves from the general cow herd. Just how much less the calf is worth from a two-year-old heifer than the calf from an older animal, depends on many factors. It looks at the present time as if it is largely a matter of the amount of available winter feed, and the ranch practices.

In table 9 I have attempted to work out a sliding scale for the lamb producers and lamb feeders. The items of cost, feeding practices, and gains are based on the economic studies of feeding operations in Goshen County, Wyoming, and on the experiment station results from our sub-stations.

The price of feeder lambs ranges from $5 to $15 per hundredweight. The costs of fattening the above priced lambs are given

Table 10. Ration on Which Feed Cost Used in Table 9 is Based

Feed	*Daily amount (pounds)*	*Daily cost*	*Price per unit*
Cottonseed cake	.20	$0 480	$48 00 per ton
Grain	.70	0 889	1 27 per hundredweight
Wet pulp . .	4 00	0 364	1 82 per ton
Alfalfa hay ..	1 50	0.862	11.50 per ton

in the table. A charge is made for all items of cost and a credit is given for the fertilizer. The lambs are on feed 90 days, and average one-fourth of a pound of gain per day.

The lambs are to be marketed at an average weight of 82.5 pounds, or before they become too heavy, for choice lambs. It is doubtful whether the lamb feeder is the one to feed the lambs to the market in an orderly manner. The packing plants may be a better place than the feedlots to hold fat lambs. The packing plants can at least check the production of more lamb on any one carcass. The lambs should perhaps be sent to the market as early as possible in order to hold down the present abundant supply of lamb meat.

The spread necessary for feeding the different priced feeder lambs ranges from $2.82 per hundredweight on 5-cent lambs to 50 cents on 15-cent lambs, when marketing is included. The cost per hundred pounds gain, including marketing, is $15.33 on the

5-cent lambs and $16.84 on the 15-cent lambs. Marketing charges are figured at 83 cents per lamb.

The feed cost is $2.34 per lamb for 90 days, and is based on the ration given in table 10.

The feed prices will vary in the different regions and for the different seasons. The above prices are those prevailing over a period of years in the better sheep feeding areas.

THE NATIONAL VALUE OF FARM ACCOUNTING DATA

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MUCH work has been done in the United States of America, on the Continent of Europe, and elsewhere in the collection of accounts from farmers. The motives in this work have been various. Frequently, in the United States and in Great Britain, the objective has been the accumulation of evidence upon which to base conclusions upon the problems of farm management. On the Continent of Europe, and particularly in Switzerland and Denmark, the objective has been the publication of statistics bearing upon the situation of the agricultural industry. In Germany, the motive behind the collection and compilation of farm accounts by the Agricultural Councils has, I believe, been largely fiscal, though the compilation of selected records by the Landwirtschaftsrat, in the form of an account of the economic position of the agricultural industry of the Reich, has turned the local data into information of national importance. I do not wish on this occasion to examine the work done, or to attempt any assessment of the effectiveness of the information obtained for the purposes in view. Conditions in each country have much to do with this. I wish, rather, to endeavour briefly to consider the utility of such data as farmers can furnish through their accounting records to assist in measuring the status and prospects of farming in the national economy.

The problem is relatively simple where farming conditions are homogeneous and production is specialised over wide areas. It is more difficult where the surface of the country is very uneven and soils are diversified.

This question is of some national interest to us in Scotland because, on account of limited resources and of a desire to serve the community as fully as possible with the funds available, we are seeking to evolve a plan of research and investigation that will serve two ends, namely, the accumulation of data that may afford a basis for advisory work on farm organisation and management, and that, at the same time, may throw light upon the broad issues which confront those who are concerned with the place and standing of agriculturists in the national or international field of which

they form a part, and with the problems of amelioration of the conditions of those engaged in agriculture.

Of the national value of farm management work there can hardly be any question. Obviously greater productive efficiency makes for higher standards of living and for greater leisure. I am aware that there are many difficult problems involved in reconciling fully the individual gain due to increased efficiency in production with the national well-being of the community as a whole. These problems arise from economic friction, and can only be solved by promoting greater fluidity in the movements of personnel and of resources. It is not my purpose to discuss these things here, though I may have to refer to them in looking at the data farm records afford. I wish to examine farm accounting records to see how far, and under what conditions, they afford to the economist who is looking at agriculture, not merely from within, but as one phase of national activity, material for inference, and for the processes of inductive thought.

I would lay down, as a first axiom, that the primary information needed for considering the efficiency of measures of economic amelioration, is precise *quantitative* data as to the present economic status of the industry. Ameliorative measures usually involve expense; they may involve legislation altering the contract status entered into between farmers and landlords, or between farmers and labourers, or between farmers *inter se*. Proposals are made for relief of burdens, for the restriction of competition, for subsidies, for credit facilities, and for loans from public sources. All these things and others must be judged in the light of facts of the existing organisation. We can never in an old country start *de novo*. What is the incidence of depression, how many farmers are involved and to what extent, where is there a shortage of credit, where actually do existing levels of taxation pinch hardest, and so on?

Behind all these questions lies the major economic question—are the national resources in personnel and in property, devoted to agricultural uses, obtaining a return commensurate with their character and volume, having regard to the rewards to be obtained in other industries? I do not suggest that if agriculture should prove to yield comparatively low returns to labour, enterprise, or capital, and if therefore the national dividend could be improved by a proportional reduction in the volume of agricultural operations, it

would necessarily be good to restrict agriculture, or to watch its decay with equanimity. I do not suggest that agricultural resources can readily be transferred to other uses. But I do suggest that decisions on agricultural policy must take into account the effects likely to be produced upon the total national material well-being, even if these effects are disregarded in favour of considerations more weighty in the estimate of the community as a whole.

I raise these points merely to answer in advance the questions that might arise as to why we need trouble about national economic statistics at all, and to state the case for assessing at its proper value, the information farm accounts can afford.

Other sources of information of course exist—data relating to the course of prices, to the level of wages, crop areas and yields, the volume of imports and exports, and so forth. But those who have attempted to use these data for answering specific questions relating to the status of agriculturists know full well that only generalisations, often of a somewhat indefinite kind, can be deduced from them. Moreover they only allow of comparative, not of absolute statements of the position of agriculture at any time.

How far, then, do farm accounting records, by supplementing the more general information available, help us to obtain a fuller view of the actual status of agriculturists engaged in different phases of the industry, and to assess the possibilities and means of amelioration of their position?

It seems to me there are two conditions precedent to the effective use of accounting data for furnishing information of national economic value. The first is that the material must be drawn from farms which are a representative and an adequate sample of the whole. It is this preliminary requirement which underlies the careful statistical analysis of farming types which is being made by my colleague Mr. Senior, at the Department of Agriculture for Scotland. Given a correct and quantitative picture of the distribution of farms, and the collection of adequate accounting and other data from representative samples of sufficient size, the foundations of an accurate picture of the economic status of agriculturists will have been laid. I do not propose to go into the difficulties of this work or into the methods of classification involved. A brief note upon these appeared recently in your Journal of Farm Economics. There must, of course, be in existence sufficient census or survey material to enable the farms to be classified and sampled.

The second condition is that the information yielded must give a true picture of average conditions in each type group and of the extent of variations from the average. I do not think this conflicts in any way with Dr. Brandt's abhorrence of the average financial results of farm groups. For the granting of individual credit the personal element in the farm economy is dominant. For observing trends and the influence of external conditions, the personal factor must be eliminated, and the average obtained. Even for estimating the aggregate credit needs of a large body of farmers, for the purpose of making adequate financial provision, it becomes necessary to merge the individual in an average of cases.

Having stated what seem to me to be statistically essential preliminary conditions, I would like now briefly to look at the kind of data yielded by farm records and to see how far they fulfill some of the needs of the economist for representative data. And here I enter, with some trepidation, upon ground which may be a little controversial Professor Boss is to follow with a paper on Farm Cost Accounting in the United States of America. I have already seen enough of the United States to realise that differences in the circumstances of agricultural production in this country and in my own, may account for many differences of emphasis and of method. But I feel bound to say, with all deference too to the views of some of my colleagues who may still think otherwise, that, for the purpose of throwing light upon the economic status and potentialities of the industry, cost accounts have, in my own country, so far proved to be of a very limited value. There is, of course, the primary difficulty of preparing a sufficiently large number of accounts to afford a real sample. If the difficulty of sampling can be overcome and attention be given to marginal, rather than to total costs, there may be much light thrown by cost records on the potentialities of different areas for extending or limiting their production of various commodities. Records of comparative cost and returns have also an important part to play in farm management studies, if comparisons are confined to alternatives that are practicable under the conditions prevailing. It has been, perhaps, the unfortunate emphasis on the final money cost of unit quantities of individual products as the end in view, that has brought cost accounting into the realm of acute controversy, not only in this country, but on the Continent of Europe and in Great Britain as well. One primary difficulty is, that so far as farming is a one-

man or family business and is the major occupation of peasant communities, the separation of concepts of product cost and standard of living is impossible. Another difficulty is, that with growing intensiveness of cultivation in many areas, the inter-relatedness of products like grain and meat tends to become more inevitable, and the separate product becomes more universally the joint product, and of this it is only possible to measure the marginal, and not the total, cost. The areas where specialised crops like rubber, sugar or other single products are grown on a large scale may perhaps be the best fields for cost of production studies. I do not think Great Britain is in that picture for any of its major products.

If we now turn to financial accounts we enter a more fruitful field. Financial accounts, if they are not "doctored" to influence the assessment of taxation, clearly lead us to a closer approximation of the economic status of agriculturists. I include in that term, workers, farmers, and landowners, because the day when one can think mainly in terms of profits of enterprise alone is passing rapidly away in favour of a greater preoccupation with the primary importance of the human factor in production.

But even in the interpretation of the financial results of farms in relation to economic rewards in other spheres, there are certain very real dangers and difficulties. We are in the habit, in economic thought, of considering the returns to the use of work and of property as two distinct things. A good deal of economic theory turns around the levels of interest and of earnings. This is, of course, valid in manufacturing and in industry, and we are disposed, in agricultural accounting, to attempt to separate capital and labour, including that of the farmer, into two compartments Thus we assess interest earned, after charging so much for the farmer's work and the work of his family, and labour income, after allowing for interest on capital employed.

I am not at all sure that this is really a valid procedure in agriculture, or, for that matter, in craft-industry and in trade generally, where the provision of labour and the ownership of capital are to a large extent combined in the same person. The farmer farms because he can, by using both savings and his own labour together, do better than he could by using both separately. Of course, much agricultural capital is borrowed, but it would be entirely wrong to assume that, in my own country, this is any considerable proportion of the money invested in agriculture. I think

we may have to regard farming profits as something comparable with the profits of shop-keepers, traders, or craftsmen, rather than with the interest earned on free capital put out on investment, or the rewards of managers of industrial enterprises. It may very well happen that the rewards accruing to farmers will, on the average, be lower than what their capital, if free, might earn in investment elsewhere, plus what their labour might earn if performed for wages either in agriculture or in other industry, and yet be adequate to satisfy them. It would be of course impossible for any considerable transfer of farmers' capital or labour to other uses to be made without altering the current rates of profits and wages.

With this warning let us examine our financial records. They tell us the amount of investment, the amount of paid and of family labour, and the amount of "profit," using that term in the wide and usually accepted sense in Great Britain, *i.e.,* the total reward for both work and capital accruing to the farm, for each farming type defined by selected sample groups. They tell us what labour is paid and in what forms, and how much labour is being used in the various forms the industry takes. They tell us further what returns accrue to the owners of land as distinct from those who farm as tenants.

This information surely is vital to the consideration of a national policy towards agriculture, yet very little of it exists in a form that presents a true picture of the agricultural situation. Financial accounts, too, indicate the proportions in which the various products bulk in the economy of different farming types. Thus the effects of high or low prices upon farm incomes can be estimated fairly closely with the aid of general statistics of yields.

Given an adequate sample, the types of farming or the regions which have reached, or are approaching, marginal conditions can be observed. The size factor can be studied in relation to varying types of organisation with a view to carefully planned programmes of land settlement. Of course, the data to be derived from accounts, even if collected from carefully selected sample groups, are not adequate in themselves for the consideration of many agricultural questions. But they may provide a substantial basis of facts upon which to decide where the major problems of agriculturists really lie. I have not yet found any other means whereby, with an equal expenditure of time and effort, the national status of agriculture can be adequately portrayed.

With regard to the very large problems underlying the adjustment of the occupational distribution of wealth, it would seem that the main value of carefully prepared statistical data relating to farming rewards and their trends may be in creating an informed opinion, to aid individuals in their choice of occupation, and of the place where they will practice it. So long as enterprise is a matter of individual choice, one of the main stumbling blocks to rapid adjustment of occupations to earnings is want of a correct knowledge of conditions.

However desirable rural life be in itself, both from the individual and from the national standpoint, it is of little use to try to extend it, otherwise than by the conscious choice of those engaged in it, unless it offers standards of economic welfare equivalent to those obtainable in other fields.

Now it is of no use for agriculturists to demand higher standards of living unless their numbers, and their organisation permit of the attainment of these standards in the world of competition. We must surely help to make it easier for agriculturists of all grades to frame the course of their lives in the light of the facts.

THE ECONOMIC CLASSIFICATION OF FARMS AS A BASIS OF AGRICULTURAL ADVISORY WORK

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WHEN invited to make some contribution to the proceedings of this Conference I thought it might be of some general interest, and more especially to those actively concerned in problems of farm management, to give an outline of what is being done in the Bristol Province in agricultural advisory work, with special reference to attempts at the economic classification of farms.

This province, as it is called, consists of the five counties of Somerset, Wilts, Gloucester, Hereford and Worcester, and comprises nearly 44,000 farms, 15,000 of which are above, and the remainder below 50 acres. Generally speaking, it is a grassland area, although nearly all farms will have some arable crops, and the type of farming would be generally classed as "mixed." Somerset and Wiltshire are largely concerned with producing milk for the London market, but the former produces more pigs—in connection with its cheesemaking—while the latter grows more cereals. Gloucestershire produces more milk for local towns and for London, and has a good deal of grazing land for beef cattle and sheep. Hereford is generally noted for its beef cattle bearing that name, while Worcestershire is in part a county of very intensive production of soft fruits and vegetables for the Midland and London markets. Sheep are kept in all five counties, but chiefly in Wiltshire and Somerset. The latter county is also noted for its cider.

The above is only intended to be a sketch of the kind of farming to be found in this area, but the point I wish to emphasise is that it is a region of highly diversified farming, and if the statement that, "No two farms are alike," applies to any area it undoubtedly applies here.

In common with other advisory districts in England, a staff of specialists in other branches of agricultural science is maintained at Bristol, and of these branches the most important are the ones dealing with the treatment of grassland, the development and improvement of various kinds of orchards, and the feeding of dairy cows. Requests for advice upon these matters have increased

so rapidly during the past two or three years that the increases in staff have not kept pace with the growing volume of work.

The three specialists concerned with these branches have recently requested the economist to ascertain whether or not some simple method of classifying farms in this area cannot be evolved, in order that the economic position of any farm requiring advice upon the three subjects just mentioned, may be defined sufficiently accurately for their purposes. Obviously any one of these specialists can, and does, advise farmers how many hundredweights of fertilizer per acre may be necessary to produce better grass or fruit, or how to feed dairy cows to produce more milk, but they realise that such advice may not always be justified, or at any rate may need modification when the economic position of the farm as a whole is considered.

The economic section has thus, in its turn, been recently faced with a large extension of its work without corresponding increase in staff, and the question resolved itself into one of placing any farm into its appropriate economic class, without the expenditure of too much labour, and without calling upon the farmer for full financial records.

It seems to me that in a region of highly diversified farming the economist, in classifying his farms, has three options. He may place them in such large classes that the resultant averages, and so forth, are almost meaningless; he may make the groups so small that he may just as well do no grouping at all; or he may decide upon the happy medium, and so classify his farms that the groups err in neither of these directions.

At the University we have 250 farms which submit full financial accounts for analysis and report, and experiments are being made with these to ascertain the most satisfactory methods of classification. Obviously there are several kinds of groups into which farms may be placed. Some of these are what may be termed primary, while others may be termed secondary classes. It is with the first type that this paper is concerned.

SOIL CLASSIFICATION

Our first attempt was to classify the farms according to types of soil. Only a rough classification could be made, since there does not exist any kind of soil map for any of the five counties forming the province. Resort was therefore had to grouping the soils

roughly into alluvium, loam, clay, sand, and so forth, with some note of the underlying geological formations. Although there are in some countries fairly detailed soil maps for certain areas, as far as I am aware this does not yet apply to England, and even if it did, I submit that the soil classification of farms is not as easy as it looks, nor as satisfactory as it is sometimes thought to be. This is especially the case in this area, where, owing to the great variety of soils within a small compass, a farm may have from six to a dozen types of soil on it. Moreover, how many persons engaged in agricultural advisory work know what is meant exactly by an acre of land for productive purposes? When statistics of production or expenditure are compiled upon the basis of an acre or a hundred acres, how much reliance can be placed upon them? The soil chemists themselves have not yet decided how to group soils, as witness their conference in Russia this summer. It may of course be argued that minute subdivision of soil types, such as the chemist needs, is not necessary for the economist. With this I fully agree, but the question still remains as to what extent this subdivision of soil types should be carried, in order to form a satisfactory foundation for some of the economist's calculations. This must perforce be left until the chemists arrive at a decision. For many farms, soil is a secondary consideration as far as economic questions are concerned.

RENTAL CLASSIFICATION

Let us now consider the question of grouping farms on a rental basis. Some people think that if the soil itself is an unsatisfactory basis of classification then the rental value may serve instead, the argument apparently being that rentals vary as the fertility of the soil, including in the term "fertility," distance from markets. In a newly settled country this is probably truer than in an old country. It is well known, however, that rentals depend upon more than this. Social amenities, and even those of the farmhouse itself, often result in a higher rent being offered for a farm than its capability for making profits would seem to warrant, and what economist can divide the payment made by such a tenant into these two or more parts?

A further complication when considering the use of rents as a basis of grouping, lies in the relating of farms in owner-occupation to those occupied by a tenant. In the former case the agricultural

economist, in England, usually accepts the assessed value for income tax purposes as the rental, since this is supposed to correspond to the amount the farm would obtain as cash rent if it were in fact let to a tenant. Experience at Bristol goes to show, however, that this is not always the case. Farm assessments, as we all know, are fairly difficult to make. Although in theory the relative burden of the assessment should be the same in all districts, in practice there is considerable variation, and successful appeals against assessments are not unknown. Moreover, even in the case of a single farm, the rental value as indicated by the assessment, has been known to be considerably different from the actual cash rent when the farm has been let to a tenant. On both sides, therefore, there are possibilities of error. The assessment on the owner-occupier depends upon the assessor's judgment, and, on the other hand, the cash rent paid by a tenant often depends upon factors other than the financial.

A still further complication in using rents as a basis for classification, at any rate as far as the Bristol area is concerned, arises from the fact that a considerable number of farms, in Wiltshire especially, have a large proportion of their acreage in poor thin soils on hillsides, while the remainder is fertile valley land. To divide the total rent by the total acreage of such farms gives a rent per acre which appears to me to mean very little indeed, and yet to attempt to convert the hillside acres into the equivalent of valley acres seems futile also, since the former are used for maintaining livestock, and the latter mainly for the production of cereals. Furthermore, since the acreage of the farms in the Bristol area varies from under 50 to over 2,000 acres, rentals per acre for comparison purposes are extremely illusory. Finally, correlation coefficients between rentals and other characteristics, such as capital, labour, or costs, seem to show conclusively that the classification of farms according to rentals is unsuitable.

TYPE OF FARMING

Let us now pass to the consideration of classifying farms according to the type of farming carried on. This method is satisfactory and is of course widely used by those engaged in agricultural advisory work. In fact we may say at once that grouping according to type of farming is indispensable, but among the agricultural economists there seems to be need for some agreed method of

doing this. At present this kind of grouping depends solely upon the opinion of either the economist or the farmer, and while, in many cases, it is easy to say whether a farm is, for example, a dairy farm, there are also many cases where the class is not so obvious, and this refers particularly to those farms on the borderline between two types of farming. Where farm accounts are available it is possible to use these in order to delimit the boundaries between one type and another, and, as most of us know, the income side of the accounts is usually considered for this purpose. That is to say, if any one farm has a fairly substantial proportion of its output in one particular kind of product, the usual method is to classify it according to that product. Here, again, however, the economists have agreed upon no rule, arbitrary though it may be. There is no agreement as to what limits shall be placed upon these proportions of the income; that is to say, a farm receiving half its total income from the sale of milk and milk products may be classed by one economist as a dairy farm, but another economist may require a higher or lower proportion of the total income to place that farm in the same category. It is suggested therefore that the economists of the various countries would make their work in farm management of more value to each other and to others engaged in agricultural science, if agreed definitions of types of farming could be formed. We should at least know what we meant by a dairy farm or a beef producing farm. To those working in areas of little diversification this suggestion may appear of little moment, but to those of us working in areas of very diversified farming the question is continually arising. The only note of caution I would like to sound here is that too many types should not be set up. Otherwise we shall probably come to the conclusion that the only satisfactory method is to "group each farm by itself."

If a satisfactory method of classifying farms according to type can be evolved, then possibly the next most significant grouping is that which depends upon either capital or labour. The latter factor is, I think, the more important since the cost of labour, even in an old country like England, now absorbs, owing to the considerable increase in wage rates after the war, probably a greater proportion of the total costs of production than any other single item. Capitalisation is so closely connected with the type of farming that it really forms a subsidiary method of grouping, which does not need to be considered further in this paper.

CLASSIFICATION ACCORDING TO LABOUR REQUIREMENTS

It may of course be argued that labour requirements are also connected so closely with the type of farming and the capital required that they, too, form only a subsidiary method of grouping farms. There is, however, this great difference, namely, that capital requirements cannot easily be allocated as between crop lands and livestock, whereas labour requirements can be so apportioned. It is therefore considered that possibly the best combination of methods for classifying farms in order that advice may be given to farmers on non-economic, as well as economic matters, is that of type of farming coupled with labour requirements.

The actual method, as I see it, is to establish a kind of index of labour requirements, by weighting each department of a farm within a certain type, in accordance with the average labour needed on the various kinds of crops and livestock. This average is calculated from a representative number of farm accounts received by the farm management branch of a university, and is then applied to all farms within that type of farming found in the area for which the university is responsible, as far as agricultural advisory work is concerned. The only particulars required from farmers not submitting accounts to the university would be a statement of the acreages under the various crops and the numbers of each type of livestock carried. By this method a very rapid classification of farms can be made, and there would be established in the university a kind of index of farms. This index could then be subdivided as and when required for any specific piece of investigation or research.

Admittedly, the method is not perfect. One argument is, naturally, that to apply an average set of labour requirement figures to every farm within a particular type-of-farming class is misleading, because all the farms in that class will not need the same labour on the same crop. Provided, however, the index of labour requirements was not split into too small divisions, it is considered that the error will not be significant, that is to say, two farms with identical crops and numbers and types of livestock would find themselves in the same section of this classification although the management of the one may be more efficient than the other. In dealing with a large number of farms, for which, in fact, this method is intended, it is not anticipated that serious discrepancies will be very frequent, and, as the scheme is developed,

it will be found possible to give farms varying considerably above or below the average in labour requirements a plus or minus characteristic, which, in effect, will be an index of good or bad management. Such an efficiency index would be of considerable use to other people engaged in agricultural advisory work, for the ease and rapidity with which the economist could construct this index would enable the other agricultural advisers to make comparisons and to know what kind of man and farm they would find, when they received requests for their services.

CONCLUSION

In concluding this paper I should like to make a few remarks upon the attempts we are making at Bristol to apply statistical methods, especially in correlation, to establish a rapid and easy system of farm classification, and incidentally to arrive at a single figure or index, which can be used as an index of ability in management.

Simple correlations calculated between such factors as capitalisation, costs of production, farm incomes and labour requirements have given fairly satisfactory coefficients, even when various types of farming are mixed together. If we confine ourselves to one particular type of farming, somewhat better coefficients of correlation are found. Our problem is now to reduce the standard deviation of the deviations from the correlation line to a minimum, by handling a larger number of farms than we have hitherto done. Even so, we realise that perfect correlation will not be achieved, and it appears that the extent, by which we fall short of the mark, will give a very good index of the ability of the farmer as a manager. Differences in managerial ability are real and, we consider, should be capable of statistical measurement.

One could continue this paper indefinitely upon these lines, and the many refinements which are possible. The point I wish to make again is that a good deal of the value of farm management work is being lost, especially for comparison purposes, either between different areas in the same country or between different countries, simply on account of the fact that the question of classifying farms has not received adequate attention.

ADVISORY WORK ON FARM MANAGEMENT

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DURING the last ten years there has been a steady and consistent drop in the general index number of all agricultural prices in the United Kingdom (table 1).

The influence of these falling prices is to be seen in the published estimates of the Ministry of Agriculture of the monetary

Table 1. General Index Number of all Agricultural Prices in the United Kingdom, 1920-1930 (1911-1913 = 100)

Year	*Index number of all agricultural prices*
1920	292
1921	219
1922	169
1923	157
1924	161
1925	159
1926	151
1927	144
1928	145
1929	131

values of the agricultural produce sold, or produced for sale, from the farms of Great Britain during recent years. These estimates for the agricultural years 1924-25 to 1927-28 are as follows:

1924-25 ..... £286.2 million
1925-26 ..... £270.2 million
1926-27 ..... £255.8 million
1927-28 ..... £266.2 million

It has been interesting, during this period of falling prices, to follow the yearly variations in the monetary values of the agricultural output, or production, on the farms whose accounts we have had under investigation, and to which we have extended our advisory service (table 2).

It will be seen that the rapid fall in agricultural prices from 1920-1922 gave the farming community very little opportunity of readjusting their methods in time to meet the emergency but that

Table 2. Output Per 100 Acres on Yorkshire Farms, 1921-22 to 1929-30*

Year	*Output per 100 acres*
1921-22	£1,048
1922-23	744
1923-24	786
1924-25	824
1925-26	774
1926-27	780
1927-28	721
1928-29	779
1929-30	806

* Farms whose accounts are under investigation at the University of Leeds.

since then, to a very great extent, they have risen to the occasion and that from 1923 onwards, in spite of further drops in agricultural prices, the actual monetary value of the agricultural output on the acreage basis has not only been well maintained, but made to rise rather than to fall.

During the war, and up to 1920, on a rising market, the selling price of agricultural products as a whole, rose more sharply than did production costs on the farm, or even the cost of living.

Since 1920, on a falling market, there has been a corresponding lag, and the selling price of agricultural products as a whole has fallen more rapidly than the production costs on the farm, or the actual cost of living, and possibly there never was a time when the farmer was able to buy so little with what he receives in return for the produce which he has to sell.

This point is brought out quite strongly by Mr. R. J. Thompson who gives the index figures for agricultural prices and production costs for the four years, 1925-1929, shown in table 3.

Table 3. Index Numbers of Agricultural Prices and of Production Costs, 1925-1929*

Year	*Agricultural prices*	*Production costs*
1925-26	159	156
1926-27	151	148
1927-28	144	153
1928-29	147	157

* Index numbers as given by Mr. R. J. Thompson.

These figures, he points out, correspond with the prevailing view that it is since 1927 that the agricultural depression has been most acute.

Our own records show that over a series of eight years on the holdings whose accounts we have had under investigation, production costs of the farms as a whole, when ranged in their order of magnitude, have been as given in table 4.

From the point of view of the farmer it is, to say the least, unfortunate that his most important production cost—the labour bill— and the third in the order of magnitude—the cost of upkeep of implements and tradesmen's bills—two items which together

Table 4. Production Costs on Yorkshire Farms*
(Based on data covering an eight-year period)

Item	*Cost per 100 acres*	*Per cent of total*
Labour costs	£250	32 2
Purchased foods	187	24 0
Upkeep of implements and tradesmen's bills ...	120	15 5
Rent	116	15 0
Purchased fertilizers	46	5 9
Purchased seed	34	4 4
Rates	24	3 0
Total	£777	100.0

* Farms whose accounts are under investigation at the University of Leeds

have been responsible for 48 per cent of the total cost of running the farm, should both be standing in 1930 at a figure at least 100 per cent higher than in pre-war days, while the agricultural products, which the labour employed directly or indirectly is helping to produce, should be selling at prices only 44 per cent above pre-war.

Under the circumstances, unless drastic alterations were being made in the methods and systems of farm management, one would certainly expect that the economic position of the farming community would be steadily going from bad to worse, and the figures as given by the advisory economist for the Bristol Province apparently give support to this supposition (table 5).[1]

[1] Proceedings of the Agr. Econ. Soc 1929, p. 76.

When, however, we examine the results of our own investigations in Yorkshire the trend has been entirely in the opposite direction and the general economic position of the farms as a whole

Table 5. Variations in the Economic Position of Farms in Somerset, 1925-26 to 1927-28

Year	*Number of farms*	*Number of farms making losses*	*Total loss made*	*Loss per farm*	*Loss as per cent of capital*
1925–26	103	55	£2,453	£23 9	0 48
1926–27	89	54	14,284	160 5	3 08
1927–28	66	36	10,849	164 4	3 59

has been found to show signs of improvement rather than of going back (table 6).

This, in our opinion, has been due in no small extent to the influence of two factors, (a) the adaptability of the farmers themselves; and (b) the efficiency of our advisory service. This is shown quite clearly by the yearly variations in the *type* as well as the monetary value of the agricultural output. There has been a gradual tendency to rely to a greater and greater extent upon stock, the monetary value of the stock products amounting in

Table 6 Summary of Results on Yorkshire Farms, 1921-22 to 1929-30

Year	*Number of farms*	*Gross result*	*Per acre*			*In terms of rental*	*As a per cent of capital invested*
			£	s	d		
1921–22	38	Deficit	2	10	6	1.82	17 7
1922–23	55	Deficit	1	8	4	1 16	10.9
1923–24	70	Surplus	0	8	11	0 30	3 4
1924 25	88	Surplus	0	10	7	0 40	4 0
1925–26	80	Surplus	0	5	8	0.30	2 4
1926–27	77	Surplus	0	7	8	0.33	3 3
1927–28	84	Surplus	0	9	6	0 40	4 2
1928–29	85	Surplus	0	12	4	0.60	6 8
1929–30	36*	Surplus	0	18	5	0 80	8.4

* Completed records not yet to hand.

1921-22 to 49 per cent of the total, and in 1928-29 to 70 per cent of the total. During this eight-year period there has apparently been a tendency to rely more regularly upon the dairy herd, while

more attention must undoubtedly have been paid to the poultry section of the farm, as the value of the eggs and poultry produced represented 2 per cent of the total output in 1921-22, and 6 per cent of the total output in 1928-29.

On the other hand, following the sharp drop in cereal prices in 1922, the monetary value of the output of crop products has fallen very considerably, with the result that while the output of stock products in 1928-29 was 6 per cent greater than in 1921-22, the output of crop products was 55 per cent less and the proportional value of the cereal crops was reduced from 24 per cent of the total in 1921-22, to 14 per cent of the total in 1928-29.

Of the cereal crops the most serious reduction appears to have been made in the wheat crop, the output of which was valued in 1921-22 at £107 per 100 acres under cultivation while in 1928-29 it was valued at £30 per 100 acres under cultivation. On the other hand, there are indications that the attention of the farming community in Yorkshire is more and more being turned towards those crops which, like potatoes, carrots, peas for picking green, flax, and sugar beet, are to a greater or less extent protected naturally by their bulk or perishability, or artificially by governmental subsidy, and which will not, therefore, have to bear the full brunt of the ever increasing competition with foreign and overseas supplies to the same extent as do the cereal crops.

This adaptability of the Yorkshire farmers whose accounts we have had under observation is perhaps brought out best by a study of the yearly variations of the labour bill in comparison with the monetary value of the agricultural output (table 7).

That alterations in farm management have been accompanied by increasing efficiency in the organisation and utilisation of labour is self evident, for while in 1921-22 no less than 39 per cent of the production from the farm was required to meet the wages bill, in 1928-29, 26 per cent of the year's production sufficed to meet the same charge, although agricultural prices as a whole have dropped during that period relatively twice as fast as have the average weekly wages of the farm labourers.

ADVISORY SERVICE IN FARM MANAGEMENT

If any advisory work is to be efficient and really effective, the advisory staff must have a broad outline of world conditions; they must know their province through and through; they must know

its possibilities and capabilities; they must know intimately the varied problems of the agricultural industry as a whole, of their particular province in particular, and of the various districts of the province in which they are working; they must gain and hold the confidence of the farmers; as a team they must work and pull together; the foundations of their work must be laid upon sound knowledge and experience patiently and laboriously collected and the corner stone of their business must be *service* and not *self*.

An intimate knowledge of the province can only be obtained when the advisory officer knows not only the land but the men

Table 7. Labour Bill per 100 Acres on Yorkshire Farms and Per Cent of Output Required to Meet Labour Bill, 1921-22 to 1928-29

Year	*Labour bill per 100 acres*	*Proportion of output required to meet labour bill*
1921-22	£409	39 0
1922-23	283	38.0
1923-24	249	31.6
1924-25	249	31.0
1925-26	241	31.6
1926-27	240	30.6
1927-28	229	31.6
1928-29	215	26 2
Average (8 years)	£250	32 0

who are farming the land. Just as I know no two farms on which I could give exactly the same advice to the same man were he transferred from one holding to another, so I know no two men to whom I should think of giving exactly the same advice were they operating on, and responsible for, the management of the same farm. Each farm has its own specific problems and each man his own specific individuality, and the advisory officer who wants to make a success of his calling must make a study not only of the problems specific to the farm but of the individuality specific to the man.

This intimate knowledge of the man can only be possible when the advisory officer is himself living the life of the farmer, taking a personal interest in his difficulties, his joys, his sorrows, his success and his failure, and the farming community, slow as they are sometimes thought to be, are quick to find out whether an investi-

gator's interests are centered in them personally or in the information he is wanting to get out of them.

GAINING THE CONFIDENCE OF THE FARMERS

Coming to my own Province of Yorkshire some 25 years ago as science tutor and lecturer in farm book-keeping and finding no authentic records available for teaching purposes, I got in touch as soon as possible with some four or five men farming in different parts of the county on different types of land and with different marketing facilities, and persuaded them to keep accounts and to place their books at my disposal. None of these men were at that time well endowed as far as this world's goods are concerned. One was just starting farming with a capital of £400; today he is farming 300 acres and the net returns from the farm have averaged more than £3,000 or $15,000 per annum for the last three years. The alterations and modifications in his methods and system of farming during the period with which I have been in touch with him would take a whole session to describe. Suffice it to say that in spite of falling prices, the monetary value of the output of agricultural products which he produced for sale has increased from £4,505 in 1922-23 to £8,963 in 1928-29.

The second man was farming some 20 acres of accommodation land which was supporting 5 dairy cows, the milk of which he was retailing locally. Today he is the absolute owner of a small and compact holding of 80 acres surrounded by a ring fence; he has got together a herd of 17 dairy cows, a flock of 3,000 laying birds, and has built up a herd of 20 breeding sows. His total sales last year amounted to £3,542 and his net profits during the last three years have averaged well over £1,000 a year. In spite of an increased output of stock products and falling crop prices, the monetary value of his crop sales in 1929-30, when barley was selling at 28 shillings a quarter and potatoes at 30 shillings a ton, was actually higher than it was in 1921-22 when barley was fetching 80 shillings a quarter and potatoes 160 shillings a ton.

The third man was farming some 90 acres of what was little more than moorland at an elevation of between 1,000 and 1,100 feet above sea level and was struggling to keep his head above water. Today he owns and has paid for the whole farm; excellent sets of buildings have been erected; the farm is now carrying 70 dairy cows, 200 laying birds, while no less than 300 pigs were

last year got off fat. The total sales last year of what was once a little moorland farm amounted to £5,069 and the total profit made during the last ten years has amounted to £11,412, or an average of £1,141 a year. Not only has this man done well himself, but he has handed over as a dowry to his daughter on her marriage the deeds of a small farm of 60 acres and set up two of his sons on separate farms, one of whom is today actually making more money than his father.

Possibly there is no man naturally more reticent than the average Yorkshire farmer with a man whom he does not quite know; but I have met no one who is so ready to open out his heart to a man whom he has learnt to trust.

GETTING TO KNOW THE PROVINCE

A glance at a geological map of England and Wales will reveal the fact that practically every one of the geological formations sweeping round in a broad curve from southwest to northeast outcrops somewhere in the county of Broad Acres. Possibly there is no county in the country which has to so large an extent been subjected to glacial action, and one would expect, therefore, to find a big variety of types of soil and a consequent big variety in the type of farming. Actually there is to be found in Yorkshire every type of farming organisation met with in the whole of England, Scotland, Ireland or Wales, with the possible exception of the hop farms in Kent and Hereford and the presence of such inns as the Hop Pole and the Hop Grove, still fairly prevalent in certain areas, suggest that hops were grown in the county in the none too distant past.

A study of a contour map of the county shows that there will be big variations in altitude which again will affect farming conditions, and particularly the ratio of grass to arable farming. To the west we get the hills caused by the Pennine Uplift cut in two by the Aire Gap. To the north of that Gap lie the Permian Group, composed here almost entirely of mountain limestone; to the south lie the Coal Measure soils, here almost entirely millstone grit whose natural shortness of lime is still further depleted by the acidity of the rain due to atmospheric smoke pollution from the adjacent industrial areas of Yorkshire and Lancashire. Less than five per cent of the land in the whole of this area will be under the plough,

yet the methods of land utilisation and the systems of farming adopted will vary as widely as chalk from cheese.

To the east again, lie two upland masses, in the north the Hambledon and Cleveland Hills composed almost entirely of Jurassic rocks covered to varying depths by deposits left by the Great Scandinavian Glacier as it forced its way from the northeast over the summit of these hills. This land, like the upland to the west, is primarily hill-sheep land; yet the type of hill-sheep kept, the method of management, the supplementary farm enterprises, and the ratio of grass and arable land differ very considerably from the corresponding hill-sheep land to the west of the county. It is the only district I know in which roots are grown systematically for scaling on the grass or moorland to the hill-sheep in the winter. It is the only one of these hill-sheep areas in which land reclaimed is likely to prove an economic success and that land reclamation is only made possible as a result of glacial action and glacial deposit. When Professor Myers was with me some four years ago I had an opportunity of taking him over this area and showing him one such farm in the process of reclamation; he will be pleased to hear that this farm of 400 acres, bought at less than £8 an acre, is now a paying proposition and left last year, after paying 5 per cent on the purchase price and capital cost of improvement, a surplus of £680 to meet management charges and interest on a working farm capital of £3,160.

The hills in the southeast are the Wolds, a chalk escarpment, the continuation of that range which comes up in a bold sweep from the south of England, through Dorset, Wiltshire, Berks, Herts, Suffolk, Norfolk and Lincoln. It is an area of large farms with 83 per cent of its area under the plough, worked almost entirely by hired labour—an area naturally adapted to tractor labour, but in which tractors are conspicuous mainly by their absence. A district which, as far as stock are concerned specializes mainly in feeding, rather than in hill-sheep, and in the fattening of cattle almost entirely during the winter; a district whose main and in many cases only sale crop is barley. It is the district in which the depression is being felt more heavily than in any other part of the county, and a district in which the farming community are most difficult to move from their traditional methods of farming.

To the southeast of the Wolds lie the heavy boulder clays of the Holderness, growing possibly the best and heaviest crops of wheat

in the world, but growing them at too high a cost to compete with success in the world market of today. The land is adapted to the growing of beans, of mustard for seed and for the feeding of cattle on grass.

Between the two uplands of the east lies the fertile Vale of Pickering, the basin of a great glacial lake, the land bearing palpable evidence of lacustrine and glacial origin. This is an area in which drainage problems, complicated by cross glacial flows, are all important—drainage problems which may eventually necessitate the straightening out of the River Derwent or even changing the direction of its flow, as I hear has been done by American engineers in the case of the river at Chicago. It was in this area that the heavy floods, reported in the American papers a fortnight ago, occurred.

Running almost due north and south lies some of the best land of the county, though varying in type and quality; Lias and Trias marl and clay in the north, the great Glacial Plain of York in the middle, and alluvial deposits in the south, much of it natural or artificial warp. The most valuable warp is found near where the tidal waters of the Humber meet the confluence of the Trent and Ouse. There are thousands of acres in this area on either side of the Market Weighton canal, the deaf carr along the banks of the River Hull in the valley of the Derwent—land less than 10 feet above sea level and so subject to flooding that pumping operations have in some cases to be resorted to almost continuously, which, by means of warping drains still in existence, could, within two years, be reclaimed. It is covered to a depth of from two to three feet with the richest alluvial deposit imaginable and, if reclaimed, its rental value would be raised from 15 shillings to 40 shillings or 50 shillings an acre. Today we have four men reclaiming land in this manner and finding it an economic success. However, an advisory officer must be sure of his ground; he must know his levels; he must know the tide range and think not once but a dozen times before he suggests the advisability of any cooperator undertaking this method of land reclamation; for it is an expensive process costing today roughly £15 or $75 an acre.

Again, in the glacial area of the Great Plain of York there are thousands of acres of thin and sometimes blow-away sand with a high lime requirement, running back to heath and common or, if under cultivation, capable of growing poor crops of oats and rye.

In the Pocklington area, just at the foot of the Wolds, this light sand may overlie a chalky boulder clay. One of the men with whom we have been closely in touch for many years was farming 400 acres in this area, Here two feet of light sand were superimposed on about 20 feet of boulder clay containing 12 per cent of calcium carbonate. We suggested he should buy the farm and marl it. He did so and has already marled 260 acres with a dressing of from 80 to 90 loads an acre, doing this in the slack seasons with his own men at a cost of £5, 10 shillings, or less than $30 an acre. In six years the total net profits left by this holding have been sufficient to meet his living expenses and the full cost of capital and interest charges on purchase and improvements. Again one would have hesitated to recommend this process, even under suitable conditions, to any but an enterprising and progressive man, in a position to market favourably, the potato, carrot, sugar beet, and other protected crops like flax and peas for picking green, which this improved land was then specially adapted to produce.

A glance at a map showing the relative density of the population would suggest, as is actually the case, that the farming methods of the county will be influenced not only by type of soil and topography but also by marketing conditions.

To get to know a large and varied county of this description is the work of a lifetime, and a 25 years' study, far from exhausting the subject, has really touched but the fringe.

METHODS OF APPROACH

The methods of approach available to the investigator are as varied as the problems to be faced, but right through we have worked with the idea of "service" well in the foreground. With this object in view we adopted at first, full and detailed "costings methods" on every farm under investigation. This of necessity restricted our economic studies to a small and limited number of farms, but enabled us to help them very considerably, and when opportunities of extension occurred we were in the favourable position of selecting our men, and the selections were made with due regard to type of soil, size of the holding, method of farming adopted, altitude, and marketing facilities. For the last eight years we have had under observation the accounts of approximately 80 farms in varying parts of the county—farms varying in size from 5 to 1,500 acres. These have included rearing, breeding, and

sheep farms, wold farms, warp farms, small holdings, mixed farms for grain and stock, light arable farms specialising in rye, potatoes, carrots and peas, heavy arable farms specialising in wheat, beans and the winter feeding of cattle, farms specializing in milk production with mixed farming on grass, on arable farms with the soiling system, and with the use of the silo. On every one of these farms the results have been looked at first of all for the farm as a whole and subjected to as critical an analysis as possible with an eye all the time to gleaning all the available information which might be made use of as an aid to increased efficiency in farm management.

Later, by means of a modified costings system, ledger accounts have been opened and each separate enterprise charged with its share of the production costs of the farm as a whole, and a more detailed and comprehensive study of the separate entities of the farm made. After this further study a detailed report is sent to each cooperator and constructive and destructive criticism offered —criticism which has been frank, sometimes brutally frank, but which has always been accepted in the spirit in which it was offered. The information collected in this way has been valuable, interesting and instructive; the samples have been small but very carefully chosen, and from each, all the information available has been extracted, classified, and critically examined, and while the samples have been small the information with reference to each farm has been as complete as we could make it.

In order to widen the scope of our work, each year one or more detailed commodity or enterprise studies are made on a more extended basis, and as far as stock are concerned, we have completed these studies in the case of milk and pork production as well as of poultry, and are at present engaged in an investigation into the various methods of sheep management. As far as crops are concerned, investigations have been made into the growing and marketing of potatoes, flax, sugar beet, peas for picking green, and a wheat survey is now on the way. Our method of attack may be illustrated in the case of a poultry investigation made in 1928.

The Ministry of Agriculture are approached and the poultry population obtained parish by parish. These are then plotted to scale, in this case one dot for every 200 birds. A bird's-eye view of the relative poultry concentration in different parts of the county is thus obtained and this map is viewed in the light of the soil,

contours, density of population, possible markets, and road and rail communication. We next note the position of each of the 80 original cooperators who are making any attempt at poultry keeping and see where our samples are inadequate or incomplete. It is an easy matter then, by means of our eight district lecturers stationed at different parts of the county, our lecturers in poultry husbandry or the various secretaries of the Farmers' Union to get into touch with any required number of poultry keepers in the areas not sufficiently covered. If in any particular area we want four additional men we should ask for eight names, interview the eight and make our own selection. These men, who are visited personally three or four times during the year, keep for us the detailed records which we suggest with reference to that particular enterprise.

In this way, broader information is gradually being accumulated and the disadvantages of the smallness of our original sample are gradually being overcome.

Incidentally, it may be of interest to state that as a result of this particular investigation which revealed that by far the greatest concentration of poultry in the county is to be found in the upland of the southern Pennines on land not particularly adapted to poultry culture but in close proximity to the markets both of the industrial area of the West Riding and of Lancashire, and that one of the least dense concentrations is to be found on the Wold uplands of the East Riding, an area suffering heavily as a result of the agricultural depression and lack of market facilities, we have taken the bold step of suggesting the opening of a large egg collecting and grading station at Beverley, in the very centre of this area, holding the view that while the mountain may not come to Mahomet, Mahomet may at least go to the mountain and as Mr. Dykes and Mr. Hinton will know the experiment is proving an undoubted success.

During the last three years, in addition to these commodity or enterprise studies, detailed surveys have also been made of the three separate sections of the county, thus helping still further to broaden our outlook and widen our sphere of action.

LESSONS TO BE LEARNED FROM THESE STUDIES

A study of the results obtained during this period when looked at as a whole or in relation to the variations of their financial and

economic success, brings out many points of practical interest to the man who is farming, or thinking of taking a farm.

SIZE OF FARM

Our own limited number of results goes to show that so far as size is concerned, the peak of maximum efficiency is apparently reached on a holding of somewhere between 100 and 150 acres, though the data at present available is not sufficiently large for the evidence to be conclusive. Actually there are indications that the efficiency curve of holdings of various sizes in our county is not a continuous one but has two peaks, the first for the family farm of the size already mentioned beyond which peak the curve falls, only to rise again to a second crest somewhere about 350 acres, from which point it appears to fall as the holdings increase beyond that limit.

As we see things the success of English farming lies neither in the extremely small holding of Denmark, Switzerland or Germany, nor in the large ranch or the industrial or collective farms of South Africa, the Far West or Soviet Russia. It is certainly not without significance that we have never been able to include any holding under 50 acres or over 500 acres in our list of really successful farms, when we limit success to those leaving a return of at least 15 per cent on working capital commitment.

In this respect a study of the following table, illustrating the variations in the number of holdings of various sizes during the last 40 years, is certainly instructive (table 8). It will be seen that, in England and Wales, the tendency has certainly been in the direction of the gradual elimination of the large holdings and also of those which have been found in practice to be too small for economic working. In spite of the repeated efforts made to encourage the small holding movement, economic forces have slowly but surely worked in the direction of the medium-sized farm, hovering round the hundred acres, which our limited results suggest to be, in this county at least, one of the best economic units.

The last published figures of the Ministry of Agriculture reveal the fact that, during the last 40 years, the actual number of statutory small holdings in England and Wales has been reduced by more than 53,000.

LOCATION

That the present day problems of the farmer are those of marketing rather than production is suggested by the fact that during a period of eight years, of these really successful records, 59 per cent come from the West Riding with its teeming industrial population, and 37 per cent come from the North Riding, most of them from farms situated within easy reach of the Cleveland area, the markets of which are second only to those in the industrial area of the West Riding, and only 4 per cent are from the East Riding,

Table 8. Distribution of Holdings in England and Wales According to Size, 1885-1926

Size group (acres)	*Year*				
	1885	1895	1913	1921	1926
1–5	114,273	97,818	92,302	81,217	74,185
5 20	126,674	126,814	122,117	116,159	108,814
20–50	73,472	74,846	78,027	80,967	78,827
50 -100	54,937	56,791	58,287	61,001	61,063
100–300	67,024	68,277	64,431	67,842	67,169
Over 300	16,608	16,021	14,513	12,947	12,580
Total	452,988	440,567	435,677	420,133	402,638

which possesses no great centre of population except Hull, which as a port is dominated by its import trade. In a district far removed from a consuming market the importance of being near to a station or in close proximity of a really good road in these days of motor transport and refrigeration cannot be over emphasised.

The fact that with these successful men potatoes and barley have, over the whole period, been the main sale crops would suggest that the successful farm is more likely to be found on light land or medium loam than on heavy clay—a supposition which gains support when it is seen that these farms have also produced more peas, carrots and sugar beet than the normal farm. Actually we have not yet been able to include in our list of successful farms any holding, grass or arable, situated on heavy clay, unless in a district favorably situated for the disposal of milk in liquid form.

GRASSLAND OR ARABLE

It is next to impossible for an arable man in an old country to do well without stock to produce manure to maintain the fertility

of his land. He may adopt simple or complex series of crop rotations, he may go in for catch cropping and green manuring, supplemented by dressings of artificial fertilisers, but, as we say in Yorkshire, "there is nowt like muck." This, the older countries have found out long ago, and the newer countries, as the inherent fertility of their virgin land is beginning to show signs of exhaustion, are beginning to realise it at last. Furthermore, the cheapest food for stock is still grass, well managed.

On the grassland farm, if stocked up to the hilt by cattle, dairy cows, sheep, pigs or poultry, manure will be produced in abundance, but cannot be utilised to the best advantage unless there is land under the plough on which sale crops can be grown, by means of which the accumulating fertility can be cashed direct.

A study of our records during the war and post-war periods shows quite conclusively that in good times it will be the arable man who will make most, and in bad times the grassland farmer who is likely to lose least.

If, therefore, a man is adopting the bolder policy and farming with a view to making money rather than to cutting down his expenses, there is no doubt that a blend of grass and arable land is desirable, and it would appear from our Yorkshire records that, except under very abnormal conditions, one of the happiest blends would be one of rather less than two-thirds grass and rather more than one-third arable. In my own mind, I have no doubt that the policy of our farmers in laying down land to grass from 1870 up to 1914 at the rate of 73,000 acres a year, and from 1919 to 1929 at the rate of 223,000 acres a year has been carried too far, not only nationally from the point of view of production, and socially from the point of view of unemployment, but also financially from the point of view of the farmers themselves.

Many a man in our country, and if I may judge from what I have seen in this country, the same is true, has made the fatal initial mistake of taking the wrong farm, and we are finding an increasing number of applications coming in for advice and guidance in the taking and selection of the holding.

RELATION OF VARIOUS FACTORS TO RETURNS

A study of the records of those men who have made and are making a success of their farming will give us some indication as to what the farmer should do with his farm after he has taken it.

These men are going in for high production, and adapting their methods to present day requirements. Mr. R. J. Thompson, in a paper read in 1926 before the Royal Statistical Society, shows that the quantity of agricultural products produced on the holding, and either sold or left available for sale, is valued in England and Wales at £817 per 100 acres, and in Denmark at £1,115 per 100 acres. On the whole of the farms in Yorkshire whose accounts have been under investigation, the output per 100 acres has been found to agree quite closely with Mr. Thompson's estimate, but on the farms which, from the economic standpoint, have stood out as being pre-eminently successful, the production has been

Table 9. Relation of Various Factors on the Most Successful Yorkshire Farms to the Average for all Farms

Factor	*Average of the most successful farms*			*Average of all farms*		
	£	s	d	£	s	d
Capital invested per acre	14	11	0	13	0	1
Rent per acre	1	9	6	1	4	2
Rates per acre	0	6	9	0	4	0
Total expenditure per acre	15	6	0	11	16	6
Foodstuffs bought per acre	2	16	0	1	17	0
Fertilizers bought per acre	0	12	2	0	10	8
Labour bill per acre	3	2	5	2	6	0
Number of men employed per 100 acres	3 02			2 34		

80 per cent above the normal for our country and 30 per cent above that of Denmark.

Apparently, therefore, the salvation of British agriculture is not to be found along the lines of ranch farming, and diminished production, and if the industry is to come to its own again it must do so by means of increased output and increased sales.

That it still pays to farm intensively is brought out quite clearly from a study of the above table, summarising our records for the last eight years (table 9).

The interesting thing is, that on these successful farms, not only has the output been high on the acreage basis but in spite of the heavy expenditure and high capitalisation it has been high in proportion to the production costs, the rent paid, the labour bill, the men employed and the capital invested.

With information of this kind in front of us we have had no

hesitation whatsoever in expressing our views quite frankly to men who had previously been convinced that the only hope for agriculture in the present days of low prices lies in cutting down of expenditure and reducing both the output and the production costs.

The subject of land utilisation is one of vital importance as far as the economics of farm management are concerned, and we have found ourselves in a very strong position in our advisory capacity when our available records, covering a series of eight years (1921-29), have brought out the following facts:

1. The land utilised for growing for direct sale off the farm, crops naturally or artificially protected, has produced each year

Table 10. Relation of Output on the Most Successful Yorkshire Farms to the Average for all Farms

Factor	*Average of most successful farms*	*Average of all farms*
Output per 100 acres....	£1,400	£780
Output per man employed	470	336
Output per £100 spent on labour.	450	320
Output per £100 production costs	140	104
Output per £100 rent paid..... ..	970	680
Output per £100 working capital invested . .	96	61

crops to the value of £22, 9 shillings, 7 pence per acre and left an average net profit of £5, 15 shillings, 5 pence per acre.

2. The land which has been utilised for growing for direct sale, cereal crops not thus protected, has produced each year for sale, crops to the value of £7, 5 shillings, 3 pence per acre and left an average net profit of £2, 14 shillings. 3 pence per acre.

3. Land, the produce of which has been placed at the disposal of poultry, has produced eggs and poultry to the value of £15, 4 shillings per acre and left an average net profit of £7, 5 shillings, 0 pence per acre.

4. Land, the produce of which has been placed at the disposal of breeding sows, has produced pork to the value of £27 per acre and left an average net profit of £4, 16 shillings per acre.

5. Land, the produce of which has been placed at the disposal of dairy cows has produced milk and dairy products to the value of £12 per acre and left an average net profit of £2, 8 shillings per acre.

6. Land, the produce of which has been placed at the disposal of breeding ewes, has produced mutton and wool to the value of £2, 18 shillings, 3 pence per acre, and left an average net profit of 6 shillings per acre.

7. Land, the produce of which has been placed at the disposal of feeding pigs, has produced pork to the value of £9, 6 shillings per acre and left an average net profit of 2 pence per acre.

8. Land, the produce of which has been placed at the disposal of feeding sheep has produced mutton and wool to the value of £4, 10 shillings per acre and shown an average net *loss* of £1, 10 shillings an acre.

9. Land, the produce of which has been placed at the disposal of the feeding cattle, has produced beef to the value of £3, 4 shillings, 3 pence per acre and shown an average net *loss* of £3, 6 shillings, 6 pence per acre.

With this information available we have felt ourselves on surer grounds when our advice was asked with reference to any suggested modifications in stock management, or as to the advisability of laying down any specific area under grass. In many cases marked improvements have been made in the financial position of the farm as a whole, not by eliminating feeding cattle altogether but by making such modifications in farm management as will ensure that this branch of stock, so frequently unremunerative will not absorb too great a proportion of the total energies of the farm.

CAPITAL TURNOVER

One of the difficulties under which the agriculturist must always labour is the comparative smallness of his capital turnover, due largely to the fact that as a rule he may have for sale from each unit of land only one crop each year, and that from the nature of his calling he must be carrying a large proportion of dead or non-productive capital. While in no system of farming would it ever be found possible to obtain the kind of capital turnover obtainable in other forms of business, yet there is no doubt that it is possible in many ways to increase it considerably with advantage. The simplest ways of doing this are to make more use of the milk cow, the breeding sow, and the laying hen; to increase the sale crops at the expense of the root break, and to aim at getting off the stock at an earlier state of maturity. While this inherent disadvantage can never be entirely rectified, yet it

can, by the internal organisation of the farm, be considerably minimised, and we have on our books farms on which, even in the worst days of the slump, it has been found possible to turn over the working capital investment, more than two and a quarter times.

RETURNS ON PROTECTED PRODUCTS

The total yearly value of liquid milk produced in our country and disposed of as such is roughly £50,000,000; the total value of imported milk products which come into direct competition with liquid milk was last year £6,000,000; hence the price of liquid milk in the home market is largely determined by the home supply, and the price at which it would be sold, both wholesale and retail, could be fixed by the men who are producing it, if only they realised the strategic strength of their position and the spirit of loyalty were more strongly developed.

On the other hand, if the milk producer is disposing of his milk in the form of butter or cheese, the price that he will have to accept will be influenced, and influenced largely, by foreign competition. In 1925, butter to the value of £53,204,417 was imported and in the same year butter to the value of £5,780,000 was produced for sale within the country; in other words the home produced butter formed less than 10 per cent of our total supply. Liquid milk must be fresh with the result that no appreciable overseas supplies reach us; butter will keep, with the result that large supplies reach us from Denmark, New Zealand and Australia, and if we wish to compete in the open market for the butter trade we must either be prepared, so long as our present fiscal policy continues, to place upon the market a sample of better quality or accept the price that these countries are willing to take. Over a series of years our producers should have a bigger chance of making money through the sale of liquid milk than through that of butter and cheese, and through the growing of potatoes, sugar beet, flax, carrots, cabbages and peas for picking green, than of the ordinary cereal crops.

These naturally protected products will be subject to more violent fluctuations of price levels than those on which the world markets have a steadying influence; they will possibly be more speculative and in times of glut, as in the case of the potato trade today, they may involve serious losses to the producers if attempts are made to force the whole of the crop on an already overcrowded

market; but it is here that money is to be made most readily; furthermore, speculation would lose more than half its risks were there introduced more organised and orderly systems of marketing these products.

CHOICE OF ENTERPRISES

With many of the stock and crop products already mentioned more or less speculative, the wise man will cover his risks.

Possibly it may be stated that there are no gilt-edged securities in agriculture; that no section of the farm is, or possibly could

Table 11. Average Profit per Laying Bird on Yorkshire Farms Keeping Poultry, 1920-21 to 1928-29*

Year	Average profit per laying bird	
	s	d
1920–21	14	2
1921–22	9	9
1922–23	3	0
1923–24	3	10
1924–25	4	6
1925–26	2	11
1926–27	4	6
1927–28	4	2
1928–29	4	5

* Farms whose accounts were under investigation by the University of Leeds

be, looked upon as in any degree "fool-proof." With this I am not altogether in agreement. From the outbreak of the war up to, and including, the present time, poultry, as far as our observations go, have been, if not fool-proof at least as fool-proof as any section of the farm, under our present fiscal policy, is ever likely to be. Actually, in spite of that fact that up to quite recently possibly no section of the farm has received so little attention, they have left good returns (table 11).

With the depletion of our laying stock during the war and the collapse of Russia, eggs remained up to 1927 the one agricultural product, the demand for which in the home market exceeded both the home and the imported supply. Egg producers in the home country are to be congratulated upon the fact that just at the time when the combined home and imported supply was beginning to

get ahead of the demand, an improved egg marketing scheme should be launched by the Ministry and legislation passed for the compulsory marking of foreign eggs.

As far as sheep are concerned, the numbers have only fallen in England from twenty million in 1868 to thirteen million in 1928. The fact that they can live on a scanty herbage of relatively poor quality makes them the pioneers and advance guard of civilisation in new countries. The fact that they give a relatively small output and capital turnover tends to push them relatively into the background, as with the advance of civilisation, farming methods develop on more intensive lines. The relative importance that sheep

Table 12. Relation of Size of Holding and Per Cent Which Mutton and Wool is of Total Output, Yorkshire, England*

Size of holding (acres)	*Total output per acre*			*Output of mutton and wool per acre*		*Mutton and wool as a per cent of total output*
	£	s	d	s	d	
20–50	27	12	0	9	4	1 6
50–100	19	12	0	10	- -	2 7
100–150.	12	5	0	14	—	5.7
150–300	11	10	0	19	2	8 3
Over 300	5	0	0	19	5	21 0

* Farms whose accounts were under investigation by the University of Leeds.

tend to play in the internal economy of holdings of different size and land values is brought out by a study of the records of the farms whose accounts we have had under investigation during the last ten years (table 12).

However intensively the land is worked it is still possible to find a place, and an important place, for this class of stock on most farms. To a large extent they may be made to act as scavengers of the farm, clearing up after the dairy and other cattle, running over the seeds in winter, getting an early bite in the spring before the other stock are turned out on to the grassland, or being folded on sugar beet tops before the land is ploughed up for wheat.

Production and the type of production must be influenced not only by the type of soil, altitude and weather conditions, but also by the position, transport, and market facilities.

This can be well illustrated in the case of Yorkshire by a study of maps of the county showing:

(a) The type of soil.
(b) The contours.
(c) The density of population.
(d) The distribution of the potato and sugar beet crops. Both crops require the same type of soil, though possibly the sugar beet crop wants more depth, and certainly is more susceptible to soil acidity; both grow naturally at the same altitude but both do not cater for the same market—hence the distribution of the area under cultivation of the two crops varies considerably.

There has been, during the past three years, a big increase in the area under flax grown for fibre in Yorkshire, and the growing

Table 13. Relation of Rent per Acre and Per Cent Which Mutton and Wool is of Total Output, Yorkshire, England*

Rent per acre (shillings)	*Total output per acre*			*Output of mutton and wool per acre*			*Mutton and wool as a per cent of total output*
	£	s	d	£	s	d	
Over 40	14	9	0	0	10	5	3 6
30–40	14	18	0	1	2	0	7 3
20–30	8	18	0	1	4	3	12 5
10–20	6	16	0	1	2	3	16 1
Under 10	1	9	6	0	11	7	38 0

* Farms whose accounts were under investigation by the University of Leeds

of the crop has proved quite a financial success, leaving, as far as our records show, an average net profit in 1928 of £5, 4 shillings, 10 pence per acre, and in 1929 of £7, 6 shillings, 5 pence per acre. One could find thousands of acres of land suitable for the growing of this crop, in different parts of the county, land farmed by men who are anxiously seeking an additional remunerative sales crop, but it is no use suggesting to those men that they should grow flax, unless they are situated within a fifteen or twenty mile radius of either Selby or Staddlethorpe, the only two places in the county possessing factories capable of handling the crop, for it is a bulky crop and heavy transport costs will kill it.

Even if the farm is close to the factory it is no use growing the crop unless precautions have been taken beforehand to get contracts signed for acceptance of delivery, for, with no other market available, it would be the height of folly to grow a crop of this description in excess of the factory requirements.

While many points of general interest come out from a study of our records and certain broad and general conclusions can be drawn from them, the problems of the farm and the individuality of the farmer are so varied that advisory work on farm management can never be carried out successfully on any rule of thumb methods, and each farm and each farmer must become a specialised field of research and investigation.

THE DEVELOPMENT OF AGRICULTURAL ECONOMICS AND OF FARM MANAGEMENT IN THE U.S S.R.

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IN RUSSIA—unlike in other countries (Germany, Denmark, Switzerland, Austria)—the science of agricultural economics and farm management had for a long time developed in the form of independent courses in agricultural colleges and universities and also in the form of special treatises and monographs. The well-known Russian agricultural economist, Ludogovsky, who as far back as 1875 wrote his "Fundamental Outlines of Agricultural Economics and of Farm Accounting," subdivided his course of lectures into three parts (not including the introduction):

1. Agricultural economics.
2. Farm management.
3. Farm accounting.

These traditions were followed by Skvortzoff, who issued a course in three volumes, dealing respectively with agricultural economics, farm management, and farm accounting.

Of course, there were in the agricultural colleges and universities some deviations from this method (Ermolov) but they did not form any leading trend in Russian economic life.

Outside of agricultural colleges, activity was most intensive in the field of agricultural economics, but not in farm management. The majority of journals and of published works dealt with agricultural economics only. As to farm management, it was chiefly developed in practice by the managers of large estates or, in its application to peasant farms, by county agents of the zemstvos (local autonomous administrations). The management of farms was mostly carried on along the lines of European experience.

The active interest in agricultural economics can be explained by the existence in the late nineteenth century of four well defined schools: (1) Marxists, (2) Revisionists, (3) Narodniki and (4) Bourgeois.

The most brilliant representatives of the Marxist School were Lenin and Plekhanov. Lenin was the author of the most important contributions to the subject, "Development of Capitalism in Russia," "Who Are the Friends of the People and How Are They

Struggling Against the Social-Democrats?," "The Agrarian Question in Russia at the End of the Nineteenth Century," "The Economic Content of 'Narodnichestvo' and Its Criticism in Struve's Book." In all, out of 22 volumes of Lenin's works, more than four deal with agricultural economics.

Plekhanov wrote at an early age "Our Disagreements," "The Law of Economic Development of Society and the Tasks of Socialism in Russia," "The Land Community and Its Probable Future," and other works. The scientific works of Lenin and of Plekhanov gave rise to numerous discussions. A whole generation of Marxist interpreters of agricultural economics, of economists and of Marxist students of agrarian policies were educated on the works of Lenin. Their number has vastly increased in our times. The contribution of Lenin and Plekhanov, who were both philosophers and political scientists at the same time, consisted of demonstrating, by thorough investigation, that agriculture was developing in Russia along capitalist lines, that within the peasantry there were growing up, on the one hand, large agricultural enterprises, while, on the other, there was an increasing number of peasants leaving the farms and going to towns and factories. In connection with this idea they analyzed especially the theory of the differentiation of the peasantry, concentration of agricultural production, the law of diminishing returns, and specialization in agriculture. Besides this, Lenin wrote a special work "The Newest Data on the Development of Capitalism in Agriculture of the U.S.A."

The Marxist theories met with objections, in the persons of Mikhailovsky, Nikolaion, and others, who advocated the peculiar idea that in our time agriculture did not and would not develop along capitalist lines. On this basis they constructed an economic system which they opposed to all other schools. The culmination of the Narodniki system was a special theory of farm management, develped by a group of practical workers. The group considered as its most eminent representatives Chaianov and Chelenzev. According to this theory, peasant economy is based on weighing the satisfaction of the producer's needs against the increasing burden of the strain of toil. In this way agriculture was declared to be beyond the field of capitalistic economy. Farm economy, as it related to the peasants, was declared to be a special system within the capitalist system. Chaianov's theory provoked

a prolonged discussion, as a result of which the theory was proved to be erroneous; nevertheless, Professor Chaianov promised to construct a complete economic theory of production and of distribution on the basis of the alleged special character of peasant farm economy. This, of course, he never could fulfill.

The revisionist system was represented by Bulgakov's "Capitalism and Agriculture" and Maslov's "Agrarian Question." This group, however, was not of particular interest, inasmuch as it merely reproduced the theories of the German revisionists, while on a number of points their views coincided with those of the Narodniki.

Much more original was the school of bourgeois economists. This group includes such prominent scholars as Postnikov, Kablukov, Manuilov, Chuprov, Kaufmann, Gerzenstein and others. The revolution of 1905 greatly stimulated the interest in agricultural economics. The most urgent problems were those relating to land distribution and organization and to the future forms of land ownership. Such problems as peasant migration or the economy of small peasant holdings also were the object of sustained attention and intensive research.

The vast extent of Russia's territory and the great variety of natural and economic conditions had long since caused regional studies to be a matter of particular interest, and many of the biggest names, such as Fortunatov, Bashaiev, and Lenin, are associated with such studies. Just before the war, the interest in cooperation had begun to grow.

It should be pointed out that before the revolution there did not exist any special research institutes where the science of agricultural economics and farm management could be concentrated. Research work was conducted, in the first place, by special voluntary associations, such as Chuprov's; secondly, by the zemstvos, and lastly, with the aid of agricultural colleges.

During the war, all researches were devoted to problems of food supply. After the revolution, the problems of agricultural economics were changed in a radical manner. Then the collectivization movement and the development of state farms brought about a great number of thorough investigations and descriptions of the new forms of economic organization. The disappearance of large-scale land ownership required a most assiduous study of agricultural economics and farm management. The revolution put

before the scientists the great problem of the reconstruction of agriculture as a whole, both technically and socially. Besides, the new social order gave prime importance to the new question of planning agricultural production. In connection with this, the research studies devoted to social planning, *i.e.,* the drawing up of control figures, five-year plans, and to general planning in agriculture, gained great importance.

The problem of industrialization also occupied an important place, due to the growth of industry in the U.S.S.R. and to the reconstruction of the entire system of national economy.

Special research institutes, unknown in the pre-revolutionary period, grew up after the revolution. The tasks assigned to them included research work on a series of definite problems as well as the training of a staff of scientific workers.

Among these institutes mention must be made, first, of the Agrarian Institute affiliated with the Communist Academy. This central institute is situated in Moscow, and is headed by Dr. Kritsman. The institute also has sections in Leningrad and in Minsk. There are institutes of a similar type in Kharkov, for the Ukraine (Director Schlichter), and in Tashkent, for Central Asia. Besides, there has been functioning since 1919 the Research Institute for Agricultural Economics and for Farm Management in Moscow, and a number of similar institutes have been formed in Rostov-on-Don (Director Nasimov), in Novosibirsk (Director Chuikov), and in Sverdlovsk (Director Ishmayev). In Moscow there is also the International Agrarian Institute. In 1930 there was formed a special Collective Farm Research Institute.

The institutes formed did not replace the agricultural colleges. The number of agricultural colleges has been greatly increased of late and now numbers sixty-eight. Each of these has a chair for agricultural economics and farm management.

It should be pointed out here that the importance of farm management has greatly increased in the recent period. The organization of collective and state farms has given rise to special problems of organization. For this reason, books on peasant budgets and on collective farms have been widely distributed. The Research Institute has given the greatest attention to this question. The most interesting treatises of this kind are the works of Chaianov on "The Cost of Production of Sugar Beet," the work of Anissimoff, Veremenichev and Naumov on "The Productive Char-

acteristics of Peasant Holdings," and the work of Rudakova and Sulkovsky, "The Class Grouping of Peasant Holdings and Their Productive Characteristics."

There have been issued a large number of publications of similar type, but only the most interesting are mentioned here. The Institute has recorded very carefully the budgets of a large number of peasant holdings.

On the same level as the above-mentioned works must be placed the investigations of the trends of the class groupings of peasant holdings. This question is the chief one which the Agrarian Institute of the Communist Academy has dealt with. The initiative for starting these studies belongs to Lenin. The most brilliant of this class are Kritsman's "Class Differentiation of the Soviet Village"; Gayster's "Differentiation of the Soviet Village"; Nemchinov's "About the Study of Differentiation"; Yakovlev's "The Village As It Is." A number of other publications have been issued, but they did not contribute very much of special originality.

In relation to the budget studies, our economists follow the main features of the German, Danish and American studies in this field; the second group of publications, however, have many original features unknown abroad. The methods of measuring social phenomena by means of statistics require careful and thoughtful treatment. Kritsman, Nemchinov and a number of others have contributed many new ideas in this field.

Next in importance is the group of studies relating to state and collective farms. This group is subdivided into two parts, agricultural economics and organization of farm management. The first part has been dealt with both in the Agrarian Institute and in the Research Institute, but the problems of organization have been studied chiefly in the latter.

The various economic problems have been treated in their relation to the nature of the new economic forms. In this respect, the most profound works are Lenin's treatise "On Cooperation," and Stalin's "Report at the Congress of the Marxist Agrarians." A thorough study has never been made of the various forms of collective farm organizations, "commune," "artel," "special partnership," "tractor station," and "simple cooperation," or of their different social implications, their respective importance, and their comparative suitability for the various regions of the U.S.S.R.

These questions are dealt with in a statistical book "The Collectivization of the Soviet Village," edited by Gayster, as well as in a number of publications issued by the Agrarian Institute of the Communist Academy. This literature shows the special interest in that field, which reflects the new and unexampled process of reconstruction in agriculture in the U.S.S.R.

On the other hand, there is the problem of the management and organization of collective and state farms. In this problem, the Research Institute of Agricultural Economics and Farm Management is very actively engaged. I have already mentioned that the science of organization had made very little progress in prerevolutionary Russia. The Institute has, therefore, had to make exhaustive studies of farm management from foreign sources. As a result of these studies, a great deal has been borrowed from the Americans and rather less from the Germans. The first edition of the Russian translation of Warren's "Farm Management" was sold out within a few months and a second edition has already been issued. Russian translations have been published of such bulletins of Cornell University, the United States Department of Agriculture, and of the Texas Agricultural College, as deal with the organization of tractor farms. There have also been translated the German works of Brinkmann and others. Besides this, scientific workers have been delegated to the United States, Germany and other countries to study various types of farm management.

But the organization of state and collective farms has already outgrown the foreign patterns. For instance, the problem of the "optimum" size of a farm has been attacked, and the first approach to a solution has been made. It has been ascertained that the "optimum" size, when 15-30 tractors are used, is 120,000 hectares subdivided into several sub-farms of approximately 10-15,000 hectares each. Such subdivision permits labor and equipment to be shifted from one section to another and thus to be utilized to the best economic advantage.

It may also be pointed out that the experience of the largest American farms (Campbell) in working with a gang of tractors has likewise been utilized in the Soviet Union, where the work is carried on by gangs consisting of from 25 to 45 tractors.

The main distinctive feature of farm management under our conditions have their roots in the new socialist structure of national economy. This causes the questions of the organization of labor

and of its compensation to assume an entirely new aspect. Our organizers are engaged in work on a large scale with a view to devising the most effective form of organization under the new conditions.

In the treatment of the new problems, a most active part is taken by the large staff of scientific workers. The results of the research work done at the Research Institute of Agricultural Economics and Farm Management are published chiefly in its journals.

Studies relating to socialist reconstruction of agriculture are published in the "State Farm" (Sovkhos) and in the Bulletin of the Research Institute. The most recent issue of the latter contained a good description of the organization of the largest state grain farm "Gigant" (Giant), by Abrosimov, Koval and Tishchenko.

In addition, a description of collective farms has been given in "Large Collective Farms." The organization of collective farms represents a range of special problems, such as the organization of means of production, and the distribution of income. To these problems are devoted the following interesting works: Nazimov's "Non-Divisible Funds," 1929; "The Payment of Labor in Collective Farms," 1930. On tractor stations, a work of Markevich has been issued under the title "The Tractor Station."

Recently, increasing attention has been given to the rôle of power in agriculture, and to electrification of agriculture, in particular.

In addition to the above-mentioned works, there have been published many investigations and simple descriptions by other institutions.

As regards work of an economic nature, the section on planning should be pointed out. Owing to the peculiar nature of Soviet economy, the planning of the entire national economy has become one of the most important factors in theoretical work. In the U.S.S.R. all economic activities are planned from one center, the State Planning Commission. Economic studies have embraced continuous theoretical inquiries into the problems of the acceleration of the development of the productive forces; of the quantitative and qualitative measures; of the proportion of different products in the general output; of the methods of distribution, and so forth. As an outgrowth of the system of planned economy there has developed the problem of specialization in agriculture

in the U.S.S.R. Up to the present time there had existed small farms which produced everything in small quantities. The state and collective farms do not want to, nor can they, engage in diversified production, and thus there arose the question of specialization by agricultural regions. At the present time there are 44 regions in the preliminary state of organization. The work is conducted chiefly by the Research Institute, in a special Bureau of Agricultural Economics and Planning, and in the local institutes associated with them.

Gordeeff, Wolf, Chelinzev, Gayster, Kubanin and others have taken part in the handling of these questions. In reference to planning, there have been published a number of discussions of control figures and of provisions of the Five-Year Plan. Articles relating to problems of planning are published chiefly in the large journals, "Planned Economy," "On the Agrarian Front" and "Socialist Reconstruction of Agriculture." Quite recently, there have been issued two volumes of research studies on "The New Stage of Socialist Construction."

There should not be left unmentioned the studies on the structure of the credit and cooperative systems, the study of the problem of the industrialization of agriculture, of its financing, of the problem of new settlements, of the general economic situation, of prices, and so forth. Some members of the staff are engaged in the treatment of the problems of general agrarian policies.

The treatment of purely theoretical problems of agricultural economics is reserved for a special section. These are treated in all the research institutions and are the subject of special courses at the agricultural colleges. This work is carried on very intensively in Moscow (Gordeeff, Liaschenko, Krisman, Uzhansky, Nikulihin), also in Leningrad (Berstis, Kozmanov, Uvarov), in Kharkov (Bilash, Sliphansky, Koval). In connection with these I should like to note that the principles of Marxist theory have been confirmed by the actual process of development. On the other hand the inconsistency of the Narodniki theories and those of other schools in relation to agricultural economics and farm management, with the actual process of reconstruction, has been very obvious. Professors Chaianov, Chelenzev, Kondratiev, Litoshenko and many others have made numerous printed and oral statements renouncing their own theories as being in contradiction to the facts of agricultural development. On these grounds they

have stated that they consider the Marxist theory of agricultural development as fully correct and the Marxist criticism of their theories as likewise correct. The changes that have taken place in Russian agriculture have thus thrown light upon many problems of agricultural economics that had been debatable previously for many non-Marxian schools.

In conclusion, we shall take up the organization of the Lenin Academy of Agricultural Sciences which deals with the whole of the research work in the field of agriculture. The Academy is organized as an association of different institutes. The unification of all institutes in one academy enables us to undertake work of great complexity, which makes the research more valuable and complete.

As an example of such a complex work may be cited the investigation of agriculture in the regions which come within the sphere of influence of the Turkestan-Siberian Railway. This investigation is conducted under the guidance of the Division of Agricultural Economics and Planning in cooperation with the research groups of all other institutes which are delegated for investigations in the several agricultural regions. As a result of this investigation, we are obtaining complete data that will serve as a basis for practical measures.

Such are, in short, the fundamental aspects of the work done at present by scientists in the U.S.S.R. in the field of agricultural economics and farm management.

FARM COST ACCOUNTING IN THE UNITED STATES

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FARM cost accounting is the oldest type of farm economic research in the United States. Yet it is a relatively new and by no means universal activity.

That farmers have long desired to know costs of production and to learn, if possible, the profits from farming is indicated in the early agricultural literature of the country as found in the newspaper files, in reports of the activities of agricultural societies of various kinds and in agricultural periodicals. It is recounted that George Washington studied the accounts of his Mount Vernon estate closely in an attempt to reduce costs of production and to find the enterprises yielding the greatest return. Other owners of estates are known to have resorted to accounting methods in attempting to improve their farm businesses. Recurring periods of depression in agriculture stimulated thought along this line at sundry times and prompted individuals to attempt to apply cost accounting to their production operations. Nothing in the way of systematic farm cost accounting is recorded, however, until well toward the close of the nineteenth century and it remained for the agricultural experiment stations to take the lead in improving the methods of agriculture through the medium of farm cost accounting.

Following the establishment of state agricultural experiment stations under the provision of the Hatch Act in 1887, providing for an agricultural experiment station in each state of the Union, there were scattered and intermittent attempts made by workers in the state experiment stations to learn the cost of crop production under varying conditions. In 1891, Director C. L. Ingersoll, of the Nebraska Experiment Station, initiated a study of "Cost of Farm Crops" with the idea of learning the cost of producing certain farm crops and the margin of profit between the cost of production of each, and market price. The study was made of crops growing on the Nebraska Experiment Station farm and was of an exceedingly simple nature. The results are published in Nebraska Experiment Station Bulletin No. 29, under date of 1892

During the year of 1892, Director George W. Curtis, of the

Texas Agricultural Experiment Station, following a public demand for knowledge about profits from crop growing, initiated a study under the title "Cost of Crop Production, and Profit Per Acre." This study, made by questionnarie, was in reality an attempt to discover the point of diminishing returns in the application of fertilizer to cotton land. It involved record-keeping and dealt with the cost of production, and must be included as one of the early investigations relating to the field of farm cost accounting The results of this study were published in Bulletin No. 26 of the Texas Agricultural Experiment Station.

In 1893, Professor B. C. Buffun, agriculturist at the Wyoming Experiment Station, inaugurated some experiments to determine the cost and profit from raising wheat under irrigation in Wyoming. An attempt was made to determine whether or not wheat grown under irrigation could be produced in competition with wheat grown on the unirrigated prairie lands farther east. Bulletin No. 17 of the Wyoming Experiment Station records the results of this preliminary attempt.

In 1898, David Kinley, then Professor of Economics at the University of Illinois, in Bulletin No. 50 of the Illinois Agricultural Experiment Station, mentions inquiries made concerning the cost of production of corn and oats in Illinois by the State Department of agriculture in 1885, 1886, and 1887. He states that the results were published in a series of tables without analysis and were therefore of relatively little value. In 1896, Professor Kinley and Mr. Nathan A. Weston, an instructor in the Preparatory School of the University of Illinois, inaugurated a study of the "Cost of Production of Corn and Oats in Illinois in 1896." This study was more comprehensively outlined than any that had been previously made and led to the conclusion that "the results of the inquiry tended to prove that the average cost of production, particularly the average cost per bushel, is much less than commonly thought," and that "when all complementary products are accounted for, the average market price of grain will rarely fall below the cost of production, and then only for brief intervals."

At about the same time that these widely scattered and unrelated investigations were made, Professor W. M. Hays, then agriculturist at the North Dakota Agricultural College, conceived the idea of finding the most profitable combinations of crops and systems of farming by keeping records of production costs of crops

grown in rotation. For this purpose he laid out a series of rotation plots on the college farm at Fargo and set up a system of records shaped to meet the needs of the situation. In 1893, Professor Hays was recalled to the Minnesota Agricultural Experiment Station where he, in association with the writer, immediately arranged for a continuation of the cost studies through an elaborate crop rotation investigation. In this investigation 36 out of the 44 plots represented different combinations of crops in rotation. It was expected that records of the labor and materials expenditures under the different crop combinations, together with the records of yields and prices for the products, would give the basis for determining the profits from each system of cropping.

During the years 1894 to 1900 the data secured from these plots were studied in an endeavor to make valid comparisons between the different systems. The plots were only one-tenth acre in size, however, and it was found impossible to get unbiased records of labor expenditures or to avoid excessive overhead charges because of the experimental phases of the scheme. No attempt was made therefore to determine the net profit to be gained from these experimental crop combinations.

Further analysis of the problem led to the conclusion that valid data on farm costs could be obtained only from primary records of farm business activities as conducted on representative farms under normal operation. The next step therefore was the development of the first organized movement in the United States for a comprehensive study of farm cost accounting, or as it was termed at the time, "Cost of Production Studies."

During the summer and fall of 1901 different sections of the state were visited by Hays and Boss, with a view to finding representative farming areas and farms under normal operation. Three areas were chosen as typical of the agriculture of the state. The first was near Northfield, in Rice County, where then, as now, dairying was the leading enterprise, with swine production and cash grain crops rounding out the farm business on most of the farms. The second area, thought to be representative of the diversified type of farming with beef cattle taking the place of the dairy enterprise, was located near Marshall in Lyon County. The third area, representative of the extensive grain growing type of farming, was near Halstad in Norman County in the famous Red River Valley. It was a somewhat delicate task in those days to

induce 15 to 20 farmers in each of these areas to agree to give the investigators free access to all of the details of their farm business and home affairs. The task was accomplished, however, and on January 1, 1902, the Bureau of Statistics of the United States Department of Agriculture joined in cooperation with the Minnesota Agricultural Experiment Station "to gather data from Minnesota farms on the cost of producing field crops and livestock products."[1] The expense was shared about equally and the work was directed by the Minnesota Agricultural Experiment Station. Three young men, students in the Minnesota College of Agriculture, were employed as route statisticians on the three routes established. Fifteen farmers on each route, chosen as farm statistics cooperators, agreed to be interviewed daily throughout the entire year by the route statisticians, giving a record of each hour of labor performed by each man and by each horse, and giving the field crop or other enterprise upon which the labor was used. A map, based upon accurate measurements of each field, was made of each farm, that the data might be so collected and classified as to show the cost per acre for each crop, on each farm, and also the average for each route and for the state.

At the beginning and close of each year complete inventories were taken of all livestock, machinery, feeds, and so forth, and during the year all cash items were secured which had to do with the receipts and expenditures on field crops, machinery, horses, and labor. During the years 1902 and 1903 very few data were secured except those which related to crop production, after which the data were extended to livestock and other affairs of the farm and the farm home. The first two years' work was in a way experimental. Methods for collecting and recording the statistics had to be devised, and many difficult problems, such as finding the exact rate of wages per hour for men and horses,were not worked out by the most exact methods until the second year.

In 1904, some departure was made from the plan first inaugurated. The number of farms on each route was reduced from fifteen to eight. The scope of the investigations was extended along many lines, including livestock and household affairs.

The Bureau of Statistics continued actively in the cooperative movement until 1911. At that time the Office of Farm Manage-

[1] From Bulletin No. 97, Minnesota Agricultural Experiment Station.

ment of the United States Department of Agriculture, then in charge of Professor W. J. Spillman, took over the responsibilities of the Bureau and widely expanded the investigational work. Cooperative relations were established with the states of Wisconsin, New York, Ohio, Missouri, and others. Because of the expense involved in supporting the research work on a statistical route, attempts were made to simplify the technique and to find substitutes for the route method. In 1913, a correspondence and visitation method was initiated by the Office of Farm Management of the United States Department of Agriculture and tested out in Minnesota, New York and Missouri. Some of these states are still using the correspondence method but most of those engaging in farm cost accounting studies have adopted the route form of investigation with the farms grouped in a particular area and visited regularly by a resident field man. During the entire thirty-year period, either the Bureau of Statistics, the Office of Farm Management or the Bureau of Agricultural Economics of the United States Department of Agriculture has remained in active cooperation with the states in developing the technique to be followed, in securing the field data and in interpreting the results. The significance of the movement is indicated by the fact that in 1928, twenty-three states and the Office of Farm Management of the United States Department of Agriculture were actively engaged in some form of cost accounting.

THE OBJECTIVES

Farm cost accounting has been developed as a method of economic research rather than as a matter of exact financial accounting. It is the result of efforts on the part of agricultural scientists and economists to assist farmers in establishing a method of analyzing and improving the production and business management of their farms. It is the fruit of agricultural research rather than of business accounting. While the facts secured enable one to make a balance sheet or show the profit or loss from farming, much more is involved in the detailed farm cost accounting than would be required for a simple accounting of the earnings of a farm business. The aim of those promoting this type of investigation has been to bring to light the basic principles governing the sound organization of a farm business. That this was the thought of the originators of farm cost accounting is clearly indicated in the

first publication on the subject, Bulletin No. 97 of the Minnesota Agricultural Experiment Station, published in 1906. In introducing the subject the authors say:

"The problems of farm management have been deemed so complex that few experimenters have as yet entered this field, and the general facts of farm management and of the management of the farm home have been little investigated. The parts of the farm have been studied, but the farm as a whole has received but little attention. While methods have been devised for investigating the soil, the plant, and the animal, little effort has been given to devising ways of studying the general farm plan and the farm business. The relation of one part of the farm to another and the relation of the farm to the markets and to other industries have not been brought under scientific investigation. The facts derived from detailed investigations concerning the soils, plants and animals are of great importance, but they are useful only as the farmer's training enables him to make proper use of these facts. A literature must be created based on facts which are largely yet to be worked out and illustrated by many successful plans of reorganized farms, and the pedagogics of farm management must be so developed and simplified that this subject may be taught in all farmers' schools. . . . .

"The long-continued efforts required for the necessary experiments with plans of crop rotation and of fertilizer requirements, and with cultural methods, for investigation to determine the cost of production of crops and livestock, and for the work of comparing one system of farming with another, make the work both tedious and difficult."

It should be remembered that these statements of purpose were written 25 years ago. They indicate quite clearly that even at that time farm accounting studies were not regarded in the narrow sense of mere money cost determinations. Few present day publications present a more clear or broadminded conception of the purpose and usefulness of farm cost accounting or indicate a more comprehensive appreciation of the economic problems of farming

This thought is further brought out in the list of objects sought, some of which I quote.

"1. To aid in making a study of the business of the farm that it may be systematically conducted under the best possible plans.

"2. To supply many averages which the farmer rarely secures from his own business, as cost per acre of various labor operations, and of producing field crop products and livestock products.

"3. To determine the cost per hour of man labor and horse labor on farms.

"4. To determine the yearly values consumed in farm machinery, and the value consumed per acre for the various farm crops.

"6. To secure practical data concerning the profits from the different farm animals, and to devise simple methods of making records which will determine the value of each individual animal as a producer, and the breeding value of the blood of each animal used as a breeder.

"7. To keep the performance records of dairy cows, and show reasons for profit and loss on the individuals.

"8. To secure the data necessary to supplement the records of experiments in crop rotations made by experiment stations, that the net profits from the various rotations may be compared.

"9. To determine and compare the net profits in various systems of present day agriculture.

"10. To assist the farmer so to organize his business that such arrangement of crops and livestock may be made as will give the largest net returns.

"11. To collect maps of actual surveys from many farms to be used in working out examples of reorganized field plans with systematic crop rotations.

"12. To assist in inaugurating simple systems of accounts for the farm business and the farm household.

"13. To secure data concerning the farm home, as the cost of living, the value of foods grown on the farm, and the cost of boarding hired help.

"14. To provide practical data to be used in schools, as consolidated rural schools, agricultural high schools, and agricultural colleges, in teaching the facts and principles of farm management.

"15. To aid in developing a literature on farm management,

and a class of effective teachers, editors, and general writers; and to assist in overcoming the indifference to antiquated methods in farm management."

While reference is made to costs and profits, and while the results of the first studies were expressed in money costs, the discussion of the data indicates that the purpose primarily was to learn relative costs and the interrelationships of the various enterprises making up the farm business. In making these comparisons, money costs, whether in actual exchange or as used on the opportunity cost or alternative use basis, became the common denominator. No better one has yet been found. In the passing years there has been refinement of method and some changes in the technique. The objectives remain the same. The principles involved are more clearly understood. There is greater need than ever for basic unit data about the farm business. Efficient farming is based on a knowledge of the possible combinations of the cost factors and comparative returns from the combinations made. Such knowledge can be gained only from a continued accumulation of basic financial and physical data concerning all phases of the farm business.

The modern concept of the function of detailed cost studies is that they should serve (1) as a source for basic unit data covering all phases of the farm business that will aid in determining what the returns from the farm business as a whole are, with an approximate determination of sources of profit; (2) in revealing the results that may be reasonably expected from different enterprise combinations; (3) in approximating estimates of consequences likely to result from changes in the type of organization in an area or region; (4) to indicate the most profitable enterprises or the enterprises making the largest returns on the resources used; (5) to show the most effective and profitable farm practices within the enterprise; and (6) to give always a large number of illustrations of organizations and practices that make for efficiency.

APPLICATIONS OF RESULTS

The farm cost accounting studies made by the various state experiment stations in cooperation with the federal department of agriculture have taken on a large significance. While these

individual route studies, taken singly, are somewhat localized and limited in area of application, they have, collectively, yielded an immense amount of factual data which may have national application. It is admitted that the detailed data are of the most specific benefit to the farmers on the farms where the records are taken. Here they serve as the basis for making comparisons of the relative merits of the farm enterprises. The comparisons may be in terms of costs and profits from competing enterprises or in terms of returns for labor and other instruments of production used for non-competing enterprises. From these comparisons each farmer having the records is enabled to find the weak spots in his farm business and to remedy them or to eliminate them altogether. Properly interpreted, they lead to more efficient methods of production and greater profits from operation.

There is a secondary benefit to all farms in the area of the cost study also which may be equally important. The findings from the farms under study are frequently used in conducting community farm management meetings, in institute or short course classes, and by progressive high school instructors in their regular school classes. This knowledge working in a community serves to stimulate many other farmers to begin farm record keeping and to adopt the better farming practices. A farm community cost study also furnishes a wealth of demonstration material for extension workers. No other type of farm management research makes available such valuable illustrative material. The details of the organizations showing good returns may be presented and contrasted with organizations showing poorer returns. The results from different methods and practices used in crop and livestock production may be presented and fully observed. Cause and effect may be brought to view. In this way the farmer is stimulated by having his attention called to results obtained by other farmers with resources similar to his own.

American farmers are notoriously poor accountants. Relatively few make any attempt at more than the simplest kind of records and those kept usually relate to their financial transactions, to crop yields or to livestock production. These are not complete enough to permit analysis of the business or to make possible comparisons with other farm businesses of a similar nature. While such records are desirable and of some value to the farm operator they

serve but poorly in determining the quality of the farm business.

Farm accounting has been greatly stimulated among farmers by farm accounting research. The Farm Accounting Service of Illinois, involving some 2,000 farm account book records, is based upon the detailed cost accounting records of that state. Hundreds of Minnesota farmers have taken up record keeping because of the influence of cost accounting studies in that state. Groups of farmers in New York, Iowa and numerous other states are keeping similar records and using them in analyses of their farm business. The budget-making form of projecting and comparing the results from different forms of farm organization is based upon the data secured through farm cost accounting investigations. That still wider use can be made of this type of research is plainly evident.

The data thus gathered from statistical routes by institutions connected with agricultural colleges are providing a great deal of subject matter for use in the classes in farm management and farm economics in colleges and schools. Through this medium of new literature and more specific information we can hope to teach efficient methods of farming. Aside from specific local values that these studies may have, their major values are reflected in a much larger way. They may be made the basis for defining profitable production areas of the principal crops and livestock products They give the basis for selecting enterprises for large areas and determining which combinations will be most advisable. Data tables built up from the accumulating records will become valuable sources for calculating and estimating the probabilities of costs and profits at any given time and place.

Detailed farm cost accounting studies are admittedly only a part of the farm economic research program. The farm management survey may well precede or accompany a route cost study. The farm management service to a community is a logical outgrowth of both. And these can well be followed by investigations of local marketing and distribution problems that often are found to embarrass or handicap a community or area.

It seems to me wise for the various states and the United States Department of Agriculture to enter systematically upon a program of longtime continuous research of this type in the major production areas for the purpose of providing "farm management

engineering data" which will be useful in making cross-sections of agricultural conditions in various places at any time. Such a program would in time provide a volume of invaluable source data for use in studying comparative advantages in production between competing areas and in directing the adjustment of systems of farming to changing economic conditions.

SOME RESULTS OF COST ACCOUNTS ON NEW YORK FARMS

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RETURNS from farming may be expressed in terms that apply to the farm business as a whole, or to the separate enterprises which make up that business. For example, workers in the field of farm business find use for such terms as "labor income," "labor earnings," "management return," and "return on investment" to show the financial returns from the business as a whole. In farm cost accounting, financial returns from income producing enterprises are usually expressed in terms of "returns," "income," "gain," "profit" and "loss." Prefixing "gross" or "net" to any of these latter measures may help to make the term more definite and more significant. However, the best use of these measures of financial returns from various enterprises results when they are expressed on a per acre, per head, per animal unit, per unit of product, per hour of labor, or some other such basis.

The following graphic sketch (figure 1) is not an attempt to classify and arrange all of the useful measures of financial returns from farm enterprises, but is simply an illustration of the variety of methods now used in farm accounting work. Some of the methods here suggested may be very useful in the analysis of crop accounts, but useless in the analysis of accounts with livestock enterprises. The best way of expressing financial returns for an enterprise in one region may not be the best for that same enterprise in some other region. Accounts with extensive enterprises may call for quite a different analysis than accounts with intensive enterprises.

Where labor is the scarce and high cost factor, one of the chief concerns of the farm operator is to get high returns for labor. If capital is the high cost factor, return on investment is important. If capital in the form of land is scarce or high priced, return per acre is important.

For a large part of the United States, good and dependable farm labor is expensive. Efficient use of labor is an ever increasing problem. Our farmers are very much interested in knowing what the returns are from each of their enterprises, and the

more labor they hire, the more interested they are in measuring the relative profitableness of various enterprises in terms of labor returns.

In the cooperative cost accounting work that is being carried on between New York farmers and the Cornell University Agri-

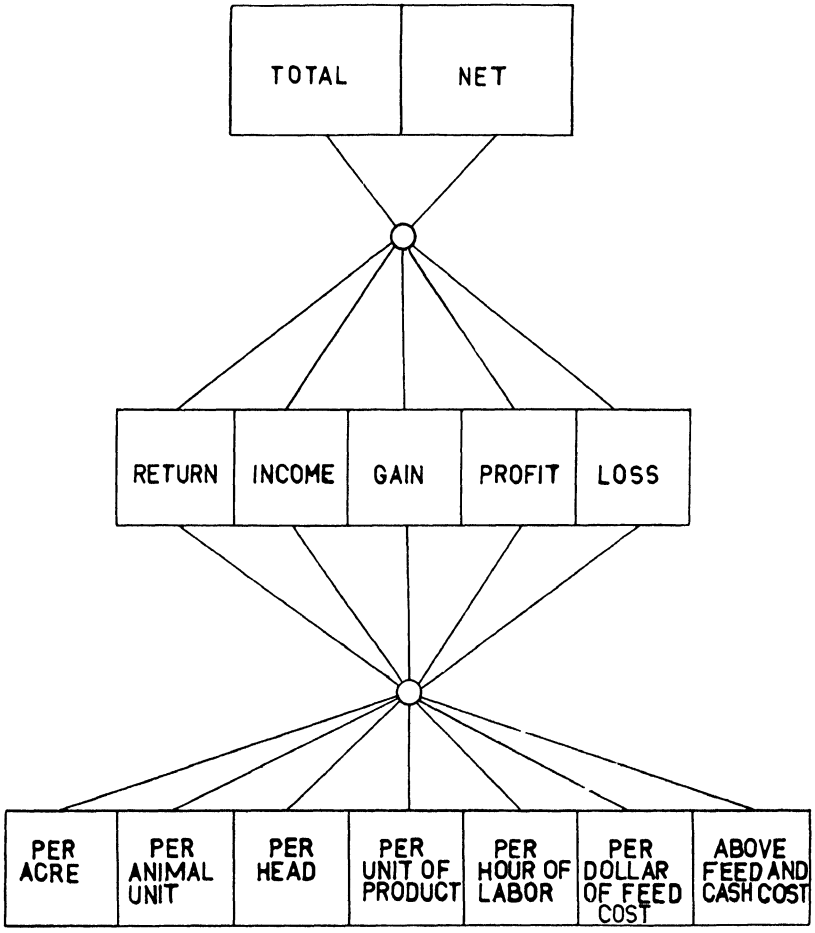

FIGURE 1. METHODS OF EXPRESSING FINANCIAL RETURNS

cultural Experiment Station, a popular and useful way of expressing the financial results of enterprise accounts is by the "return per hour of man labor." This phrase or term may be worth a brief definition or explanation.

If from the total returns from any enterprise, all costs except

those for man labor are deducted, the remainder which we might term "labor returns" represents what the farmer had for the labor on that enterprise. Dividing this remainder (labor returns) by the total hours of man labor on the enterprise gives the return per hour of labor. In other words, such a calculation shows how much of a wage any enterprise has actually paid. If costs, other than labor, exceed total returns from any enterprise, the deficit is divided by the total hours of man labor and a minus sign prefixed to the quotient. To say that return per hour of man labor on oats for the past 5 years averaged minus 21 cents, is to say that the farmers have, on the average, paid 21 cents an hour for the privilege of working on this crop.

The emphasis placed on this factor of return per hour of labor is justified on the basis of such facts as the following:

The ledger headings in the 1929 farm account books for a group of 35 selected farms in various parts of New York show a total of 54 income accounts of which 36 were crop accounts, 9 were animal accounts, and 13 were accounts with operations other than the production of crop or livestock products. In another group of farms centering around Batavia, Genesee County, New York, a region usually considered as a cash crop region, the 1929 farm accounts show an average of 14 income producing enterprises per farm. Further, one-third of the total hours of man labor on these farms was spent on dairy cattle, and one-half of the total hours of man labor was spent on livestock of all kinds. With the wide range that our farmers have in the selection of enterprises, certainly they should know something of the relative profitableness of these different enterprises. Return per hour of labor is probably the best single measure of the relative profitableness of these various enterprises.

Farm accounts in New York, covering a period of about 20 years, not only give us a good indication of average returns for a period of years, but also point out a few striking changes in the relative profits of certain enterprises—changes that are of a more or less permanent nature. Because some enterprise has paid very well, we cannot assume that it will always be profitable, or if it is unprofitable for a time, that increased efficiency may again make it profitable. Failure to make a profit on any enterprise may be due to more than a short crop, a low price for this year's crop, or low efficiency.

Consider the hay enterprise as illustrative of this point. For the seven years, 1914-1920, the average return per hour of labor from this crop on farms with cost accounts was 88 cents (table 1). For the 16 years, 1914-1929, the return per hour on hay was 47 cents, and for five years, 1925-1929, the return per hour of labor averaged 5 cents. Timothy and the mixed hay crops do

Table 1. Returns per Hour of Labor on Some of the More Important Farm Enterprises in New York

Enterprise	*Average returns per hour of labor*			
	7 years 1914-20	16 years 1914-29	5 years 1925-29	1929
Alfalfa	$ 0.97	$ 0.84	$0.81	$ 0.64
Apples	—	0.78(a)	0.83	0.83
Barley	−0.03	−0.07	−0.07	−0.08
Beans*	0.12	0.09	0.00	0.64
Buckwheat	0.07	−0.09	−0.37	−0.10
Cabbage	0.51	0.48	0.61	0.81
Corn (canning factory)	—	—	−0.02(b)	0.29
Corn for grain	0.14	−0.01	−0.14	−0.11
Cows	0.33	0.33	0.48	0.53
Hay	0.88	0.47	0.05	0.09
Oats	0.01	−0.13	−0.21	−0.73
Oats and barley	—	—	−0.30	−0.82
Oats, barley and peas	—	—	−0.18	−0.53
Peas (canning factory)	—	—	0.52(e)	0.41
Potatoes	0.55	0.71	1.25	1.47
Poultry	0.67(c)	0.55(d)	0.49	0.52
Wheat	0.57	0.23	0.19	−0.21

* The bean crop was practically a total loss on farms keeping cost accounts for the years 1925 and 1927

(a) 10 year average
(b) 2 year average
(c.) 6 year average
(d.) 15 year average
(e) 3 year average

Returns per hour of labor are calculated as follows. If the total charges except those for man labor are deducted from the total returns from any enterprise, the remainder (labor returns) represents what the farmer has as pay for the labor on that enterprise Dividing this remainder by the hours of man labor on that enterprise gives "returns per hour of labor "

not look very promising as cash crops for New York farmers. We have, in a large measure, lost our market for this kind of hay. This, apparently, is a permanent change and calls for adjustments in the systems of farming in those areas where hay was formerly a good cash crop.

Wheat paid New York farmers an average of 57 cents per hour during the period 1914-1920, 23 cents per hour for the 16 year period, 1914-1929, and an average of 19 cents per hour for

the past five years. In 1929, the short crop of wheat on New York farms resulted in an average return per hour of labor of minus 21 cents. If wheat would average $1.25 per bushel in value, the New York farmer must get a yield of 25 bushels or more per acre to earn wages on this crop.

Eastern farmers used to earn a few cents an hour growing corn for grain and buckwheat. Although profits never were high on these crops, they did add some to the total farm income. But now, farmers must pay quite a little for the privilege of growing these crops. Oats, barley, oats and barley together, and the combination of oats, barley and peas are now in the same class with corn and buckwheat. None of these crops have been very profitable to New York farmers in recent years, and give little promise of becoming profitable in the near future. These crops may be continued on a large number of farms because of their place in a definite rotation, or as catch crops, or nurse crops, or for other similar reasons. Only with yields or prices considerably higher than average, or costs much lower than average, can the eastern farmer hope to make money on the grain and mixed hay crops.

While most of the intensive cash crops, such as potatoes, cabbage, and apples are of a speculative nature, they have, in the long run, proved quite profitable on farms where cost accounts have been kept. No matter whether you consider the pre-war average, the long time average, or the average of recent years, these crops show very favorable labor returns. There is an occasional year with any of these crops when costs exceed returns, but the average for any period of years is good. In 1928, for example, some upstate New York farmers keeping cost accounts produced an average of 194 bushels of potatoes per acre at a cost of 72 cents per bushel. The average value of those potatoes was only 57 cents per bushel. In 1928, these growers received only 6 cents an hour for the time spent on potatoes, while the average cost of an hour of man labor was 43 cents. In five of the past 16 years, the average return per hour of labor on potatoes has been lower than the average cost per hour of labor. But the average return per hour of labor on potatoes for the long period is 71 cents. A comparison of the return per hour of labor and the average cost of labor shows that apples paid more than wages in all but 2 of the last 10 years; potatoes paid more than wages in 11 of the 16

years; cabbage paid more than wages in 7 of the 16 years, and alfalfa paid more than wages every year. Every year some farmers lose money on these enterprises and likewise, every year some farmers actually make a little on corn, oats and other enterprises generally considered unprofitable.

Occasionally, the New York dairy farmer is obliged to take a low rate of pay for the time he spends on the cow enterprise. Seldom is it necessary for him to donate all of his labor and then pay something for the cow's company, as is the case with most of the few New York farmers who persist in raising beef and hogs. Looking back over the returns from the dairy enterprise, we find that in 1921, New York dairymen received an average of only 10 cents an hour for all the time they spent on cows that year. On the other hand, they averaged 60 cents an hour for their time on cows in 1928. Results from the accounts with the dairy enterprise indicate that it is one of the most conservative of all enterprises for New York farmers, quite dependable year in and year out, and with serious losses very infrequent.

During the past five years, hens have paid just about as well as have dairy cows. For the period 1925-1929, hens have paid an average of 49 cents for each hour of labor, while cows have paid 48 cents an hour. In 1929 hens paid 52 cents an hour for the time spent on them and cows paid 53 cents.

The whole story concerning the relative profitableness of certain enterprises is not, of course, told in table 1. These figures are averages, and while they tell what the returns have been and give some indication of what, in general, may be expected of certain enterprises, they may be misleading to those individuals who are able to get yields or prices higher than the average, or whose costs are lower than the average.

Some of the most pertinent facts brought out by studies in farm cost accounting are the relations between yield and cost, and yield and returns. Our studies along these lines show that for practically all enterprises, high yields mean low costs and a high return per hour of labor. In all our accounts there is little indication of having reached the stage of diminishing returns. In other words, even the highest yields on farms with cost accounts were economical yields and show the most favorable returns. To be sure, costs do not decrease, nor returns increase at the same rate for all enterprises, as yield increases. In general, the more in-

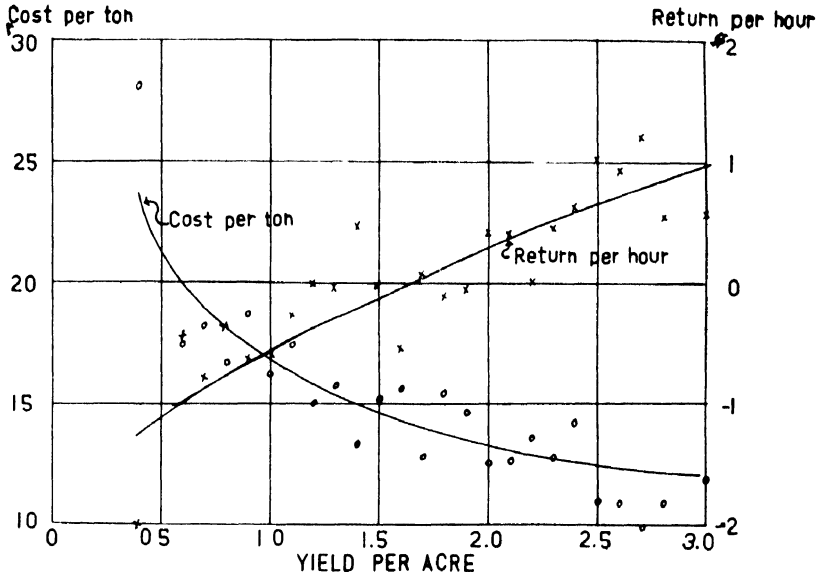

FIGURE 2. RELATION OF THE YIELD PER ACRE OF MIXED HAY, COST OF PRODUCTION PER TON, AND RETURN PER HOUR OF LABOR, 1924-1928
Based on 151 cost accounts

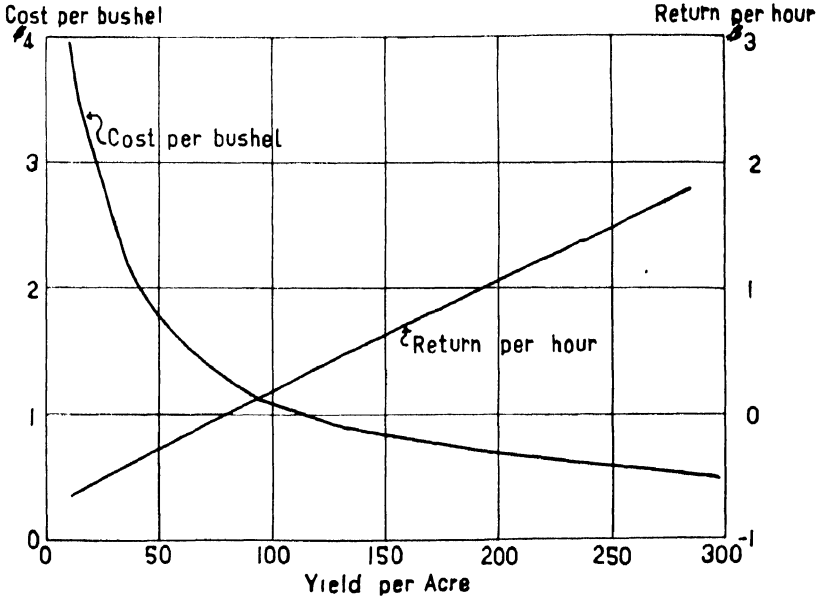

FIGURE 3. RELATION OF THE YIELD PER ACRE OF POTATOES, COST OF PRODUCTION, PER BUSHEL AND RETURN PER HOUR OF LABOR 1924-1928
Based on 90 cost accounts

Table 2. Relation of Yield, Cost Per Unit, and Returns Per Hour of Labor for Some New York Farm Enterprises, 1924-28

Enterprise	Number of accounts	Unit for yield and costs	Average Yield per acre or animal			Average Cost to produce a unit			Average Returns per hour of man labor		
			High third in yield	Middle third in yield	Low third in yield	High third in yield	Middle third in yield	Low third in yield	High third in yield	Middle third in yield	Low third in yield
Alfalfa	71	Tons	3 0	2 1	1 6	$11 11	$15 04	$15 01	$1 15	$ 73	$.47
Apples	43	Bushels	219	135	64	57	.76	1.28	1 38	.67	.44
Barley	41	Bushels	41	28	17	91	1.17	1 86	.39	02	—.64
Beans	36	Bushels	17	8	1	3.35	5 98	9.61	90	—.24	—1.27
Buckwheat	27	Bushels	24	17	9	1 18	1 78	5 04	09	— 55	—.78
Cabbage	48	Tons	125	77	40	9.11	14.00	24 69	53	60	.21
Corn for grain	41	Bushels	52	34	23	1 38	2 03	2 21	.24	— 15	—.24
Corn silage	96	Tons	11.5	7.6	4 5	6.35	7 59	11 03	—	—	—
Hay	152	Tons	2 4	1 7	1 0	12 37	14 59	16.82	51	— 10	—.35
Oats	80	Bushels	56	41	27	66	.82	1.30	29	—.03	—.51
Oats and barley	31	Bushels	48	36	20	.77	1 00	1.40	.19	— 11	—.77
Oats, barley and peas	53	Bushels	45	34	21	.75	1 05	1.52	.21	—.01	—.88
Potatoes	90	Bushels	229	136	60	67	.90	2.09	1.10	.64	.02
Wheat	81	Bushels	30	18	11	1.38	1.98	3 21	69	.13	—.64
Dairy cows	91	100 lbs milk	92 31	69 74	52 97	2.52	2 69	2 87	.45	.39	.23
Hens	43	Dozen eggs	12.1	9.8	8.3	.36	.38	.45	.70	.59	.17

tensive the enterprise, the greater the advantage of getting a high yield.

The effect of yield per acre of hay on cost per ton and return per hour of labor, is shown in figure 2. A yield of 1¾ tons of hay per acre just about pays all costs other than labor. A yield of 2½ tons per acre results in a return per hour of about 50 cents. To realize $1.00 per hour for time on the hay crop, a yield of 3 tons per acre is necessary. The range of data available indicates that cost per ton might be further decreased with an increased yield, and that also, return per hour would be further increased with an increase in yield.

Figure 3 is a similar graph for potatoes. As yield increases, the cost per bushel decreases and returns per hour of labor increases.

The selection of farm enterprises that pay well is just one of the many problems farmers have in the organization of their business. For our conditions, the average return per hour of labor on various enterprises gives some indication of the relative profitableness of these enterprises. Farm cost accounts for a few years on any farm will check or correct these general conclusions with the facts on that farm. After the selection of the enterprises on a particular farm has been decided upon, it will usually pay to work for a good yield. But with all this, we should not overlook the fact that farm profits as a whole is the main consideration. Excellence in any one enterprise does not guarantee the success of the farm business as a whole. A moderate degree of excellence in all enterprises usually results in the greatest farm profits.

METHODS AND RESULTS OF RESEARCH WORK ON THE EFFICIENCY OF HUMAN LABOR ON GERMAN FARMS

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FARM cost accounts covering a period of one hundred years or more show that the cost of human labor represents from 25 to 50 per cent of the total cost of production on German farms. In view of this fact it is surprising that we have not given more attention to the study of scientific methods for increasing the efficiency of this important factor. It is true that Albrecht Thaer and Johann Heinrich von Thuenen who were among the earlier writers in Germany on matters pertaining to agriculture, emphasized the importance of the effective utilization of farm labor. Von Thuenen, as a matter of fact, developed a mathematical formula for use in determining wage scales for agricultural laborers, which he deemed of sufficient importance to have engraved on his tombstone.

As the science of agriculture developed, however, interest centered on research in plant industry, agricultural chemistry, animal husbandry, animal nutrition, and so forth, and little or no attention was given to research in methods for increasing the efficiency of labor. The development of improved farm machinery appeared to solve the major labor problems. Only the agricultural economist gave the labor question any consideration, and his approach was wholly from the economic point of view.

Scientific studies of labor in industry have been made in the United States by Frederick Winslow Taylor and others. I first became acquainted with this work through the writings of Hugo Muensterberg, a fellow countryman of mine who has taught for many years in your universities. It seemed to me that Taylor's theories and those of his followers could be applied to advantage in devising ways and means for increasing the efficiency of farm labor. I tried to develope this idea in a paper written in 1919 at a time when German agriculture was in great distress, and when the ability of her people to work appeared to be the principal resource remaining to Germany.[1] I suggested that an in-

[1] Seedorf, J. J. W. Die Vervollkommnung der Landarbeit und die bessere Ausbildung der Landarbeiter unter besonderer Beruecksichtigung des Taylorsystems. Berlin, Deutsche Landbuchhandlung, 1919.

stitute be organized and that careful scientific investigations be made of all possible ways and means of increasing the efficiency of agricultural labor. This project was undertaken by the State of Saxony which founded an institute and an experimental farm for the study of this problem at Pommritz.

In general it may be said that we have applied the microscope to a study of the labor involved in various farm operations. A given operation is analyzed into its component parts, and careful time and motion studies are made of every element. The object of these studies is to find the most efficient way of performing each part of the operation. A method for performing the operation as a whole is then developed by combining the most effective means found for performing each of the various elements involved. Such methods of job analysis have long been effectively employed in German industry. However, the possibility of employing similar methods as a means of increasing the efficiency of labor in agriculture has been overlooked by German farmers, and as I have learned since coming here, by American farmers as well.

Little has been done in the way of standardizing labor operations. There are wide differences in the way in which the same farm operation is performed in different parts of Germany. This is true to a lesser extent in the United States. Some of these differences are due, of course, to differences in natural conditions of soil, climate, topography, and so forth. However, for the most part they appear to be largely due to the fact that farmers in the various parts of the country have merely become accustomed to performing a given task in a certain way, and continue to use the methods which their fathers used before them. It would appear that there is room for the development of a science of agricultural labor, which would have as its object the increasing of the efficiency of agricultural labor, and through increasing efficiency, the improvement of rural standards of living and the lowering of the costs of production of agricultural products.

Agricultural labor may be considered from the economic, the physical, or the social point of view. Agricultural economists have done a very considerable amount of work in Germany on the economic aspects of agricultural labor. Cost accounting in Germany is very common, and has been carried on for many years. Careful analyses have been made of the labor costs entering into the vari-

ous farm operations. In many of your own colleges excellent work is being done in this field. It may be said, however, that there is still room for further investigation along these lines.

Very little work has been done to date in studying the effect of various kinds of labor, or rather in studying the effect of the various motions involved in performing given types of labor operations, on the physical well-being of the laborer. Such studies will of necessity take us over into the fields of chemistry, physics, physiology, and other related sciences. Much work remains to be done in this direction.

Since the improvement of human welfare is the ultimate end of research work in all branches of science, we cannot overlook the importance of investigations into the social aspects of rural life. Considerably more progress has been made in this field in the United States than in other countries. Rural sociology is recognized as a special field for research, and courses in this subject are given in the majority of the agricultural colleges in the United States. Nothing of this sort has been done in Germany.

In making studies of the efficiency with which various farm operations are performed, the following factors must be considered:

1. The man.
2. The tools or machine used.
3. The type of soil, the class of crop, or the class of livestock with which he is working, and the climatic, economic, sociological, and political conditions under which he is working, and the mental attitude of the worker.

As previously stated, little has been done in attempting to determine the effect on the physical and mental well-being of the worker in performing a given kind of work. A great deal more investigational work needs to be done in this direction. We must borrow from the findings of workers in the other branches of science and apply the results to the solution of our problems.

In industry standardized methods of performing each operation, based upon careful time-motion-fatigue studies have resulted in greatly increased output per worker. Similar methods can be applied with equal effectiveness in agriculture. Let us analyze, for example, the operations involved in seeding grain with a grain drill. The time required to perform the drilling operation may be divided into the following component parts:

1. The time during which the machine is actually running.
2. The time required for turning.
3. The time required for refilling the machine.

The efficiency with which the machine is operated, measured in terms of actual accomplishment per unit of time, depends upon a number of factors such as the rate at which the machine is drawn by the tractor or horses, the time required for turning, the time required for refilling, and the amount of time, which for various reasons, is lost. The size and construction of the machine, soil conditions, the size and shape of the field, and the ability of the operator has, of course, an important bearing upon the work accomplished within a given time. The figures in table 1, which are based on a large number of investigations made near Göt-

Table 1. Results of Time and Motion Studies of Grain Drilling Operations On a Large Number of Farms Near Göttingen, Germany

	Range	*Average*
Rate of travel (meters per minute)	53–95	70
Time required for turning (minutes)	0 53 1 16	0 82
Time required for filling (minutes)	1 05 3 75	2 06
Distance traveled per hour of working time (meters)	2059 3629	3184

tingen, Germany, illustrate the variations existing in the time required to perform certain operations.

The effect of the length of the field upon the per cent of the total working time actually spent in drilling, is shown in figure 1. The drill was in actual operation approximately 80 per cent of the total working time in the fields 500 meters in length, while it was in actual operation only between 50 and 60 per cent of the time in the fields 100 meters in length. Stated in another way, the percentage of lost time, that is time spent in filling, turning, and so forth, was over twice as great in the short fields as in the larger ones.

The results of some of our studies are rather surprising. In plowing it is the practice on many farms in Germany to use both horses and oxen in the same field. Under such circumstances, of course, the slower moving oxen set the pace. Our studies showed that the number of acres plowed per day by four teams of horses and a team of oxen working in the same field was

actually less than the number of acres plowed per day by the same four teams of horses working alone (figure 2).

Nearly all types of farming operations requiring the use of human labor have been investigated in Germany during the past few years in some one of the various institutes. Dr. Derlitzki at Pommritz, and Dr. Ries at Bornim, have made studies of the labor operations in connection with the planting and harvesting of potatoes. A very considerable amount of work has also been done at Pommritz on the culture of sugar beets.

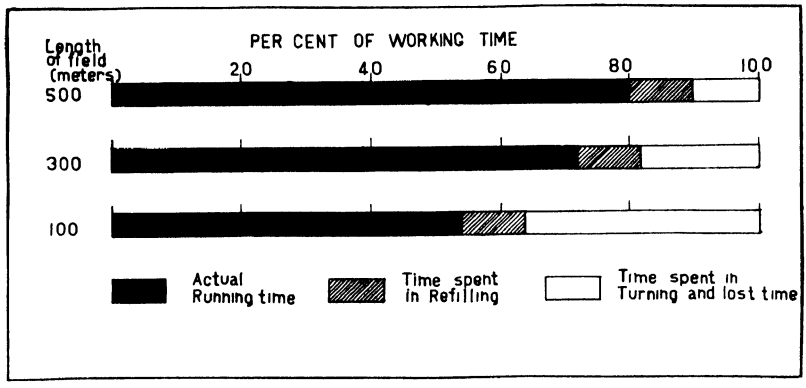


FIGURE 1. PERCENTAGE DISTRIBUTION OF WORKING TIME IN DRILLING GRAIN IN FIELDS OF DIFFERENT LENGTHS

The capacity of the grain drill was 75 kilograms

Dr. Buchholz of my own institute at Göttingen has made a study of the labor methods used in cutting asparagus in one of the most important asparagus producing areas of northern Germany. The asparagus is all cut by hand. A study was first made of the types of knives used; the material of which they were made, and their shape, length, and weight. None of the knives in use were found to be entirely satisfactory; about 25 per cent were classified as good, 50 per cent as fair, and the remainder as poor. It was found that there were considerable differences in the way in which different people perform the operation of cutting asparagus. Time and motion studies were made of each method. The number of motions made with each hand in performing the operation were counted (table 2).

You will find the same wide variations if you investigate almost any kind of farm labor operation. A variation in the rela-

tive time required to perform a given task of from 100 to 226, such as is shown in table 2, is very great. Use of inefficient methods means loss of time and loss of money.

I have read with interest during the past year of the corn-husk-

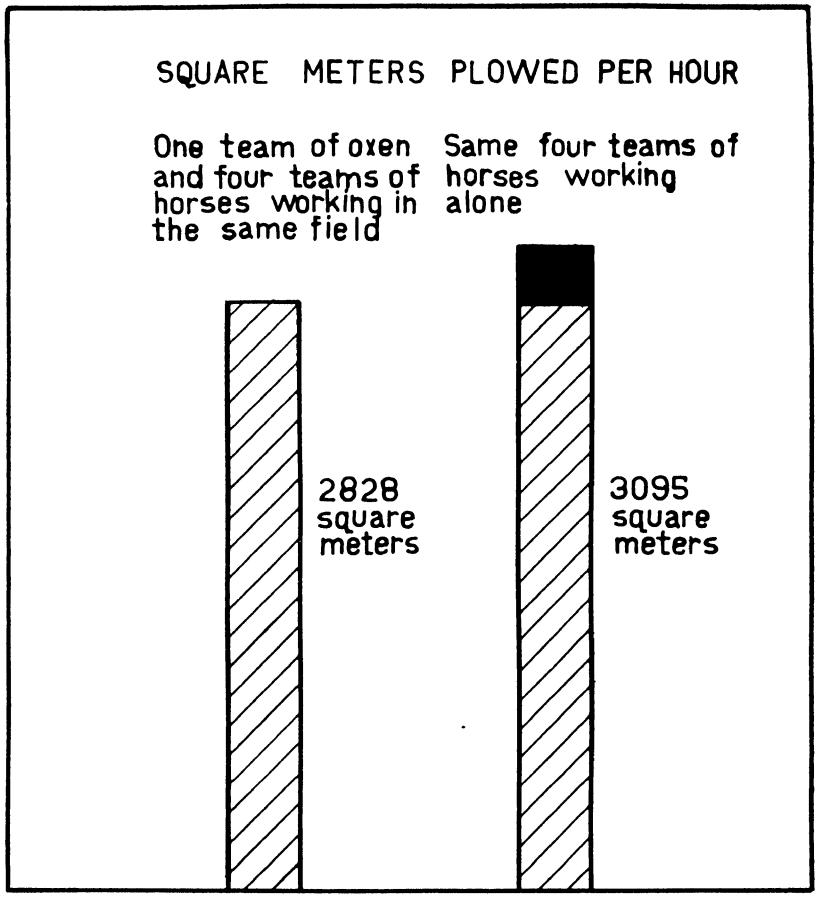


FIGURE 2. NUMBER OF SQUARE METERS PLOWED PER HOUR BY ONE TEAM OF OXEN AND FOUR TEAMS OF HORSES WORKING TOGETHER IN THE SAME FIELD, AND BY THE SAME FOUR TEAMS OF HORSES WORKING ALONE

The oxen and horses working together travelled at the rate of 1.9 kilometers per hour, while the same horses working alone travelled at the rate of 2.6 kilometers per hour.

ing contests held in the United States. To make such contests of the greatest possible use, time and motion studies should be made at the time such contests are held.

One of the principal objects of a science of agricultural labor

is to find ways and means of keeping the agricultural population healthy, through reducing to a minimum undue fatigue. A beginning has been made in studying fatigue at Pommritz and at Göttingen, where the methods developed in the field of human physiology have been employed. Through the use of a respiration apparatus it is possible to measure the amount of energy used in performing a given piece of work. An experiment was carried out under laboratory conditions at Göttingen to determine the amount of energy required to perform the motions incident to picking up potatoes in each of three different ways. Small wooden balls of about the same size and weight as potatoes were

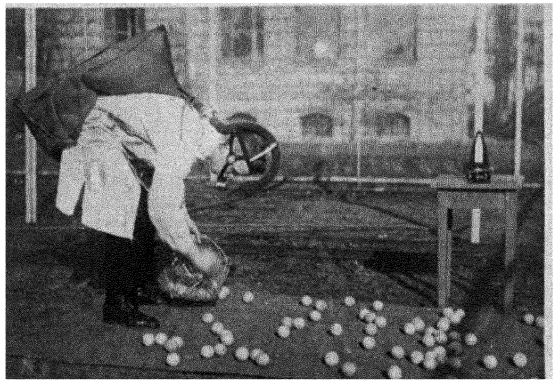
Table 2. Number of Motions Made in Cutting Asparagus by Different Methods

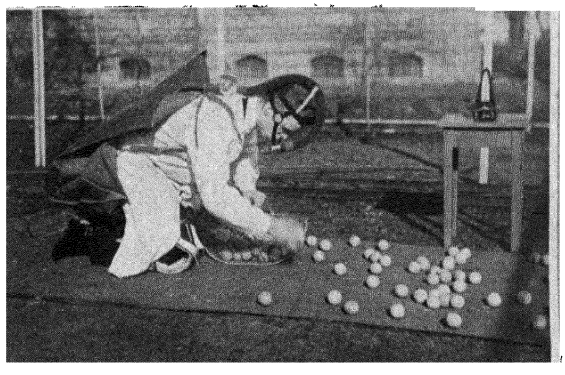
Method	Number of motions			Relative amount of time required
	Left hand	Right hand	Total	
I	8	1	9	161
II	5	7	12	193
III	4	4	8	100
IV	3	8	11	226
V	7	6	13	194

used in the experiment. The person performing the work picked up the balls while in each of three different positions (figure 3). The apparatus used for supporting the body shown in the figure is a machine invented in Denmark which is used to some extent in thinning beets. The amount of energy required to perform the work in each of the three different positions shown in the illustrations, is given in table 3. In thinning beets the relatives were as follows: While bending over, 100, while kneeling, 94.5, while supported in the machine, 80.9.

Experiments have been carried on at Pommritz to determine the effect of the weight of the individual grain bundle upon the amount of energy required to load a wagon of bundled grain. A bundle weighing 7.5 kilograms was found to be the best size. More energy was required to load the wagon when either smaller or larger bundles were used. Many other experiments have been carried out along somewhat similar lines.

The human labor requirements of agriculture have, of course,





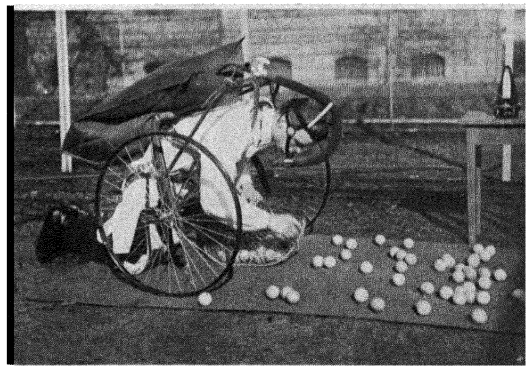


FIGURE 3 MEASURING THE AMOUNT OF ENERGY REQUIRED TO PERFORM A GIVEN PIECE OF WORK WHILE IN DIFFFRENT POSITIONS, BY MFANS OF A RESPIRATION APPARATUS

The number of calories of energy used in performing the work in each of the thiee posttions is given in table 3.

been greatly reduced through the introduction of farm machinery. At the same time it must be kept in mind that machines are not well adapted to certain types of work, and that in any case the machines must be operated by human labor. Machines should be designed not only to efficiently perform an actual mechanical operation, but in addition they should be so constructed as to reduce to a minimum the amount of human energy required to operate the machine. This latter consideration has frequently been overlooked by our engineers in Germany.

Farm lay-out and size of farm have an important bearing upon labor requirements. There is a great deal of difference in the lay-out of the typical German and of the typical American farm.

Table 3. Amount of Energy Required to Perform the Work of Picking Up Potatoes in Each of Three Different Positions*

Position of worker (figure 3)	*Calories of energy used in 5 minutes*	*Relative*
Bent over	19.2	100
Kneeling	15.7	81.8
Supported in machine	11.1	57.7

* Based on laboratory experiments carried on at the University of Gottingen.

In Germany the majority of farmers live in villages rather than on the farm. Some of the fields are located at very considerable distances from the buildings, and the fields are frequently small and irregular in shape. Under such conditions it is impossible to make efficient use of labor. In the United States on the other hand the farmer lives on his farm and can so locate his buildings as to reduce travel to and from the field to a minimum. He can in most cases arrange his fields as to size and shape so as to permit of the efficient use of machinery. I must say, however, that in driving through the country I have seen many irregular shaped fields which were not of the best size for efficient operation.

It is sometimes possible to improve the shape of a field through exchanging land with an adjoining farmer. A map of each of two fields in Pommritz before and after such an exchange is shown in figure 4. The saving in the time required to plow, cultivate, harrow, drill, and hoe the fields following the exchange of the land is given in table 4.

The importance of the shape of a field varies inversely as its

size. Small irregular shaped fields do not permit of the efficient use of labor. The economies effected through the consolidation of small irregular fields into larger fields of a somewhat better shape are illustrated in figure 5.

The location and construction of the farm buildings is another factor which has an important bearing upon labor requirements. The type of farm buildings used in Germany differs somewhat in different parts of the country. In most cases, however, the cattle

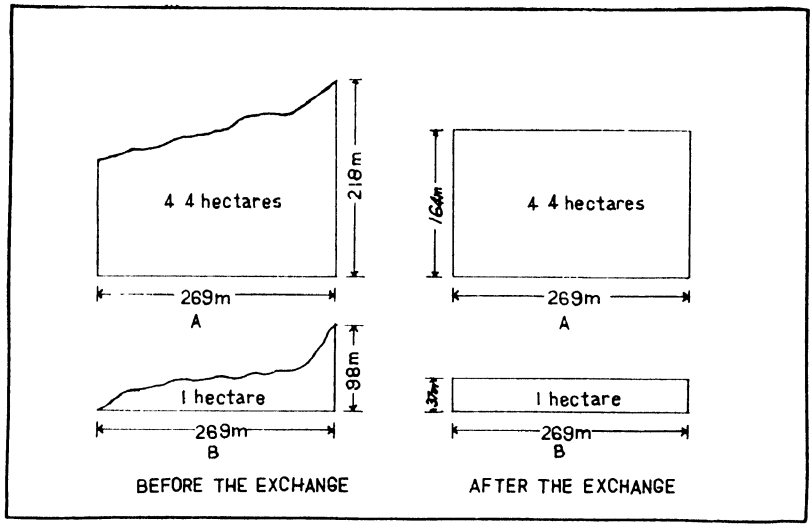


FIGURE 4 CHANGES MADE IN THE SHAPE OF FIELDS BY EXCHANGING LAND WITH ADJOINING PROPERTY OWNERS, POMMRITZ, GERMANY

Small, irregularly-shaped fields do not permit of the efficient use of labor. Generally speaking, fields which are rectangular in shape can be most efficiently worked (table 4).

and horses are housed under the same roof as the farmer and his family. One end or one side of the building is used as the house, and the remaining end or side is used as a cattle and horse barn, and has a storage for grain and hay. Two typical buildings of this type of construction are shown in figures 6 and 7. Such an arrangement greatly reduces the time required for going back and forth between the house and barn. Many buildings of this type are not, however, conveniently arranged, which results in the loss of much time and labor. Frequently a rearrangement could easily be made which would greatly reduce the

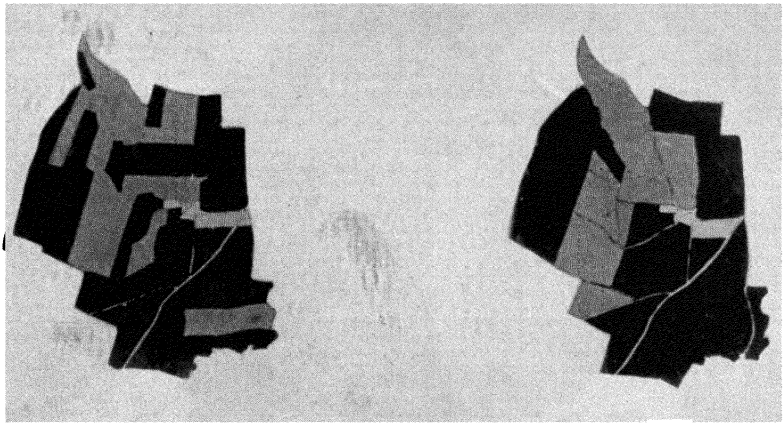


FIGURE 5. ECONOMIES IN THE USE OF HORSE AND MAN LABOR CAN SOMETIMES BE EFFECTED THROUGH CONSOLIDATING SMALL, IRREGULARLY-SHAPED FIELDS INTO LARGER FIELDS OF A BETTER SHAPE

Before the small fields were consolidated, three men, three women, and three horses were required to work this farm. After consolidation only two men, two women, and two horses were required to do the work.

FIGURE 6. A FARM DWELLING IN HANOVER

The farmer and his family live in the end of the building shown in the background. The horses and cattle are stabled on the ground floor in the forepart of the building, while the second story of this part of the building is used as a storage for grain and hay.

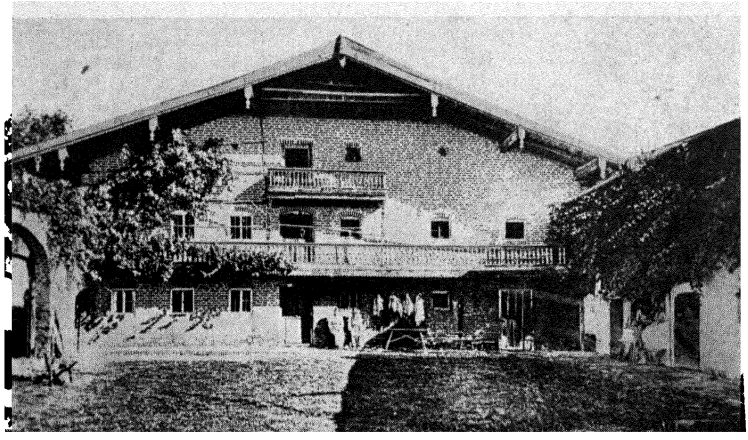


FIGURE 7. A BAVARIAN DWELLING

The farmer and his family live in the side of the building shown at the left. The horses and cattle are stabled on the ground floor in the side of the building shown at the right, while the second story of this part of the building is used as a storage for grain and hay.

labor requirements. This applies not only to the barns but to the houses as well.

I have found many well-designed barns in the United States. However, the lay-out of the farmstead is frequently very poor. Apparently no system was followed in the arrangement of farm buildings relative to one another. In many cases the house was at a very considerable distance from the other buildings. It would seem that the danger of fire has been somewhat exaggerated. The loss of time and labor resulting from poor building arrangement

Table 4. Percentage Saving in the Time Required to Perform Certain Field Operations Resulting from an Improvement in the Shape of the Field Through Exchanging Land with Adjoining Property Owners*

Field Operation	Saving in time	
	Field A (4 4 hectares)	Field B (1 hectare)
	(Percent)	(Percent)
Plowing	5	24
Cultivating	4	39
Harrowing	9	38
Drilling	9	40
Hoeing	8	38

* See figure 4 for shape of fields before and after the exchange of land.

is usually a more important expense item than the cost of fire insurance.

Labor saving devices such as elevators for hay, grain, and straw, are to be found in many farm buildings in Germany, although they are still not as common as we would like to see them.

When we first started our investigations, our work was not received with much enthusiasm by the farmers. The majority of them were of the opinion that no one knew more about organizing farm work than did an experienced farmer. This, of course, was the same attitude taken years ago toward scientific work in the fields of plant industry and animal nutrition. After awhile, however, when we had secured some results, they began to see that the problems which we were attempting to solve were nothing more than the problems confronting every good farmer in the planning of his work. Farmers operating the larger farms first became interested. They employed a large amount of hired labor

and had tried to make use of systems of wage payment worked out under the Taylor system. Agricultural labor in Germany is for the most part paid on a time basis, although before the war a considerable amount of piece work was done. After the war, due largely to the activities of the labor unions, the piece work system of payment was abandoned. After completing certain of our investigations, we recommended a bonus system of wage payment, known as Pensumpraemienlohn. Under this system the worker gets a certain daily wage, and upon the completion of a given task, he receives a premium or bonus. This system has worked out very well in those cases where sufficient care has been taken in working out the details of the scheme. A careful analysis must be made of each job to be performed. It is impossible to make general recommendations because conditions change not only from farm to farm but also from field to field, and sometimes from day to day, or even from hour to hour. In some instances the farmer would not make the necessary time studies, but attempted to arrive at a satisfactory basis of wage payment by setting up rough standards based upon our findings. In the majority of such cases the farmers lost money or the laborers were dissatisfied. As is usually the case in such instances, the farmer blamed the system rather than himself.

In recent years piece work has again been introduced to a certain extent. Our studies show that the use of piece work and bonus systems of wage payment have increased the efficiency per worker from 30 to 50 per cent.

We have learned that a willingness to work on the part of the laborer is equally as important a consideration as is his physical ability to work. One of our greatest tasks is to devise ways and means of keeping our laborers contented and willing to work as efficiently as possible. The small, independent operator, who has as a motive his own self interest is generally considered to be the most industrious and efficient of agricultural workers. However, there are, of course, wide differences between individuals even within this group. It should be our object to keep an able and industrious class of people on our farms. We have already lost many of our best people to the cities.

It is, of course, impossible to make as efficient use of labor in agriculture as in industry. However, there is a great deal of agricultural labor in Germany which is not efficiently used due

to the fact that the farm business is poorly organized. By a careful selection of crop and livestock enterprises and by the use of a carefully planned crop rotation, many economies in the use of labor can be effected. Each day offers many opportunities either to save labor or to waste it. If books are kept, and if each day's work is carefully planned in advance, many mistakes will be avoided. Many German farmers are making much more efficient use of their labor through the use of such methods.

It is difficult for the individual farmer to make the careful investigations necessary in order to work out the most efficient methods of performing various farm operations under his particular conditions. In order to overcome this difficulty, the German Agricultural Society (Deutsche Landwirtschafts Gesellschaft) created some ten years ago a special division to make studies of this kind. Specially trained college graduates were furnished the small local associations of farmers, known as Landarbeitsringe, to make the necessary labor studies. Some of the results of their work have been published.[2] The method of organizing these "rings" and the methods used in working out various problems will shortly be published by the Institute of Agricultural Economics at the University of Göttingen, Göttingen, Germany.

We have but made a beginning in this work. A certain number of other countries have already followed our example in making studies of this sort. The problem of how to use the labor employed in agriculture most efficiently is an international one. There are very few countries which do not have something to learn from the experiences of other countries. It would be of great scientific value if studies were made in every country in the world of the methods employed by the most efficient farmers in the use of labor, and if careful scientific descriptions were available of the methods used in performing each of the various farm operations.

Our scientific research is only a means to an end, namely, to educate our rural population in the best methods of carrying on their work. In Germany a great deal of work has been done in training our people in schools and colleges. During the past month I have seen in the United States some of the finest of agricultural colleges. However, up to the present time very little work

[2] See bibliography, pages 964-966.

has apparently been done in the training of agricultural labor. Most of our agricultural colleges in Germany have taken up work along this line during the past few years. Many courses for extension workers, farmers, and farm laborers have been given at the experimental farms at Pommritz and Bornim. Recently some of the larger farms have given short training courses for their apprentices. There are a number of schools which have been established for sometime, for training workers for the dairying and hog raising industries. Our numerous agricultural schools have also begun to give instruction along these lines.

As labor is not so plentiful in the United States as in Germany or in other European countries, I am convinced that there is a large field for scientific investigations of the kind which we have been carrying on. There is no question but that the results would pay for the effort and money put into the work.

BIBLIOGRAPHY

*Balkenholl, Hans. Deutsche Ackerwagen. Eine arbeitswissenschaftliche Studie. Diss. Göttingen, 1929.

Bartel, Reinhold. Prämienpensumlohn und Pensumberechnung bei Gespannarbeiten. Bücherei für Landarbeitslehre, Berlin, 1926.

v. Bismarck, L. Über den Einfluß von Anstellung und Ganglänge beim Mähen mit der Sense. Diss. Göttingen, 1928.

v. Bismarck, L. und Buchholz, H. Methodik und Technik der Arbeitsbeobachtungen in der Landwirtschaft. Bücherei für Landarbeitslehre, Berlin, 1930.

v. Bismarck, L. und Buchholz, H. Göttingen Leistungstabelle. Berlin, 1929.

Blome, Curt. Studien über Landarbeit in den Vereinigten Staaten. Diss. Göttingen, 1929.

*Buchholz, H. Das Spargelstechen. Eine arbeitswissenschaftliche Studie. Diss. Göttingen, 1930.

Delille, Kurt. Die wichtigsten landw. Handgeräte und ihre Anwendungsweise unter Zugrundelegung der Verhältnisse im Kreise Marienburg (Hann.). Diss. Göttingen, 1925.

Derlitzki, Georg. Das Taylorsystem und seine Anwendung in der Landwirtschaft. Leipzig, 1921.

Dralle, Edmund. Vergleichende Untersuchungen über landw. Handgeräte, Arbeitsmethoden und Leistungen in nordhannoverschen Heidebetrieben. Diss. Göttingen, 1927.

Feige, Georg. Das Tariflohnsystem in Spiegel von 200 ober-und niederschlesischen landw. Betrieben. Berlin, 1929.

Felber, G. W. Der menschliche Arbeitsaufwand der provinzialsäch-

sischen Landwirtschaft in den einzelnen Arbeitsabschnitten. Arbeiten der Landw. Kammer für die Prov. Sachsen, Heft, 51, Halle, 1928.

Herrmann, H. G. Der Aufwand an menschlicher Arbeit in der Landwirtschaft und seine Schwankungen im Laufe des Jahres. Diss. Halle, 1927.

Hesse, Paul. Über Leistungsfähigkeit und Arbeitsleistung. Ein Beitrag zur praktischen und experimentellen Landarbeitsforschung. Diss. Göttingen, 1922.

Hesse, Paul. Die Bestimmung landw. Arbeitsleistungen mit Hülfe von Arbeitsstudien. Berlin, 1925.

Hubmann, J. W. Ziehkuhhaltung. Diss. Göttingen, 1929.

Jacobs, Ferd. Mensch und Handarbeit im landw. Betriebe. Diss. Göttingen, 1925 (Maschinenschrift).

Joachim, Hans. Landarbeits-Organisation. Diss. Göttingen, 1930.

Keller, Karl. Der erzieherische Wert der landw. Arbeit in der Fürsorgeerziehung. Diss. Göttingen, 1924.

*Kleinknecht, Karl. Mensch, Arbeit und Leistung in der Landwirtschaft. Untersucht in 2 Großbetrieben im Kreis Halberstadt. Diss. Göttingen, 1929.

Kühnlein. Der Arbeitsverbrauch in bäuerlichen Betrieben. Kühn-Archiv, Band 7, Heft 2-3, Jena, 1916.

Lüders, W. Die Erhöhung der landw. Arbeitsleistungen durch Anwendung des Taylorsystems. Berlin, 1924.

Mattheus. Erfahrungen mit reinen Prämienlöhnen. Breslau, 1928.

Münzinger, Adolf. Der Arbeitsertrag der bäuerlichen Familienwirtschaft. Berlin, 1929.

Münzinger, A. Die Arbeitskurve der einzelnen Feldfrüchte. Berlin, 1928.

Oudemans, Th. Ch. Die Ackerwagen Hollands, eine arbeitswissenschaftliche Studie. Diss. Göttingen, 1926.

Peters, August. Arbeitsverfahren und Arbeitsleistungen in der Landwirtschaft. I. Großbetriebe, Arb. der D.L.G., Heft 360, Berlin, 1928. II. Bäuerliche Betriebe, Arbeiten der D.L.G., Heft 368, Berlin, 1929.

Pross, Walter. Untersuchungen über die Interessierung des Landarbeiters am Betrieb des Arbeitgebers unter besonderer Berücksichtigung der Frage der Ertragsbeteiligung. Diss. Berlin, 1927.

Ries, L. W. Erziehung zu Arbeitswillen und Arbeitsfreude in der Landwirtschaft. Berlin, 1926.

Ries, L. W. Leistung und Lohn in der Landarbeit. Berlin, 1924.

Sannes, Helmuth. Die wichtigsten Handgeräte der Prov. Hann. und die Arbeitsverfahren im Kartoffelbau. Diss. Göttingen, 1926.

Schönberg, Max. Ein neues Ziel der landw. Arbeitsforschung. Leipzig, 1928.

Seebaß, E.-A. Geräte und Arbeitsstudien beim Zuckerrübenbau in verschiedenen Rübenbaugegenden. Diss. Göttingen, 1925.

Seedorf, W. Die Vervollkommnung der Landarbeit und die bessere Ausbildung der Landarbeiter unter besonderer Berücksichtigung des Taylorsytems. Berlin, 1919.

Seedorf, W. Landarbeitslehre, Friedrichswert, 1924.

Seedorf, W. Die internationalen Aufgaben der Landarbeitswissenschaft. Internationales Landw. Institut. Rom, 1928.

Steding, Friedrich. Bedeutung und Anwendungsmöglichkeiten psychotechnischer Methoden zur Förderung der Landarbeit. Diss. Göttingen, 1925, Dessau, 1925.

Steding, Friedrich. Der Einfluß der Betriebsgröße auf die Betriebsorganisation unter besonderer Berücksichtigung des Arbeitsbedarfs. Berlin, 1926.

Stieger, Georg. Der Mensch in der Landwirtschaft. Berlin, 1922.

*Tismer, Joh. Geschichte der Landarbeit. Diss. Göttingen, 1930.

Vahlbruch, Rudolf. Ausgleich der Arbeitsspitzen. Berlin, 1930.

Waslé-Range. Leistungslohn und Leistungsbestimmung für Gespannarbeit. Stettin, 1929.

Weber, R. Arbeitsbedarf und Arbeitsverteilung bei verschiedenem Anbauverhältnis der Früchte. Berlin, 1930.

Westermaier, K. Die Arbeit der Gespanne im landw. Betriebe. Friedrichswert, 1925.

"Die Landarbeit." Beilage der Zeitschrift "Deutsche Landw. Presse."

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* Not published as yet.

THE ORGANISATION OF LIVESTOCK INSURANCE

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ALTHOUGH the insurance of livestock has been undertaken in Great Britain for a matter of about 200 years, the progress made both in the number of livestock insured and in the organisation of this class of business is disappointing. During the 17th and early 18th centuries a number of insurance companies of a mutual character were founded with the object of covering livestock risks, chiefly horses, but the life of these companies was as brief as the risks they insured and they were quite unequal to meet the demands made upon them. The frequent bankruptcies resulting in many unsatisfied claimants made it very difficult for those companies who were to follow, but from 1844 when the Farmer's and Grazier's Company was formed until today, a large number of companies have undertaken the insurance of farm livestock. These are in the main, however, joint stock companies with other important and profitable insurance interests than livestock risks. From inquiries made there is no doubt that the amount of insurance against death from disease or accident, placed on farm livestock by these companies, is very small. In fact I would say that 90 per cent of the premium income from the insurance of livestock of all these companies is obtained from insuring specific animals against special risks such as foaling, castration, transit, and so forth.

Generally speaking, only cattle and horse risks are covered and the premium rates for cattle vary from 4 per cent for fattening cattle to 7½ per cent for dairy cows. The risk of death from tuberculosis, however, is not included in the above rates unless the insured animals have passed successfully a tuberculin test. When tuberculosis is included in the proposal a further 2½ per cent is usually charged. Compensation paid is generally the full market value except in certain cases when only two-thirds of the value is paid.

By far the most important class of horse insurance is the risk attendant on foaling. Brood mares can be insured either for 30 days commencing with foaling or six months or more from the date of foaling. The premiums vary from 3¾ to 7 per cent.

Similarly horses used for agricultural purposes can be covered against death from disease or accident at rates of premium varying from 4 to 8 per cent. Briefly, the above are the risks involved and rates of premiums usually charged. It is well to remember, however, that although there are facilities open to the farmer to cover the many risks involved in his business, they are not such as to make it a feasible financial proposition for his serious consideration. After all it can hardly be expected of the farmer to insure a dairy herd of 30 cows at the rates of premium prevailing at present which in the example given would require approximately £70 not including the risk of tuberculosis. In this example it is good business for the farmer to stand his own losses.

The tariff and non-tariff companies make no attempt to develop livestock insurance as they do other classes of insurance risks, and even when it is undertaken the large proportion of the insurance written covers special risks, particularly foaling and transit, and not the risk of death or accident of commercial farm animals. One insurance company official has maintained that livestock insurance is not one of the most lucrative of insurance risks as evidenced by the small margin of profit made by even those companies who make it a special feature. One can readily believe this statement and the small financial return is due not to low premium rates but to low premium income. It appears that the big insurance organisations, more interested in other and more profitable branches of insurance, consider that the rates quoted for livestock risks can not be lowered however prohibitive they may be to the farmer. The facilities offered by the joint stock companies at the present time are not, in the opinion of farmers, sufficiently attractive to induce the average farmer to even consider the insurance of his livestock.

In addition to the tariff and non-tariff companies undertaking the insurance of livestock risks we have in England a number of small mutual insurance societies better known as cow and pig clubs The Ministry of Agriculture ascertained that there were over a thousand pig insurance societies and approximately 150 cow insurance societies in England immediately before the war. A survey which we made in 1926, however, clearly showed that both in numbers and membership these small societies have rapidly declined since 1913. Of over 800 known pig clubs in 1911 only 300 were traced in 1926. Taking 1913 as indicating a 100 per

cent membership and pigs insured, the corresponding figures for 1926 would be 74 and 79 per cent respectively. The decline in the numbers and membership of the cow clubs has been even more severe.

Both the cattle and pig insurance societies are mutual organisations consisting mainly of very small holders and cottagers in the district where the society has been formed. All the societies have some form of rules but these are not in any way as comprehensive and binding on the member as are the rules of similar continental societies. The administration of such a society is in the hands of a president, secretary, and a management committee of from four to six members. With a few exceptions, all the societies charge an entrance fee on new members ranging from 6 pence to 3 shillings 6 pence per animal in the case of pigs and 2 shillings 6 pence to £1, 10 shillings per animal in the case of cows; that is, roughly, from 10 to 80 cents and from 60 cents to $7. Premiums for pigs vary from 1 shilling to 6 shillings per animal per year, and for cows from 2 shillings to 12 shillings. Compensation varies in different societies—some paying full market value others two-thirds of that value. The growth of these local mutual insurance societies is an expression of mutual dependence and co-operation and there is no doubt that many of these small mutual associations have been very successful and have realised their primary object of covering the livestock risks of the cottagers at very low premium charges. They have not, however, attracted the medium- and large-scale farmers and as at present constituted they can not possibly tackle livestock insurance on a big scale. As experiments in mutual livestock insurance the history of these small societies is interesting, and within a limited sphere, they have been commercially successful; but as long as they remain isolated societies without the advantages of either re-insurance or federation it is quite impossible for them to make any substantial contribution to the solution of livestock insurance in Great Britain.

Mention should also be made of another form of mutual insurance which has developed of recent years in Great Britain. I refer to slaughter insurance. Owing to the stringently enforced regulations governing the sale of meat, butchers are liable to suffer heavy losses on account of animals being condemned as unfit for consumption. With a few exceptions the butchers them-

selves organise an insurance fund to cover themselves against the risk of meat condemnation and farmers are not asked to contribute to the scheme. One association investigated had approximately 140 butcher members insuring annually 14,000 cattle. It was found very early in the history of this society that cows were a very unprofitable class and had to be abandoned. The premiums charged for other classes of cattle vary from 1 shilling 6 pence per head for bullocks and heifers, to 7 shillings 6 pence for heifers once calved. Compensation is paid at the rate of two-thirds the market value.

Another society similar in character but involving both farmers and butchers and administered through an auction mart is an interesting example of what can be done in the direction of neutralising losses suffered through unforseen causes. This society levies a half penny per pound sterling of the price realised in the auction, on both the farmer and the butcher and the full value of the beast is paid in the case of a confirmed claim.

The fund covers the risk of tuberculosis and does not include any other disease risks. A comparison of the two slaughter cattle insurance associations described above provides the following points of distinction. In the first place, the auction mart insurance fund covers its members only against the risk of tuberculosis whereas the other society insures against all infectious and contagious diseases. Secondly, the former definitely limits the insurable risk to two classes, bullocks and heifers. Lastly, there is a very important difference in the assessment of premiums. The auction mart fund collects its premiums from both the farmer and the butcher on the basis of a given sum per pound sterling, the other society charging a fixed premium per head.

Briefly, the above are the existing forms of organisations undertaking the livestock insurance business in Great Britain, but the farmers, generally speaking, do not take advantage of the facilities offered for insuring livestock risks other than the special risks mentioned earlier. Is it the insurance organisations or the farmers that are responsible for this condition of affairs?

It is sometimes maintained that the financial institutions of England have been developed to meet the needs of the manufacturing industries and of commerce and not the needs of agriculture. Banking principles, for example, have been evolved to meet the credit requirements of our big industrial and commercial concerns,

and it is the opinion of many that effective credit facilities for the farmer have yet to be evolved. Can the same reasoning be applied to insurance? During the 19th century the development of practically all forms of insurance was rapid. The risks involved, particularly in some forms, were scientifically evaluated and the rates of premium were calculated not so much on competition as on the evidence of long periods of statistical investigation. With the rapid growth of industrial and commercial activity since 1850 the insurance offices have realised that only through efficient organisation and a strong financial status is it possible to meet the increased demands for provision against loss of life and property. Today a business man can insure his property, his workmen and his life for large amounts with complete confidence that should the calamity happen against which he is protected he will obtain full satisfaction.

The farmer has also every facility for insuring his house, farm buildings and stock against the hazard of fire and his workmen from accidents. Agriculture, however, in many respects is distinct from all other industries, and the principles which would apply in the one do not necessarily apply in the other.

Capital invested by the farmer in the form of buildings, harvested crops, growing crops, livestock and labour is even today open to many risks of partial or even complete destruction. Within the last three decades considerable progress has been made in the prevention of disease amongst livestock and crops and naturally such progress lessens appreciably the risks of losses in production. There are, however, instances where the outbreak of fire, the ravages of a disease or the inclemency of the weather cannot possibly be forseen. Under these circumstances the farmer is almost powerless and his only safeguard is insurance. Further, the farmer has his capital invested in many different enterprises, the risks involved varying in importance for each enterprise. Insurance of this kind, from the insurer's standpoint, demands a great deal of supervision to overcome what is generally known as moral hazard. This, needless to say, is not peculiar to agriculture but it is undoubtedly far more difficult to overcome. In this connection it is pertinent to ask if the present system of large joint stock insurance companies, their interests not mainly concerned with agriculture, can ever overcome some of the difficulties peculiar to farming and at the same time cover their risks at an attractive

premium. It is readily admitted that when farming risks resemble those found in other industries the joint stock company form of organisation can give complete protection at a fair premium payment. When, however, the farmer wants to cover his special risks, for example, to insure his crops against hail or disease, his livestock against the risk of mortality, the present system, judging only by results, does not easily lend itself to meet this demand. The joint stock form of organisation necessarily carries heavy overhead charges, is usually centralised in administration and is essentially a profit making concern which makes it very difficult for the companies to offer the farmers insurance cover on attractive terms. The mutual form of insurance organisation, more common on the Continent of Europe than in England, has certain decided advantages over the joint stock form in that it does not have to provide large sums of money for overhead charges and profits. However, even if the mutual forms are organised to cover a wide area the problem of supervision is still formidable.

Another difficulty with the risks peculiar to agriculture is the question of measurement. The fixing of premiums can not be left to guess work and the competition of the market. With the application of the principles of insurance to human life, considerable actuarial progress has been made in evaluating risks. In life insurance today the mathematician is in a position to calculate the probable length of any individual's life from his present age. Estimation from statistical data of percentage losses to total losses based on complete mathematical measurement of probability is equally applicable to risks other than those of human life. In agriculture the farmer carries on his own shoulders the burden of many risks which are measurable, and insurance would appreciably lighten this load. The difficulty, however, in connection with such risks as hail, windstorm, disease, or mortality of livestock is the paucity of information regarding those risks. On the Continent of Europe and to a less extent in the United States of America, evidence is available on the incidence of losses suffered by the farmer. Until such information is available in England it will be almost impossible to tackle the problem of agricultural insurance, particularly livestock insurance, with any hope of success.

In addition to the necessity of obtaining information for the purpose of measuring risks, it is equally essential to know some-

thing about the selection of risks. All kinds of risks are not equal, and even in the same class of risk there is a great deal of variation. Malherbe well defines this principle of selection as it applies to agriculture when he says that "it means the careful selection of risks and the excluding not only of positive risks, but again those risks which present a predominance of unfavourable chances." To overcome this danger insurance of the same risk must be divided into a number of classes depending on age, condition of health, kind of work performed and so on, in which the premium will vary for each class. If this variation exists within the same general class, obviously, it is even greater in the different kinds of insurable risks covered. Generally speaking, the risks peculiar to agriculture can be looked upon as comparatively regular in their incidence, and as affecting a number of people in varying degrees of intensity depending on the size of the holding and the extent of their business. Naturally, the small farmers suffer more from the lack of insurance facilities than does the larger farmer but even the large farmer can not afford to indefinitely ignore the position in which he finds himself. At present the selection of risks and their evaluation are too much against the farmer, that is, the premiums are high, probably because the insurance companies consider most agricultural risks and especially those peculiar to agriculture as certain or *quasi* certain. Non-farming risks are more profitable than the purely farming risks. The ratio of losses in the former are considerably lower, and as is the case with agricultural credit, the existing machinery lends itself more easily to non-agricultural business. It is extremely unlikely under these circumstances that the big tariff offices will devote more attention in the future to the risks peculiar to agriculture.

The question of risk measurement and selection, moral hazard and supervision raises the important problem of organisation. The organisation of insurance differs according to the nature of the risk. If the risks to be insured are small it is not necessary to have a big organisation with heavy overhead charges which necessarily mean higher premiums. Continental experience and practise favor some form of mutuality in the business of agricultural insurance. Cow and pig clubs are forms of mutual insurance societies existing in England which have accomplished much in insuring the livestock of the small farmer. The area covered by

these societies is small and efficient supervision is possible because the members are well known to one another. The great drawback, however, in such an organisation as this if applied to larger farmers is the limitation of its sphere of activity. A mutual insurance society covering a parish or two will be successful provided no severe losses occur or at least do not occur until a good reserve fund has been built up. If heavy losses have to be met in the initial stages the chances for successful progress are remote. The affiliation of these small societies to a centralised society or the re-insurance of a proportion of the risks underwritten would solve the problem of distributing the risks over a wider area thus making the burden of losses, when occurring, easier to withstand.

Insurance of the ordinary livestock of the farm presents many difficult problems of organisation which in some measure are common to other agricultural risks. Probably the difficulty of overcoming the moral hazard problem is more acute in this class of business than in any other. A French economist maintains for example, that the great peculiarity of livestock insurance is that it is not in the interest of the farmer to look after his insured animal—"He finds it on the contrary to his advantage in many cases to let the animal die." In France this difficulty of supervision experienced by the big joint stock companies forced the companies to increase the premiums and pay only a share of the insured value. These steps, however, were not sufficient in themselves to overcome the difficulty of supervision, and it has been maintained that it was only after livestock insurance was taken up by what are termed "Mutuelles Locales" that this class of business flourished in France. As Jouzier maintains, these societies have furnished in the most complete manner the solution to the livestock insurance problem. Composed as they are of farmers who know each other and whose moral code is in itself a security, they have made inexpensive supervision possible. An examination of the premiums demanded by a joint stock company and those demanded by a local mutual society revealed the fact that the former demanded a premium of slightly over 40 francs per thousand francs insured while the latter only charged a little under 8 francs for the same total value insured. It appears from this that French experience justifies the theory that ordinary joint stock companies are not the most suitable and efficient form of organisation to cover livestock risks.

I think that there are two or three points arising out of my previous remarks which are of fundamental importance in connection with the successful organisation of livestock insurance. The first of these is the question of distribution of risks. A local society only grouping a very limited number of risks will, without the slightest doubt, be the victim sooner or later of a predominance of unfavorable risks and this to a small society with limited financial resources would be fatal. This is what has actually happened to the cow and pig clubs in England and a number of unaffiliated local societies in France and Germany. To guard against such an eventuality it is essential for insurance societies, if they are organised on a local basis, to re-insure part of their risks. Re-insurance can be effected either through affiliation with a provincial society or directly with a national association. In France, a number of provincial societies further re-insure with a national association. This, however, will depend on the area covered and the number of risks insured. Judging from continental experience, the essential point is that there should be sufficient distribution of risks to insure the advantages obtained from the law of averages, although in this connection it might be mentioned that one of the most successful livestock companies in France definitely limits its area to three departments and the manager of this same society maintains that if livestock risks were spread over a bigger area, the insurance office would be open to a very uncertain and heavier average of losses and he contends that to be successful an insurance company, dealing exclusively with livestock, should limit its activities to a small area where the risks tend to be uniform and where fair tariff rates can be established; that, the organisation should be of a mutual character, as otherwise it would not make sufficient profits to repay capital and provide for reserves; and that it should not exceed 30 per cent of total receipts for expenses, including commission charges.

To be effective, safe, and attractive, is the ideal aimed at in any form of insurance. What form of organisation will meet most successfully these requirements? In England, the joint stock insurance companies admirably fulfill one of the above principles, namely, safety, but livestock insurance in England is not effective because the premiums demanded are not sufficiently attractive to the farmer. They are high because in the main administrative expenses of supervision are high. It is not easy and probably

impossible for the big joint stock companies to overcome many of the difficulties of supervision, depreciation in values, and constant inspection which is characteristic of livestock insurance. To successfully undertake this class of business, supervision must be effective and at the same time inexpensive. Most of the continental European countries where a great deal of livestock insurance is practised favor some form of mutual insurance organisation effected mainly through local societies affiliated or re-insuring their risks with bigger associations. Continental experience, and writers on this subject of organisation almost unanimously maintain that only through local mutual insurance societies is the farmer able to insure his livestock inexpensively and this is attributed to the efficient and economical supervision of the local societies. It appears both from the success of this form of insurance in some of the European countries and the negligible amount of insurance effected in England through the joint stock companies that there is every justification for this view.

Another point of importance and one to which I had intended devoting more attention, is the part of the state in the organisation of livestock insurance. In France, Belgium, and Germany, the government has taken an active interest in the formation and administration of local mutual insurance and re-insurance societies. Annual financial grants are given to these associations provided they fulfill certain conditions with regard to organisation and structure as well as supplying the government with annual statistical returns. It can be definitely said without any qualifications that had the state not assisted both in a financial and regulatory way in the organisation of the continental insurance societies, nothing like the same success would have been attained. The part taken by the state in connection with livestock insurance raises the last point I wish to make this evening. I refer to the problem of livestock losses and diseases which is of the utmost importance not only to the farmer but to the nation. The problem of losses is naturally a serious one but the prevalence of certain diseases such as tuberculosis demands a closer examination than has been given to it in England. Steps ought to be taken by the government to ensure the collection and publication of statistics relative to both incidence and cause of losses among livestock. One of the ways, and perhaps the best, would be through the formation of livestock insurance societies which, if assisted by

the government, would be obliged to furnish complete information on both these points. Livestock insurance as effected by the Baden Cattle Insurance Federation in Germany for example, not only covers the risks the farmer undertakes in the production of livestock but serves also as a measure leading to the prevention and lessening of these risks.

It is well to remember that indemnifying the insured against possible losses is only one aspect of insurance. The other, and equally important aspect, particularly in the case of farm livestock, is the influence of insurance in the elimination and prevention of infectious and contagious diseases, and in this connection the state could play an important and effective part.

INCREASE IN FARMERS' INDEBTEDNESS IN GERMANY AND NEW METHODS OF INDIVIDUAL CREDIT CONTROL

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PRIOR to the war the credit needs of the German farmer were supplied from one or both of the following sources:

1. Long-term credit was secured from the provincial Landschaften or other mortgage banks which were all under the supervision of the government.

2. Short-term credit, or so-called personal credit, was secured from private banks, independent business men, livestock merchants, and to a large extent from cooperative savings societies.

FARM MORTGAGE CREDIT

The regulations of the various mortgage banks and Landschaften governing the appraisal of farm property for purposes of making long-term mortgage loans, were subject to the approval of a state official. Loans on first mortgage security were rarely granted in excess of 35 to 40 per cent of the estimated value of the farm. In connection with the Landschaften, special corporations known as "Banks of the Landschaften" furnished second mortgage credit, usually in an amount not exceeding 15 or 20 per cent of the appraised value of the farm. That is, a farmer might secure a first mortgage loan equal to 35 or 40 per cent of the value of his farm and a second mortgage loan equal to 15 or 20 per cent of the value of his farm, or a maximum loan on both first and second mortgage security equal to approximately 60 per cent of the estimated value of the farm. The Landschaften had a special provision in their regulations to the effect that in no case might a farm be appraised more than once within five years for purposes of extending mortgage credit. This was to prevent too frequent requests for increased credit based on rising land values.

Prior to the war, the German agricultural credit system functioned very satisfactorily. This was a period of rising land values in all parts of the country. German agriculture was prosperous, and there were few failures among the farmer-borrowers. In-

terest rates were in the neighborhood of 4 to 5 per cent, so that interest on indebtedness was not a particularly heavy burden. Land values were rising and farms were readily saleable. This latter factor accounted to a considerable extent for the satisfactory working of the system. Even if the individual farmer failed, the banks had little or no difficulty in disposing of properties acquired through foreclosure for more than enough to cover their investment. Steadily rising land values and increasing land rents provided additional security for all kinds of agricultural credit, though nobody remarked upon the fact that rising land values were an important factor in the situation until recent years when the opposite development began to take place.

SHORT TERM CREDIT

Short-term credit was based largely upon the personal reputation of the individual borrower. There were some 23,000 local limited liability cooperative societies making short-term loans. These societies were organized into three "revision" federations.[1] Two of these federations had so-called central cooperatives covering a province or larger territory. The local cooperatives were members of these central organizations, which were in turn affiliated with the Preussische Zentral Genossenschaftskasse (abbreviated "Preussenkasse") in Berlin.[2]

The third federation, the Raiffeisen, had only one central bank which was affiliated with the Preussenkasse. This central bank had a large number of provincial branches of which the local cooperative societies of the Raiffeisen were members. The liability of the local societies was, for the most part, unlimited. The three federations as such were not directly engaged in granting credit. Their function was primarily a supervisory one. The Preussenkasse acted as a financial clearing house for the whole cooperative system toward which all the savings flowed, and from which they were distributed to the various points of demand in the system.

The cooperative system of supplying short-term credit to farmers functioned very well prior to the war. The by-laws of the local cooperatives usually fixed the liability of their members at

[1] Revision=audit

[2] The Prussian Central Cooperative Bank.

from 5 to 10 times the amount of their capital subscriptions. If an individual farmer failed, the losses arising out of such a failure were absorbed by the local cooperative. If so many farmers failed that the local cooperative could not absorb the total losses, such losses were passed on to the provincial cooperative and only if the central cooperatives with all their reserve funds failed, were the reserves of the Preussenkasse likely to be impaired.

During and following the inflation period the credit situation became critical. Early in 1924 farmers paid as high as 30 per cent interest on borrowed money and even in 1925 the interest rate remained in the neighborhood of 20 per cent. In addition to high interest rates, taxes, farm wages, and the prices of commodities which the farmer had to buy remained high relative to the prices received for farm products. Under these unfavorable circumstances, many farmers found themselves hopelessly in debt. During 1926 and 1927 many large farm businesses in eastern Germany became insolvent. The cooperatives as well as other agencies making short-term loans found their assets frozen. A general scramble ensued among the various creditors. Each tried to secure additional collateral security against his advances, in the form of chattel or crop mortgages, or the signatures of additional guarantors. This merely added to the difficulties of the situation. The whole atmosphere was charged with suspicion and uncertainty. Even farmers who were in good financial standing were in many cases threatened with disaster due to the possibility of failure of local cooperatives of which they were members. As previously stated, the by-laws of the majority of the cooperative credit societies provided that the individual members of such societies should be liable for the debts of all other members up to an amount equal to 8 or 10 times their capital stock subscriptions or, in the Raiffeisen system, to an unlimited amount. Many of the small cooperative credit societies were not in a position to stand heavy losses. Their membership in many cases included both large and small operators. The failure of a single large operator resulting in a heavy loss might well have started many small farmers of limited means on the way to bankruptcy.

INDIVIDUAL CREDIT CONTROL

To deal with the situation, Otto Klepper, the newly appointed President of the Preussenkasse, formed a special division for in-

dividual credit control in January, 1928. It was the task of this division to make a careful detailed analysis of the status of each loan on all of the larger farms, since it was the operators of the larger farms who were experiencing the greatest difficulty, and it was among this class of loans that the possibility of heavy losses appeared greatest. By August, 1928, reports had been made to the Preussenkasse on some 5,300 farms. These reports were based on questionnaires sent to the farmers by the credit control division of the Preussenkasse through the central and local societies. Each record represented a preliminary report on the individual farm. In the meantime, an intensive farm to farm study was started by the central division. Specially trained experts, all graduates of agricultural colleges and with experience in the management of large-scale farms, were sent into certain districts to make a careful study of all farms on which money had been loaned and to keep in close touch with both local and provincial societies.

In the reports on individual farms, the investigator was asked to report, among other things, the following:

1. The estimated sale value of the farm under normal conditions, and the estimated forced sale value of the farm.
2. The total indebtedness of the operator, including both secured and unsecured debts. The trend in the farmer's indebtedness, that is, whether it was increasing or decreasing, was given special consideration.
3. The probability of loss to the cooperative arising out of the loan in question, and the estimated amount of such loss.
4. The probable operating income or deficit of the farm for the current year and for the year next following.
5. The investigator's estimate of the managerial ability of the operator It was recognized, of course, that managerial ability is a rather intangible factor and that in last analysis the investigator's report merely reflected his opinion. However, as subsequent reports are made on the same farmer by different investigators such information becomes of increasing value.
6. Changes in the operation and management of the farm which, in the opinion of the investigator, would lead to increased returns.
7. Recommendations as to the course to be followed by the bank in making future extensions of credit.

The investigators sent their reports to the main office in Berlin where all data were checked and recommendations noted. Copies of these reports were then sent to the provincial cooperative banks and copies were, of course, retained by the Preussenkasse. The reports placed before the executives and directors of the various organizations the facts of the situation and gave a sound basis

for action. Certain farms were found to be operated at a loss and the farmer hopelessly encumbered with debts. Other farms were found to be on a sound financial basis, while a third group was classed as doubtful. With accurate and adequate information at hand the action of the bank could be suited to the needs of the individual case. A regular inspection of doubtful cases was maintained. In some instances the farm was visited four or five times a year. The investigators of the Preussenkasse were all men who had been trained in agriculture, and who were familiar with farm management practice. It was not only their duty to make a credit report on each farm visited, but more important still, it was their duty to keep the central banks and the Preussenkasse fully informed as to general conditions in their district. At first, farmers objected to the new system of control, but within a short time the relations between farmers and investigators were excellent, and the farmers began more and more to carry into practice the advice of the investigators.

The cost of the system of individual credit control, which is relatively low, is borne by the Preussenkasse. The prevention of losses on two or three large loans would more than justify the expense, and experience during the first year proved that hundreds of losses, both large and small, could be prevented by such a system. There are at present 15 investigators in eastern Germany controlling, for the most part, loans on large farms. Investigations are made of small farms when necessary, but the past three years have shown that relatively little trouble is likely to develop among loans on small farms.

The system of individual credit control has had far reaching effects. Under this system, the extent and trend of farmers' indebtedness is known at all times. Such information provides a sound basis for action on all matters pertaining to farm credit. The system of control has not only helped the farmer who was in difficulties, but what is equally important, it has resulted in the granting of increased credit to those farmers whose farms are shown to be efficiently and profitably managed. The cooperative credit societies affiliated with the Preussenkasse are in a position to promote improved farming methods, and to assist the individual operator in making adjustments to meet changed economic conditions. A closer control over credit has worked to the advantage of the individual farmer as well as to the advantage

of the loaning agency. Close supervision means decreased losses, which in turn means lower interest rates to the borrower, and a reduced risk of loss through failure of the local cooperatives. Closer contact between bankers and agricultural experts means greater elasticity in loaning policies and a closer adjustment of such policies to agricultural conditions. Furthermore, to the extent that losses are decreased, the possibility that the local cooperative will fail is decreased. Since each member of the local cooperative credit society is individually liable for the debts of every other member, to the extent that losses are decreased through careful credit supervision the risk of loss to a member in good standing arising through the failure of another member or members, is greatly reduced. The system of individual credit control works, therefore, to the advantage of all classes of borrowers as well as to the advantage of the Preussenkasse, the central cooperatives, and the local cooperatives.

The system of individual credit control has been extended to cover loans made to operators of greenhouses, creameries, and other types of agricultural business organizations. One of the most interesting recent developments in this direction is a proposal to extend the system to the field of farm mortgage credit.

AGRICULTURAL CREDIT PROBLEMS IN THE UNITED STATES

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AS LONG as agriculture in the United States was in the pioneer stage, other problems were so pressing that little or no attention was given to the problem the individual farmer had to face in securing sufficient credit to finance his needs. In early days capital requirements were so small that it was not believed necessary to make special provision whereby the individual could borrow a part of the small capital, which even then was necessary, to set himself up as an independent farmer. On the frontier, land was free. In older sections it was very low priced. Farm implements were crude, few in number, and cheap. They were often made by the local blacksmith or mechanic. It is apparent, therefore, that a man could begin farming without any very extensive investment of capital. The sum required could be accumulated by working for a few years. During this early stage, farmers were dependent upon local money lenders for any sums that they had to borrow. Even in the newest sections of the country there were always a few people who had some surplus funds and made a business of loaning these funds to their neighbors. During the period of early agricultural development, rates of interest were inordinately high. In central Iowa, for example, during the '50's and '60's, farm mortgages were usually made at 10 per cent interest. The term was usually for one year and it was not at all uncommon for a borrower to pay a bonus of 10 per cent for such a loan, thus increasing the interest to approximately 20 per cent per annum.

Under such conditions it is not surprising that farmers avoided debt. They preferred to progress slowly, expanding their business and improving their living conditions only as fast as they could save from their rather small cash receipts. While progress under these conditions was necessarily slow, it was preferable to getting enmeshed in the coils of the money-lender. All too frequently, this brought about loss of the farm and forced the owner into a new country where he had to repeat the years of heavy work required to subdue new land.

Throughout the nineteenth century and the early part of the

present century, agriculture was financed to a considerable extent from savings of the individual farmer, from funds supplied by the local money-lender, or by the local bank. In the case of funds loaned on the security of first mortgages, some money was supplied from outside sources. From the beginning of the third quarter of the nineteenth century, and to a certain extent even earlier, a large traffic in farm mortgages was carried on between mortgage brokers in the Middle West and investors in the East, particularly in the New England States. Life insurance companies during this period also furnished large amounts of money to farmers of the Middle West. For many years they have been the largest single source of first mortgage credit.

As time went on, it became apparent that the credit conditions for agriculture were not as satisfactory as those for other forms of industry. There was no uniformity in lending practices, interest rates were high, mortgage brokers and loan agents charged high commissions, loan periods were short, and in general, mortgage credit conditions were very unsatisfactory. Short-term credit conditions were also unsatisfactory, but as farmers have never borrowed as much for current needs as they have for other purposes, dissatisfaction with short-term credit machinery was not as marked as in the case of the mortgage credit system.

After many years of investigation and debate Congress finally established the Federal Farm Loan System in 1916. Thus for the first time, agriculture was provided with a source of credit specially planned to fill the needs of that industry. The low interest rates, and the long-time amortized loan provided by the Federal Farm Loan System met with immediate response from farmers with the result that at present the Farm Loan System has almost one and three-quarters billions of dollars in outstanding loans. This is perhaps 20 per cent of the total farm mortgage debt of the United States.

Although the Federal Farm Loan System greatly improved the status of farmers with respect to mortgage credit, comparatively little has been done to improve short-term credit conditions. The Federal Reserve Act of 1913 extended some special benefits to agriculture. The Federal Reserve Board was given rather broad powers in administering the act and has shown a disposition to deal liberally with agriculture in the matter of credit extension. Following the post-war depression, there was much agitation to

improve farmers' short-term credit conditions. This agitation resulted in the passage of the Agricultural Credit Act of 1923. This legislation established a series of intermediate credit banks whose function it was to provide credit for agricultural purposes for terms extending from six months to three years. For various reasons, however, these banks have not been widely patronized. They have performed very good service in certain sections of the country. Their most important function has been the financing of cooperative marketing associations. Recent legislation extends their powers in this respect and we may look for even greater use of the intermediate credit system by cooperatives. These governmental institutions greatly improved farmers' credit conditions.

At present farm mortgage credit is supplied by (1) Federal Farm Loan System; (2) life insurance companies; (3) farm mortgage bankers; (4) private investors; and (5) commercial banks. The Federal Farm Loan System and the life insurance companies hold approximately 40 per cent of the total farm mortgage debt. Farm mortgage bankers and commercial bankers together supply only a small amount of mortgage money. Probably the largest source of mortgage funds is the private investor. Of private investors very little is known. It would appear that for the country as a whole, farmers are adequately supplied with first mortgage credit. In certain localities this is not true, but generally speaking, this statement would hold. There is, perhaps, need for some institution to supply second mortgage credit. Just how pressing this need is, we do not know. Neither do we know what safe-guards would have to be provided to make loans secured by second mortgages reasonably secure.

The bulk of the short-term credit is supplied by commercial banks. This source is supplemented by credit extended by merchants and by loans from private sources. In the better developed sections of the United States, the short-term needs of farmers appear to be adequately cared for. In other sections where banks are not so well developed, farmers are too dependent upon store credit for their short-term requirements. This form of credit is very expensive and if possible should be avoided. It is particularly important in the South. Except in the South, farmers are as well supplied with short-term credit as are other small business men. It may well be that certain changes in the banking structure would result in improved service to agriculture, but until research in

agricultural credit has been carried further, we can not tell where or how the present system may be improved.

Compared with the fields of farm management, marketing, or prices of farm products, research in agricultural credit has been neglected. For the most part, agricultural credit research has consisted of descriptive studies whose objective has been to find out how agriculture was being financed, how adequate were the sources of credit, and what were the special problems in the field. In any new field of research, such general studies are necessary before research of a more intensive nature directed toward the solution of specific problems can be intelligently undertaken. Enough of these ground-clearing, preliminary studies, have been done so that we may look forward to results throwing some light upon problems uncovered in the preliminary surveys.

A committee recently appointed to study the field of research in agricultural credit and to outline methods of research in that field, suggests that credit problems may be approached from the point of view of first, the area; second, the institutions; third, the types of credit; fourth, credit functions; and fifth, the commodity. It is recognized that research conducted according to the approach outlined in any of the above, will cut across the subject matter suggested in the other approaches. The emphasis, however, will be different. The credit problems of the country can, perhaps, be suggested in no better fashion than by reviewing briefly the outline of research in this field as suggested by this committee.

Under the area approach, descriptions of the credit situation prevailing in an area would be discussed, its development traced, and suggestions for the solution of its difficulties proposed. As suggested above, most of the credit research to date has been of this type.

The institutional approach suggests that credit problems be studied from the point of view of the financial institution supplying such credit. Investigation in this field would include a statement of the historical background, the economic set-up, the financial set-up, the operating organization, policies, business practices, services, costs, margins and rates for various services of the institutions being studied. Studies dealing with institutions supplying agricultural credit should lead to improved credit conditions by suggesting improvements in the internal economy of the institutions. Studies, such as outlined here, of country banks, of chain

banking systems, agricultural credit corporations, livestock loan companies, farm mortgage companies, Federal land banks, Federal intermediate credit banks, joint stock land banks, insurance companies, and stores, doubtless would result in suggestions for improving the services rendered by these institutions or in suggestions whereby the users of these services may adapt their plans of operation so as to take fullest advantage of existing credit sources.

This institutional approach can be made not only from the point of view of the institution supplying credit but also from the point of view of the institution receiving such credit. Much work needs to be done in studying the credit uses and needs of the using institution. For example, the financing aspects of a farm organization has been almost completely overlooked by research workers in farm management. The credit problems involved have been almost entirely ignored. Similarly we need to know much more about the credit needs and the nature of credit of the different systems of farming. For example, just how do the credit needs of the corn, hog, and beef-cattle system of farming in Iowa differ from the credit needs of the wheat farm in Kansas, or the dairy farm in New York, or the citrus ranch in California. It is obvious, of course, that the credit needs of these different types of farming must differ radically. It would follow that different types of financial institutions must be used by the farmers of these different areas. These farmers will use different proportions of mortgage and short-term credit. The differences in the type of security offered may result in different types of credit institutions growing up in these different farming areas. The short-term credit requirements differ widely in the seasonality of demand for loans and in the term of loans. Perhaps short-term loans are more adequately secured under certain types of farming than under others. All of these things we should know.

Much the same type of analysis needs to be done for the various cooperative marketing agencies. Surely the financing problem of a cheese cooperative differs widely from that of a cotton cooperative. One organization, perhaps, needs much more than the other for building permanent facilities. It may take a much longer time for one product to pass from the original producer to the distributing market than it does for the other. All of these differences in products and methods of handling result in different demands. We do not know how adequately these demands are met or whether

some modification of existing facilities needs to be made to take care of the demands not now satisfactorily met.

A problem which calls for immediate consideration is that of risk in the extension of agricultural credit. Almost nothing is known of the comparative risk involved in real-estate loans, for example, compared with the risk involved in the purchase of railroad or industrial bonds. For many years, it was assumed that real-estate mortgages were the finest type of investment, excelled only by government bonds, and some, but not all, state or municipal bonds. For many years this assumption proved correct. The depression of 1920 and 1921 has demonstrated, however, that real-estate values in this country can go down as well as up. As a result farm mortgages are no longer as attractive to the conservative investor as formerly. We now need facts rather than assumptions to guide us in determining the amount of risk in farm mortgage loans.

The risk factor in the short-term loan is also almost as important as in the case of farm mortgage loans. Its study is made more difficult, however, as the personality of the borrower is a more significant factor in determining the safety of the loan than is true in the mortgage loan. We do not know whether farmers as a class are more, or less inclined to meet their obligations promptly than are small business men in other lines of activity. Neither do we have exact information of the extent to which agricultural production as such is inherently a better or worse financial risk than manufacturing or commerce.

Appraisal policies of our loaning institutions are matters of concern to those who desire to improve agricultural credit conditions. Inasmuch as all farms must be appraised before loans are made, it is clear that the appraisal must be correct if justice is to be done both to the borrower and the lender. Heretofore, farm land appraisal has been made with the sole object of protecting the lender of funds. Events of the past few years show that appraisers have been none too successful in achieving their objective. The recent experience would suggest that our appraisal system needs over-hauling. Methods of appraisal at present differ slightly or not at all from methods in common use 60 years ago. There is undoubtedly great opportunity for improvement in land appraisal, and research on this problem may be expected to yield results that will be of real benefit to borrowers and lenders. Such re-

search should have for its objective reducing the problem of land evaluation so far as possible to a problem of measurement rather than, as it is at present, a problem of the individual judgment of the appraiser.

Farm land appraisal at present consists of little more than making an estimate of what the land will sell for under present conditions. When loans are made for periods of 30 or 35 years, it is necessary to examine the bases of land values much more adequately than is done at present. By isolating and measuring the factors influencing land values in an area, it should be possible to establish means by which appraisals may become much more standardized than is now true. When standards are set up for an area, the appraiser's task will become one of measurement and one of fact collecting. There will still be plenty of room for the exercise of judgment. The appraiser will have to determine the credit risk of the applicant. He will have to determine the extent to which individual farms may be above or below the standard for the area. But he will no longer be expected to exercise his judgment in arriving at the basic value of the property. This will already have been done by experts who have had at their command all of the facts influencing the level of land values in the district.

No small part of the research on this problem will consist of finding ways and means of collecting the necessary current data needed as a basis for appraisal of land. The Federal land banks, the life insurance companies, the United States Department of Agriculture, and the state experiment stations—all will have an important part to play in the solution of this problem. The experience of the past ten years has brought the lending institutions into a frame of mind where they are frankly skeptical of their present appraisal methods. Not much forward looking work has been done as yet, but we may expect increasing experimental and investigational work to be done. It is a fairly safe prediction that the best farm land appraisal methods of ten or fifteen years hence will bear slight resemblance to the methods now in current use.

There is a series of problems closely related to the study of the credit needs of a particular type of farming organization that calls for special study. For example, under what conditions may credit advanced for the purchase of fertilizer for the growing of cotton in various sections of the South be economical, both from

the standpoint of the grower of the cotton and from the standpoint of the lender of funds. The same question may be asked regarding the purchase of feeder cattle, or a tractor, or the clearing of land, or the construction of special farm equipment. These are suggestive of a host of similar problems that may properly become the subject of research in this field.

It was suggested early in this paper that credit problems could be studied through the commodity approach. Such research would examine the uses, needs, and nature of credit required in a particular form of agricultural production such as wheat growing, cotton growing, dairy farming, ranching, or orcharding. In like fashion the credit problems of marketing cotton, tobacco, or citrus fruits may become the subject matter of special researches.

There is another set of problems of a more general nature upon which study needs to be done. These problems are, perhaps, of even more interest to those interested in agriculture as an industry than those which have been mentioned heretofore. We do not know very much about the variations in interest rates within areas or the causes of such variation. Study of this problem will assist materially in arriving at a more conclusive answer to the question of whether or not our present sources of agricultural credit are sufficient. In the same connection investigation of the place of agricultural credit in our whole financial structure may properly become the subject for extended research. We have no very adequate idea of the relationship existing between agricultural financing and general financing. Nor do we understand the effect of monetary disturbances upon the agricultural credit problem. It is clear that general credit policies will necessarily have an effect upon agricultural credit, and consequently upon such problems of public interest as the expansion or contraction of production of any farm product, land utilization, and agricultural development in general.

For those interested in keeping abreast of current agricultural conditions, certain sets of index series which may properly be the subject of research in agricultural credit, will be of great service. For example, indexes of collections of farm loans, interest rates, rates of payment on principle of mortgages, volume of mortgage indebtedness, forced sales, farm foreclosures, and volume of "distressed" land holdings will prove to be very good indicators of the condition of agriculture.

The foregoing discussion of research problems in agricultural credit is by no means definitive. It is merely suggestive of the type of problems which now engage the interest of those engaged in research in this field. Research has progressed sufficiently far for us to know that we can no longer safely advise the setting up of new institutions to extend farm credit, nor can we safely suggest the liberalizing of the present institutions. What is needed most just now is an understanding of the uses of credit by farmers under various conditions of production, and after we have learned that, the degree to which our present facilities meet, or fail to meet, the present needs. The other type of research is of a more general nature and will be of particular service to those interested in the larger phases of agricultural economics.

As previously suggested, most of the research published to date is of the general ground clearing type. Not very much analytical work has been done. The point has just been reached where workers may profitably extend their efforts toward the solution of more fundamental problems.

It may be of interest to learn some of the preliminary results of a study in farm credit now under way at the Iowa Agricultural Experiment Station. This study is intensive in character, and should supply some of the data needed to construct some of the indexes suggested above. The project is being conducted in co-operation with the divisions of Agricultural Finance and Land Economics of the Federal Bureau of Agricultural Economics. All relevant information contained in each farm mortgage recorded in Story County, Iowa from the beginning of the county in 1854 to June, 1930 has been transcribed upon tabulating machine cards. These cards have been coded, punched and are now in process of tabulation. When the study is completed, we expect to have a series of farm mortgage interest rates from 1854 to date. Other information will show terms of mortgages, total mortgage indebtedness outstanding at particular dates, amount of loans per acre, number of foreclosures each year for the entire period, residence of the mortgagor, mortgagee, and assignee (if any), sources of farm mortgage credit, average equities in land, the extent to which land purchase is a purpose of the loan, average length of time particular pieces of land have been mortgaged, and much other information of a similar character. In the course of another study, all of the land transfers in the county were recorded, and these

data were found very useful in the present study. A part of this same study has involved the securing of prices of agricultural products at local points for as much of the period as these data are available. We expect to construct an index of local prices and to determine what relationship, if any, exists between price fluctuations and mortgage loan fluctuations. The geographical center of the state is located near Story County, and Story County is representative of a large proportion of the state of Iowa. It is hoped that the results of this investigation will be representative of results which could be secured by similar means from most of the central part of the state.

Table 1. Number and Amount of Farm Mortgages Recorded in Story County, Iowa, by Ten Year Periods, 1854 to 1930

Period	*Number of mortgages recorded*	*Amount of mortgages recorded*
1854–1860	424	$187,869
1861–1870	1,541	779,227
1871–1880	3,934	2,632,881
1881–1890	3,845	3,569,038
1891–1900	4,323	6,513,087
1901–1910	3,652	11,193,398
1911–1920	4,531	35,752,559
1921–1930	3,751	31,184,937
Total	26,001	$91,812,996

From 1854 to June, 1930, 26,001 farm mortgages were recorded in Story County. The total amount loaned during this period was $91,812,996. The number and amount of mortgages recorded by ten-year periods from 1854 to date is shown in table 1.

Since 1871 from 3,500 to 4,500 mortgages have been recorded during each ten-year period. A total of 4,531 mortgages were recorded between 1911 and 1920. Although the number of mortgages recorded during the past 60 years has not varied greatly from decade to decade, the amount of the mortgages has increased very rapidly. From 1871 to 1880 mortgages to the amount of $2,632,881 were recorded. From 1911 to 1920 the mount of the mortgages recorded was $35,752,559. From 1921 to 1930 the amount of mortgages declined to $31,184,927.

In 1920, 807 mortgages amounting to $10,505,634 were recorded. This was the heaviest year during the period. The second

largest year in point of numbers was 1875 when 605 mortgages amounting to $486,425 were recorded. The amount was small when compared with the amounts in recent years. More than a million dollars of mortgages per year have been recorded in each year since 1901 with the exception of four years.

The number of foreclosures in Story County by ten-year periods from 1854 to date is shown in table 2. The decade having the fewest number of foreclosures was from 1911 to 1920, with a total of ten. During the succeeding nine years, from 1921 to 1929, there were 203 foreclosures. The largest previous number of foreclosures occurred during the decade of 1871-80 when there were 193 foreclosures.

Table 2. Number of Farm Mortgages Foreclosed in Story County, Iowa, by Ten Year Periods, 1854 to 1930

Period	*Number of foreclosures*
1854–1860	72
1861–1870	87
1871–1880	193
1881–1890	83
1891–1900	52
1901–1910	13
1911–1920	10
1921–1930	203

The data in table 3 represent results for only three of the sixteen townships in Story County. Tabulations have not progressed far enough to give these data for the whole county. This table indicates that loans made by private individuals have declined in importance from the very beginning of the study. From 1854 to 1860, 80 per cent of the mortgage loans were supplied by private individuals, while in the period from 1921 to 1930 only 22 per cent was thus supplied.

The funds from insurance companies, however, have shown exactly the opposite trend. From 1861 to 1870 only 1 per cent of the mortgage loans were supplied by insurance companies while during the present decade, 45 per cent were insurance company loans.

Other important sources of mortgage funds are the commercial banks and former owners. The banks seem to be maintaining, or perhaps, increasing their percentage of mortgage loans. During

Table 3. Per Cent of Funds on Mortgage Loans Coming from Different Sources, by Ten Year Periods, 1854 to 1930, Three townships in Story County, Iowa

Period	Source of funds and per cent of funds from each source										
	Local money lenders	Private individual	Insurance companies	Banks	Farm mortgage companies	Federal land banks	Joint stock land banks	Story County school fund	Former owners	Miscellaneous	Total
1854–1860		80						7	3	10	100
1861–1870	1	53	1					8	36	1	100
1871–1880	6	46	8	7	1			4	26	2	100
1881–1890	10	36	27	11	1			3	11	1	100
1891–1900	15	41	22	8	1			2	10	1	100
1901–1910	10	31	33	15				1	10		100
1911–1920	4	26	28	13	3	1	2		23		100
1921–1930	2	22	45	19	5	3	3		1		100

Table 4. Number of Mortgages Recorded Classified According to Interest Rates, by Ten Year Periods, 1854 to 1930*
Three townships in Story County, Iowa

Period	Interest rates (per cent)							
	10	9	8	7	6	5	4 or less	Total
	Number of mortgages	Number of mortgages	Number of mortgages	Number of mortgages	Number of mortgages	Number of mortgages	Number of mortgages	Number of mortgages
1854–1860	39			1	3			43
1861–1870	169	11	45	4	13			242
1871–1880	581	39	46	19	12	1	4	702
1881–1890	88	6	312	66	133	1	1	607
1891–1900	1		145	206	255	60		667
1901–1910			40	29	171	344	2	586
1911–1920			36	40	228	370		674
1921–1930			83	42	179	252	2	558

* Data as to interest rates were not available for 288 mortgages.

:he last decade they made 19 per cent of the loans. Former own-ers, however, appear to be declining in importance. From 1861 :o 1870 they made 36 per cent of the mortgage loans, from 1911 :o 1920 they made 23 per cent of the mortgage loans while during the present decade they have made only 1 per cent of the mortgage loans. This is because very few sales have been made during the last ten years. Most of the transfers are the results of fore-

Table 5. Percentage of Cash Paid Down in Purchase of Land, Grouped According to Cases for the Period 1854-1930,* Three townships in Story County, Iowa

Per cent of cash paid down	*Number of cases*
0-9 9	77
10-19.9	96
20-29.9	112
30-39.9	105
40-49 9	109
50-59.9	155
60-69.9	113
70-79 9	70
80-89 9	38
90-99 9	30
Total	905

* Only cases involving some borrowing on mortgages were included. Where more than one mortgage was given, all the mortgages were totalled and that amount subtracted from the purchase price of the land to find the amount of cash evidently paid down

closures or the inability of the owner to maintain title to his property.

Study of these records shows that there has been a substantial decrease in the interest rate from 1854 to 1930 as is shown in table 4. From 1854 to 1860 only four mortgages out of a total of 43 giving the rate of interest, were made at a rate lower than 10 per cent. The number of 10 per cent mortgages increased until 1880. During the decade 1881 to 1890, the modal interest rate dropped to 8 per cent and from 1891 to 1900 the modal rate declined still further to 6 per cent. Since 1901 the modal rate has been 5 per cent.

Table 5 shows a frequency distribution from the sales of land in three townships from 1854 to 1930 classified according to the per cent of cash payment. The table indicates that most of the purchasers paid down from 20 to 70 per cent of the purchase

price. The largest single group paid from 50 to 60 per cent of the purchase price. Four hundred and ninety-nine purchasers paid less than 50 per cent in cash and 406 paid more than 50 per cent of the purchase price in cash.

The change in the total outstanding debt from 1860 to June 1930 is indicated in table 6. The debt increased very rapidly from $22,000 to $85,000 between 1860 and 1870. This jumped to

Table 6. Total Outstanding Farm Mortgage Debt at Ten Year Intervals in Three Townships in Story County, Iowa, 1854 to 1930

Year ending December 31	*Total outstanding farm mortgage debt*
1860	$ 22,235
1870	85,895
1880	213,564
1890	316,306
1900	498,990
1910	898,363
1920	3,758,843
1930*	$3,563,202

* Mortgage debt as of June 1, 1930

$213,000 in 1880, to $316,000 in 1890, to almost $500,000 in 1900, and $900,000 in 1910. During the decade from 1911 to 1920 the outstanding debt increased to $3,759,000. Since 1920 there has been a small decline to $3,563,000. Much of this decline has been caused by the foreclosure of mortgages.

The foregoing is in no sense a complete analysis of the data collected. These tables have been presented merely to illustrate the type of analysis possible in this kind of research work. Preliminary results indicate that much very valuable information can be secured by analyzing official records of the kind used in this study.

FARM CREDIT PROBLEMS IN THE UNITED STATES WITH SPECIAL REFERENCE TO COUNTRY BANKS

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MOST of what is known about country banks has not been published, but consists of the unwritten experience of bankers, supervisory officials and others who are familiar with the practices and policies of bankers and the routine business that passes through banks. There is nowhere a body of published materials which describe the conditions of banking in various parts of the country and the experience with different loan policies.

In their efforts to appraise the banking facilities of farmers, agricultural economists have been handicapped seriously by the lack of explanatory materials. To pass judgment on the quality of banking service one should know what types of business are conducted by banks in given areas and what hazards are involved in the various phases of their business. The studies that have been concerned with country banks have thrown little light on these points.

My task in discussing the subject of country banking is therefore a difficult one. It has seemed best to present some of the results of past research and consider the probable meaning of these findings in terms of banking practice and farm welfare. The latter undertaking is accompanied by a good many hazards, but my intent is merely to suggest lines of inquiry that may prove useful in future research.

Both research and casual observation have shown that the credit needs of farmers are of many varieties, ranging in purpose from production loans to loans for medical service and vacations, and in time, from a few days to many years. Likewise, it is well understood that farmers in this country have access to a wide range of credit facilities. They can borrow directly from local state or national banks and trust companies, the smaller mortgage companies, livestock loan companies and agricultural credit corporations that are located in their communities. They can negotiate loans through the local agents of distant insurance companies, joint stock land banks, mortgage banks, livestock loan companies and agricultural credit corporations, and through the national farm loan associations which secure business for the federal land banks.

Their paper is accepted by banks in the large commercial centers, federal reserve banks, and federal intermediate credit banks, providing it has the endorsement of a local bank or agricultural credit corporation. In addition, farmers make purchases on credit from many commercial concerns, borrow extensively from each other, and frequently are the recipients of direct government loans. One of the first questions to arise is, where do country banks—the local state and national banks—fit into the farmers' financial scheme?

In seeking to obtain loans, farmers find a high degree of specialization in the operations of the financial institutions. Federal and joint stock land banks, insurance companies and mortgage companies as a rule accept only first real estate mortgages at conservative valuations, and their advances ordinarily have maturities of more than three years. Agricultural credit corporations and livestock loan companies specialize in short term production loans secured by chattel mortgages and crop liens. The federal reserve banks, federal intermediate credit banks and commercial banks in the large centers accept farm paper only when it is endorsed by some responsible local institution, and they have varying requirements as to the purposes for which the proceeds of loans may be used. Usually their advances bear short maturities and often they must be secured by collateral. Not one of these institutions makes a practice of handling unsecured loans without endorsement or loans secured by junior liens on real estate. Only a few of them accept loans secured by chattel mortgages and crop liens, endorsed or unendorsed.

Here, then, appears to be the field of country banks. Of all financial institutions, they are the only ones that lend extensively and directly on unsecured obligations. They are the chief market for paper secured by chattel mortgages and often they hold paper secured by junior real estate mortgages. Some of them have large amounts of first real estate mortgages. In general, the loans of country banks are those which cannot command an outside market, although there are many exceptions to this rule in the case of the first real estate mortgage loans.

It does not follow from this that the business of country banks is particularly hazardous. Because they are in close contact with their borrowers, country banks can make safely a class of loans that would prove extremely hazardous for distant institutions. In most

cases, also, they select the best of the local loans that are not placed with outside agencies, and leave the poorer risks to merchants, dealers and private lenders. Nor does it follow that country bank loans are used exclusively or even principally for purposes of current production. There is some evidence, which will be presented later, that the composition of the loan accounts differs widely from bank to bank and from area to area. It seems much safer to think of country banks as institutions that deal chiefly in a class of business which does not have direct access to outside markets. Since this class of farm paper is large, it is of much concern to farmers that their banks remain solvent and are operated in the interest of agriculture.

How far country banks can go in meeting the loan requirements of their customers is determined mainly by the volume, character and behavior of their liabilities. Bankers generally feel that their loans should be restricted to an amount which can be supported by the funds supplied by depositors, but if these funds prove temporarily inadequate, bankers often borrow from other banks or rediscount some of their paper. There have been very few analyses of bank liabilities, but, such as they are, they indicate a number of differences among banks which seem to have an important bearing on farm finance.

One of the most striking of these differences is found in the seasonality of the deposits. In some areas, notably those which emphasize the production of a single product such as wheat, potatoes or cotton, the deposits are subject to tremendous seasonal changes in volume, while in highly diversified areas the deposits are nearly constant throughout the year. But time and savings deposits seem to be much less responsive to seasonal forces than demand accounts, so that in any given area the changes in total deposits bear a close relationship to the proportionate amount of demand accounts.

It seems obvious that the lending policies of banks must be greatly influenced by the seasonality of their deposits. When, as is the case with some banks, the deposits increase as much as several hundred per cent during a few weeks at harvest time, fall rapidly as the accumulated debts of customers are paid, and then continue to fall at a moderate rate as the production season advances, there is little doubt that a large part of the peak fund should be in-

vested in commercial paper or call loans, which can be disposed of or collected at short notice. It is equally apparent that banks having moderate seasonal changes in their deposits can safely invest most of their funds in local paper, for with them the requirements of liquidity are not so great.

These conclusions find their support in the underlying conditions with which country banks have to deal. Immediately after harvest in one-crop areas, farmers receive a considerable part of their year's income. It is the receipt of this income which causes bank deposits to rise rapidly, and farmers at this time are in possession of the funds with which to pay off their production credits. They should have little need to borrow immediately after harvest, hence the investment of bank funds in call loans or commercial paper at this time is not detrimental to their interests, and is, in fact, one of a very few employments for the funds that will not be detrimental to their interests. Farmers in diversified areas, on the contrary, receive their incomes at more frequent intervals and their expenditures are distributed more evenly throughout the year. Neither the receipt of income nor the demand for loans is as concentrated in given seasons as in one-crop areas. The income deposited by some farmers offsets the funds withdrawn by others and loan payments by some farmers enable the banks to lend to other farmers. Banks in diversified areas do not have the surpluses and deficits common to one-crop areas.

Still a further inference is to be drawn from these varying conditions. It seems certain that a given loan fund which revolves almost continuously among local farm borrowers in a diversified area will satisfy as large a volume of local production demands as a much greater fund which in one-crop areas is used in some seasons for local loans and in other seasons for outside investments. Banks in diversified areas, consequently, should be able to employ more of their lending power in making capital advances than would be feasible for banks in one-crop areas.

From this point of view, country banks in the United States appear, not as highly standardized institutions, but as institutions whose business in each case is adjusted closely to the peculiar conditions existing in the local community. All factors which affect the receipt and expenditure of income and the accumulation of wealth in a community exert an influence on the liabilities of local

anks and the local demand for loans. Some country banks have elatively constant deposits, consisting chiefly of time and savings ccounts, and loans which represent principally advances for fixed apital uses. Others, in poorer areas, have to contend with tremenlous seasonal changes in their deposits and find it difficult to meet ven the production credit requirements of their communities. Obiously different standards of judgment should be applied to the ractices of banks operating under these widely divergent conditions.

Not only are there vast differences among banks in the charcter of their business, but there are also great differences in the azards or risks which the banks assume. From some points of iew, the one-crop areas seem to involve the greatest risks in bankng. Here the injurious effects of price declines, bad weather, nd pests are at a maximum so that in poor years the volume of leposits falls to low levels and the banks have great difficulty in ollecting their production loans. On the other hand, good years roduce a greater abundance of deposits in one-crop areas than in liversified areas, and the temptation to over-expand loans reaches maximum. With the more even course of business in diversified reas, there is less danger of over-expanding loans in good years nd less need to contract them in poor years. From this it follows hat banks in diversified areas should be able to render a more onstant and reliable service than those in one-crop areas.

But there is another angle of this problem which is much more lifficult to appraise. By force of circumstances banks in one-crop reas are not able to involve themselves nearly so deeply in fixed apital advances as are banks in highly diversified areas. To meet he great fluctuations from season to season and year to year in he local demands of depositors and borrowers, they have to maintain a highly liquid position. While these great year to year hanges are a nuisance and involve special hazards, it is a question f the liquidity of loans which they engender is not a protection gainst longer time downward trends in property values, such as he decline of land values that has been in force since 1920. Banks whose loans have been based on equities in land in many cases have ound it impossible to protect these advances. They consequently ave become insolvent in spite of the fact that their ability to meet urrent demands was not seriously impaired. Risks of a similar

character arise in one-crop areas, of course, when there are successive crop failures year after year.

The differences among country banks that have been suggested in the preceding discussion are further evidenced by the variations known to exist in rates charged on bank loans to farmers. These rates are highest in the southern and mountain states and lowest in the northeastern states. Other points have intermediate rates. Banks in the northeastern states have tremendous accumulations of time and savings deposits and their total deposits are further stabilized by the influence of industrial activity. Banks in the central states have also large accumulations of time and savings deposits and their agriculture is well diversified. In the southern and mountain states there generally are much smaller proportionate accumulations of time and savings accounts and there is less diversification in agriculture.

The conventional explanation of sectional differences in rates on bank loans is that the rates are determined by the costs and risks of banking. In support of this conclusion a few studies have shown that the unit costs of banking and the percentage losses on assets have varied in close conformity with the rates. Also, the preceding discussion suggests that there are wide differences in the character of the business of banks in different parts of the country, which might be sufficient to explain the variations in the bank rates.

Some known factors, however, cause one to doubt if the line of causation is as clearly defined as has usually been thought. It is known, for instance, that many country banks have a customary lending rate which is applicable to a large proportion of their loans and which year after year remains unchanged. In a remarkable number of cases this customary rate is the legal rate of the state in which the banks are located. It is known also that when these banks come into possession of more funds than are needed to meet the home demand, they usually invest the surplus in outside paper bearing low rates rather than attempt to increase local demand by reducing their customary rate. These facts raise the question if custom and legislation do not often determine the rates, and the rates, in turn, determine the costs and the risks that are assumed by the banks.

Reference is made here solely to what banks designate as their

customary rate. This rate does not apply to all borrowers or to all classes of loans. In areas where farm mortgage loan institutions are active, the banks find it necessary to lower their rates on such loans as are affected by the competition of these institutions. There always are some borrowers, moreover, whose accounts are so valuable to banks that they are granted preferential rates. Customary rates apply to the general run of customers whose accounts are of no more than ordinary value and who do not have access to outside institutions with lower rates. This class, however, includes the majority of borrowers in many banks.

Time permits me to mention only one more problem. Of the many that remain unsolved, the question of country bank failures undoubtedly is most important. Since 1920 several thousand country banks have been forced to close, and in seven agricultural states, more than 40 per cent of all the banks operating in 1920 have failed. The loss to farmers resulting from these failures has been far and beyond the amounts reflected by the claims that have not been paid.

The studies that have been concerned with bank failures have produced very little information that can be used as a prevention in the future. It is clear that the difficulties of agriculture have been responsible to a large extent for bank failures, but the way to agricultural prosperity has not yet been lighted. Also, although little has been made public on this point, it is quite certain that prior to 1920 banking regulation in many states was of an exceedingly casual character, and that bankers had become careless as a result of many years of prosperity. While some progress has been made in improving bank regulation, the specific character of the reforms needed is still a matter of uncertainty. Bankers undoubtedly have learned much since 1920 that can be put to good use, but there is little or nothing in the written records to tell what this is and to serve as an element of protection when the next generation of bankers takes up the reins.

What farmers want is a banking service that is well adapted to their needs, that is rendered at reasonable cost, and that will not add to their difficulties by breaking down in times of agricultural depression. Except for figures on the number and distribution of bank failures, agricultural economists at present have no information of a character to indicate how well these require-

ments have been satisfied. Nor will they have such information until detailed studies of the original records of banks and farmers in representative areas of the country have been made. Just how these studies should be conducted is a matter that time and experience alone can decide. My effort has been merely to indicate the character of the problems of country banks and to hazard a few guesses as to the differences that will be found among them.

RURAL CREDIT IN CHINA

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CHINA has been an agricultural nation for over four thousand years, and somewhat more than 85 per cent of her total population belong to the rural class. It may be said that, in general, the credit needs of this large farming population are not nearly so well supplied as are the credit needs of the tradesmen and other classes of city persons, and that interest rates in the country are much higher than in the city. There are at least three important reasons for this state of affairs:

1. The small annual income of the farmers prevents them from making sufficient savings to meet such emergencies as funerals, sickness, short crops, and so forth. This statement is substantiated by the results of a study of 2,866 Chinese farms made by Professor J. Lossing Buck of the University of Nanking, which shows that the average farm area is 7.0 acres, and that the average yearly family income is only $139.[1]

2. There is a lack of mutual understanding between rural and urban classes which practically prevents investments in rural enterprises by city persons.

3. The credit supply of the country is far below the demand for credit. Furthermore, city banks do not accept farm land as security for loans.

Interest rates in country districts vary from 1.5 to over 10 per cent monthly. A monthly rate of 1.5 per cent is obtainable only from cooperative credit societies. As an extreme example of usury, it may be stated that the farmers near Nanking pay one dime as interest each month for every dollar borrowed.[2] This rate is available only to reliable farmers. Farmers with poor credit pay two dimes instead of one. In general, loans with high rates of interest are small loans made for short periods. This places the small farmer in a particularly unfavorable position. It is almost impossible for a farmer to regain his original economic position,

[1] Buck, J. Lossing: Chinese Farm Economy. p. 87. University of Chicago Press, 1930.

Family income is the actual amount of money gained by the operator from the year's business. It is obtained by subtracting the operator's cash farm expenses from his cash farm receipts. The currency in which values are given is Chinese silver currency (Mexican). The average bank exchange rate (Shanghai) of one hundred gold dollars into Chinese silver currency for the period 1921-25 was 189.30.

[2] One Chinese (Mexican) dollar equals approximately 12 dimes.

once he assumes debts bearing such heavy interest charges. As a result, the lands of the small farmers are gradually taken over by the money lenders. Eventually, the latter become landlords, while the farmers become tenants.

Surveys of some 500 farms, made in 1927, revealed the fact that the average amount borrowed per farm during that year was $174.82 while the average repayment of principal per farm during the same year was $34.35, resulting in an average net increase in indebtedness of $140.47 per farm. The average rate of interest charged on the above loans was 3 per cent monthly, while the average rate of interest earned on the capital invested in 2,866 Chinese farms, as reported by Professor Buck, was 9.4 per cent per annum. This explains why most of the farmers would rather continue to follow poor farming practices than borrow money for productive purposes. Failure to follow improved farming practices is not entirely due to a lack of knowledge concerning such practices, but is due in large part to the fact that credit is not available at a reasonable cost. The establishment of a legal rate of interest by the National Government has tended to lower the interest rate somewhat, but it has not entirely solved the problem.[3] Because of the heavy interest charges, farmers do not borrow except of necessity. In most cases the proceeds of the loans are used for consumptive purposes or to meet social obligations, rather than for productive purposes.

For the most part, farmers obtain their credit in one of the following forms: (1) short term cash or grain loans from private lenders; (2) farm mortgage credit; (3) shop credit; (4) pawn shop credit; (5) loans from mutual loaning and savings associations; and (6) loans from cooperative credit societies.

The percentage distribution of the various forms of credit, based on surveys of 500 farms, was as follows: Short term cash or grain loans, 32.6 per cent; farm mortgage credit, 27.7 per cent; shop credit 10.0 per cent; pawn shop credit, 5.7 per cent; credit from mutual loaning and savings associations, 24.0 per cent.[4]

[3] The National Government established a maximum legal rate of 20 per cent per annum. However, owing to the difficulty of obtaining loans at the legal rate, some of the farmers are willing, at the suggestion of the money-lender, to add part of the interest on the contract as principal so as to keep the interest charges nominally within the legal rate.

[4] Cooperative credit societies are a recent development in China. The amount of money borrowed by the 500 farmers included in the above survey from cooperative credit societies was a negligible percentage of their total indebtedness.

Short term cash or grain loans constitute the most common form of farm credit. The period of the loan varies from one month to one year, but is commonly from two to six months. Generally, neither security nor guarantee is required, and sometimes there is not even a written contract. The ease of obtaining such loans attracts the farmer to borrow in spite of the high interest rates charged.

In case the debtor fails to pay his debt when due, the professional money lender can go to the debtor's home and carry away the amount of grain necessary to pay the loan in full, without the consent of the owner. This can be done only by a professional money lender who has considerable power in the village and, in effect, enjoys a monopoly of the lending business. The government strictly prohibits such practices, and they have been done away with altogether in some regions.

Farm mortgage loans are commonly in rather large amounts, and the money is usually used to liquidate small debts or to defray extraordinary expenses such as those in connection with weddings or funerals. In mortgaging land, the farmer may either retain the right of farming the land by paying rent each year, or he may turn the land over to the mortgagee, in which case the income from the land would be counted as interest. The term of the mortgage is usually very long, but the farmer can redeem his land any time after the first three or five years.

The amount of shop or store credit varies in different localities. In some localities there is little or none while in others it makes up a large proportion of the total outstanding indebtedness.[5] In the latter case, farmers are very punctual in paying their debts each year so that they can secure credit for the year following. Prices charged purchasers who buy on credit are very much higher than prices charged cash customers. This is especially true of the more important commodities such as rice, soy bean cake and so forth.

Pawn shops charge 2 per cent interest monthly and the maximum period of such loans is eighteen months. Extra charges, in addition to interest, are made in some instances, which raises the actual interest rate to 2.5 per cent per month. In some places, farm im-

[5] For example, in Chang Shu District alone, farmers' purchases of bean cake amount to approximately $20,000,000 annually, of which over 60 per cent represents purchases on credit. Prices to persons buying on credit are at least 2 per cent higher than prices paid by cash customers, and in addition, interest at the rate of 2 per cent per month is charged on outstanding accounts.

plements and grain may be pawned. While the pawn shops provide a convenient source of credit for farmers, they do not help a great deal since the majority of farmers do not have much which they can pawn. The number of pawn shops is decreasing.

The mutual loaning society, which is indigenous to China, is very popular in both rural and urban communities. Such societies are always organized by someone who wishes to borrow. He invites a number of his friends and relatives to become members while he becomes head of the society. Meetings are held at regular intervals. At each meeting each member turns over to the head of the society a certain sum of money for each share which he owns and the money collected in this manner, except that collected at the first meeting which always goes to the head of the society without interest, is turned over to some one member. The number of such collections which an individual member may receive is determined by the number of shares which he owns. If he owns only one share, he may receive only one such collection, and so forth. The amounts which the individual members pay for the use of the funds differs somewhat depending upon whether or not they receive one of the earlier collections or one of the later ones. In general, the payments are so arranged that the persons receiving the last few collections have somewhat the advantage on the basis of the returns which they receive on their money. In effect, the members receiving the earlier collections are in the position of borrowers, while the members receiving the later collections are in the position of lenders. In all cases after each member has received a collection for each share which he owns, the society is dissolved. Some of the more important ways of determining the order in which collections shall be allocated to members are as follows:

1. By throwing dice, in which case the member throwing the highest figure receives the collection. After a member has received one collection for each share owned, he may not, of course, throw dice for subsequent collections.

2. By competitive bidding, the member offering to pay the highest interest rate receiving the collection. However, after a member has received one collection for each share owned, he may not bid for subsequent collections. Under this method, the interest is paid in advance by deducting the interest charge from the collection. This system of determining the order in which each member

shall receive the collection is prohibited by the government since it tends to result in usurious interest rates.

3. By determining the order in which each member is to receive the collection at the time of organization. This is preferable to either of the other methods mentioned.

The advantages of the mutual loaning society are: (1) that it mobilizes local credit resources; (2) that it enables members to obtain loans at somewhat more reasonable interest rates (about 2 per cent per month); and (3) it provides a means for saving. Its principal defects are: (1) the frequent inability of the head of the society to fulfil his obligations, namely, the collection of the amounts due from the various members, or the payment of such amounts from his own resources in case of their default; (2) the fact that the society is frequently dominated by a few powerful persons; and (3) the fact that in many cases the benefits are unequally distributed among the members.

The cooperative credit societies are a new form of organization in China, and are still in an early stage of development. The first society was organized in Nanking in the autumn of 1923. There are now over 1,000 such societies, located chiefly in the provinces of Kiangsu, Hopei, and Chekiang. Although cooperative credit societies are new in China, and are still in an experimental stage, the cooperative idea is not new to Chinese farmers. The National Government has taken steps to promote cooperative credit organizations.

Most of the cooperative credit societies have been very punctual in making repayments, but there has been little or nothing turned over to the societies in the form of savings of the members. Apparently the only way to build a sufficient reserve fund in each society is to force the members to increase their membership shares each year.

A few of the encouraging developments in the field of cooperative credit may be briefly summarized as follows:

1. The provision for unlimited liability of the members of cooperative societies has been found to work out satisfactorily. This is not surprising in view of the fact that personal credit is traditionally prevalent in the rural districts of China and that under the family system each member of the family is liable for the debts of every other member.

2. Cooperative "grain saving projects" have been successfully

carried out by some of the cooperative savings societies, thereby enabling their members to carry themselves through the difficult period which usually precedes each harvest. Each member deposits every year a certain amount of grain, the combined deposits forming a reserve supply for lending to members in time of need. Repayments, both of principal and interest, are in the form of grain.

3. Cooperative irrigation and drainage projects have been carried out by some of the cooperative societies. Such projects reduce the chances of crop failure due to flood or drought, and on the low-lying rice lands, enable the farmers to grow a winter crop on the land.

4. The granting of short term loans for cooperative marketing has enabled farmers to sell their cotton crop at a net premium of 21.3 per cent over the local price. In silk producing districts, improved credit facilities have enabled farmers to produce silk of a better and more uniform quality, thereby raising the price at which their product sells as well as greatly widening the market for it.

The Farmers' Bank of Kiangsu Province, which was established in July, 1928, by the Kiangsu Provincial Government, grants loans to the rural cooperative societies in Kiangsu Province, and the number of such societies in that province is increasing rapidly. Up to the end of June, 1929, the 495 rural cooperative credit societies in Kiangsu had a total paid up share capital of $31,104, and unpaid share capital of $8,964.

The lack of cheap and adequate credit in rural communities is one of the important factors limiting agricultural production and rural improvement in China. Cooperative credit societies have an important rôle to play in China in the development of credit and savings systems in rural districts, which will not only provide sufficient working capital for the farmers, but will provide it on such a basis that they can borrow with some hope of retaining their financial independence.

FACTORS DETERMINING THE VALUE OF FARM REAL ESTATE IN THE UNITED STATES

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THE SUBJECT assigned for discussion may for convenience, at least, be approached from two points of view: (1) that which takes the prevailing "level" of farm real estate values as its starting point and proceeds to an analysis of the variations about that "level," trying to isolate and measure factors with which these variations may be associated; (2) that which is concerned with the analysis of changes in the "level" of values, that is, the movement of values in time. It is, of course, clear that these two aspects are by no means independent of each other, but are merely different viewpoints with respect to essentially the same phenomena.

The term value, I should perhaps make clear, is used to mean probable market price, in conformity with common American usage. In most studies that have been made, it is based on estimates, rather than on prices actually paid.

The first point of view is that with which the American appraiser typically approaches his problem, at least until recently. His basis for appraisal was the prices of farms recently sold in the neighborhood at voluntary sale. His method of appraisal was comparison of the farm in question with those which had been sold. The factors he considered in his comparison and the weights he gave each were matters of judgment, experience, and personal opinion. As a result, wide differences of opinion and practice were found, both as to the factors to be taken into account and the importance to be assigned to each. Income, in contrast with practice in some other countries, was rarely taken into account, and if so it was merely a rough estimate, usually for a single year, used as a rough check on whether returns would be sufficient to cover interest requirements on the mortgage. As is characteristic of a new country, a free and active land market generally prevailed, and enough voluntary sales were usually at hand to serve as a basis for "purchase price appraising," as our practice has been called. The valuation of land for taxation in the United States also is typically defined by statute and court decision as the price which

would be paid at private treaty by a buyer willing but not compelled to buy, to a seller willing but not compelled to sell. Only very recently have proposals to tax real property on some sort of an "income" or "productivity" basis been broached in our state legislatures.

In contrast with the attention given the whole subject in other countries represented in this Conference, the subject of farm realty values occasioned little concern in the United States until very recently. As a result this brief paper will offer little else but fragmentary data and general, highly inferential observations which are admittedly not very satisfactory.

A few studies have been made in the United States, and others are under way in the United States Department of Agriculture, which attack the problem from the first point of view and attempt to verify these matters of appraisers' judgments and to give more precise expression to them. Among these studies may be mentioned those of Haas, Ezekiel, Wallace, and Tennant. Each of these was concerned with the relationship between some physical factor or group of physical factors and farm real estate values. Tennant was concerned primarily only with the influence of roads on values, which he obtained by asking farmers to estimate directly how much given road types added to the values of their farms.[1] Wallace, using multiple linear correlation, took as his data county averages for the 99 counties of Iowa, in which data, of course, variations in important factors affecting the value of individual farms may be obscured or obliterated.[2] Haas and Ezekiel used individual farms, the former in a county in southern Minnesota, the latter in a county in southeastern Pennsylvania.[3,4] Haas used cross tabulation and multiple linear correlation. Ezekiel used the multiple plane and solid curvilinear correlation methods which he had developed—an important contribution Because of the possible presence of intercorrelation and since so many of the relationships appear to be non-linear, use of the

[1] Tennant, J L., Reported in "Roads in New York State," by G. F. Warren and F. A. Pearson, Farm Economics, New York State College of Agriculture, February, 1929, p. 1053.

[2] Wallace, H A. What is Iowa Farm Land Worth?

[3] Haas, G. C. Sale Prices As a Basis for Farm Land Appraisal. Technical Bulletin No. 9, Minnesota Agricultural Experiment Station.

[4] Ezekiel, Mordecai. Factors Affecting Farmers' Earnings in Southeastern Pennsylvania, U. S. Department of Agriculture Bulletin No. 1400.

methods developed by Ezekiel seems necessary in studies of this kind. The factors with which Haas found values to be measurably associated were: depreciated value of buildings, per cent of the land in cultivation, soil quality as measured by crop yield, distance from market town, size of market town, and road type. The factors which Ezekiel used, and their coefficients of net determination, were:

	Per cent
Dwelling value	11.95
Value of dairy buildings	12.45
Value of other buildings	19.21
An index of crop yields	4.55
Percentage of the farm area tillable	2.81
Percentage of the farm area level	6.16
Type of road	.47
Distance from town	2.08

Figure 1 will serve as an illustration of the curvilinear nature of the relationships frequently found when multiple curvilinear correlation is applied.[5] These curves were obtained in an unpublished land appraisal study of individual farms made by the United States Department of Agriculture in Indiana. In building value, for example, a point is reached, in this case at about $50 worth of buildings per acre, where further additions of building value add nothing to the value of the farm. A similar relationship appears between the percentage of the farm area which is improved land and the value of the entire farm. After about 80 per cent of the farm area is improved, further additions apparently do not increase the value. Distance to market likewise is a curve. In this case at about 10 miles from town, additional distance does not greatly affect the value.

The available studies suggest these general shapes of the build-

[5] This chart is not especially readable in its present form. However, for present purposes the curves may be interpreted as follows, using "distance to market" as an example: A farm a half mile from market town, averaged about $215 an acre in the area studied. A farm 3 miles from town, after the influence of the other factors affecting value has been eliminated or "held constant" by statistical means so that only the influence of distance alone was left, averaged about $198 per acre or $17 an acre less. A farm 9 miles from market averaged about $185 an acre. This was about $30 an acre less than a substantially similar farm a half mile from town, and about $13 an acre less than the same kind of a farm was worth 3 miles from town. The other curves of figure 1 may be read in the same way.

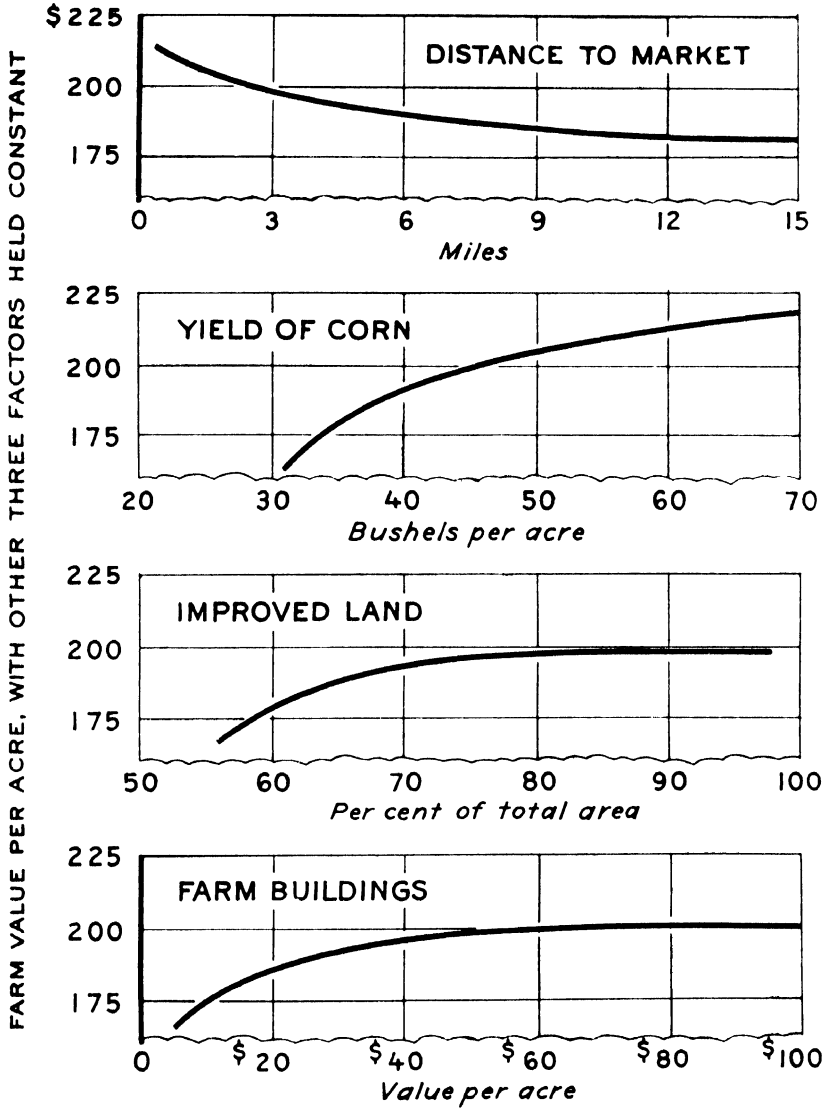

FIGURE 1. NET RELATIONS OF FOUR FACTORS TO THE VALUE OF INDIANA FARMS, 1922

An illustration of relationships obtained in the "cross section" type of study. Many of them are curvilinear. More research is needed to determine the usefulness of such studies in developing "experience tables" for appraisal use.

ing and distance curves to be more or less characteristic but in the other two factors rather marked differences have appeared. For these differences, variation in type of farming and farm practices appear responsible in part, at least. In a cash corn area in Iowa, for example, where all the land possible is desired for cultivation, the per cent of improved or tillable land curve did not flatten off at the upper end, nor did the yield curves, which may have been owing to differences in fertilization practice, in part at least.

The opinion may be ventured that studies which attempt to go beyond opinion and judgment and by statistical analysis, determine and measure factors by which farm to farm variations in value may be explained are yet too few in number, too widely scattered as to location, still too dissimilar in methodology, and each has still too much variation remaining unexplained, for any very definite conclusions to be drawn.[6] Satisfactory data, both in accuracy and scope, are difficult to secure at best. The demoralization of the land market, furthermore, has disturbed the regularity, and the normality, of relationships. The factors that have been used are not always free from criticism: For example, a more objective, more rigid, and more fully representative measure of soil quality than estimated crop yields should be tried. Perhaps soil type can be handled directly. Other factors than those used need to be tried. Presumably, for example, a farm of the optimum size is worth more per acre as a going concern than one not an economic unit. Then also, more attention may be worth giving to possible joint effects. If distance now is measured in hours and not miles, then the distance curves of figure 1 may show rather significant differences when broken down, so to speak, on road type by the use of correlation surface.

The differences in the apparent association with values of the same factor in the studies which have been made caution against generalization until further research has been made. Haas in his Minnesota county, for example, in 1919 found farms on graveled roads, other factors held constant, to be worth about $22 per acre more than those on dirt roads. Ezekiel, in Chester County, Pennsylvania, in 1922 found gravel or broken stone roads to give a

[6] Not more than two-thirds of the squared variability has been accounted for in any of the studies that have been made.

$15 per acre superiority over dirt roads, and hard-surfaced roads a superiority of $31 per acre over dirt roads. In a similar study made in southern Wisconsin by the United States Department of Agriculture in 1924, as yet unpublished, the differentials were much lower, being less than $3 per acre as between gravel and dirt roads and less than $8 per acre as between hard-surfaced and dirt roads.

However, despite all the difficulties perhaps some day there may be developed for the guidance of the appraiser "experience tables" of typical relationships similar to the tables of "depth influence," "corner influence," "alley influence," and so forth, now in every day use among the appraisers of city property.

With regard to the second aspect of the problem, perhaps brief consideration of the behavior of farm real estate values in the United States during the war period, but more particularly since 1920, will be of greater interest than for earlier periods, and will be sufficient to suggest several factors which appear to be important in determining the movement of values. A glance at figure 2 shows how widely average farm real estate values have varied in different sections of the country since the pre-war period, both in the extent of rise during the period up to 1920 and in the character and extent of movement since. These figures are the average estimated values of all farm lands with their improvements, of the United States Department of Agriculture converted to relatives with 1912-1914 as 100 per cent.[7] They are given here for the 9 geographic divisions in which the various states are customarily combined, which will serve roughly as an indication of the regional diversities.

Changes in farm real estate values, of course, presumably should be in some relation to changes in income. Lack of data, however, permits only presumptive relationships to be inferred. In the Northeastern States, which include both the New England and

[7] The sources of these data and the methods of their compilation are described in United States Department of Agriculture Circular No. 15, "The Farm Real Estate Situation, 1926-27," p. 33. A more detailed discussion of recent changes in farm real estate values and of the factors apparently involved therein than it was possible to give in this paper will be found in Circular No. 15; in succeeding issues of "The Farm Real Estate Situation" published as U. S. Department of Agriculture Circulars No. 60 and 101; and in the mimeographed report of the Department, "The Economic Basis of Farm Land Values."

Middle Atlantic divisions, average values rose comparatively little during the war period and fell comparatively little afterward, in relation to other sections of the country. One of the reasons for this may be that the prices of dairy products, an important source of income in the Northeast, rose least and were the last among

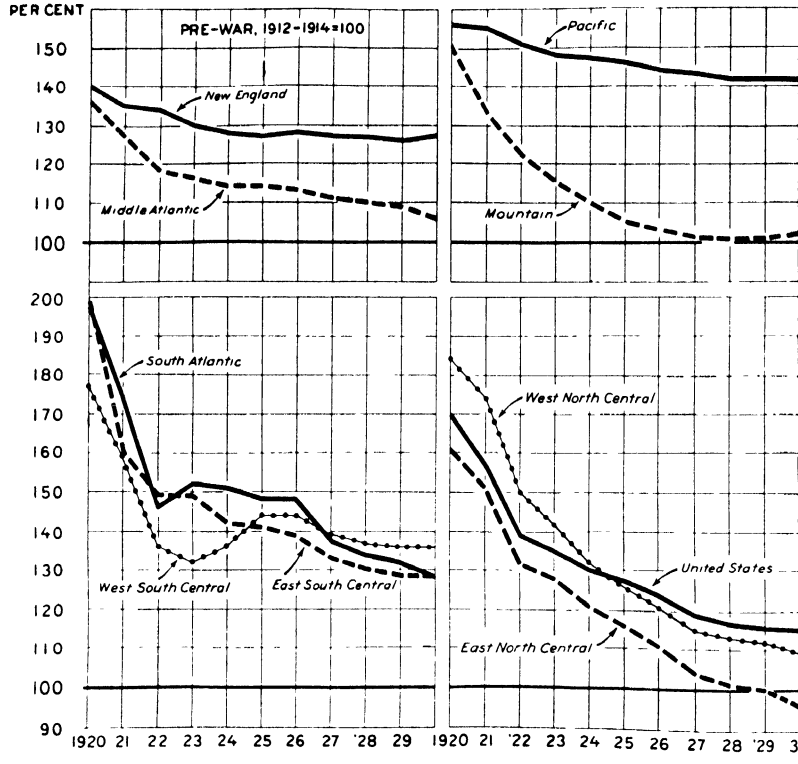

FIGURE 2. FARM REAL ESTATE· INDEX NUMBERS OF AVERAGE VALUE PER ACRE, CENSUS DIVISIONS, 1920-1930

The movement of average farm real estate values, both in the extent of the rise during the "boom" and in the character of their behavior thereafter, varied considerably as between the different sections of the country. Declines still continued to occur during the year ended March 1, 1930.

the major product groups to rise during the war period. In contrast, we find that average land values in the Cotton Belt showed the highest rise during the inflation period of all regions relative to pre-war. This appeared to follow in some degree, at least, the price of cotton, for of all the staple products, cotton rose fastest, and highest in price during the war-time period and was among

the earliest to rise. Values in the Middle West, on the other hand, during the war period rose to levels, in relation to their pre-war levels, higher than in New England, but not so high as in the South. In somewhat similar fashion the prices of meat animals and grains during the war rose more rapidly and to a higher average level than did dairy products, but not so high as did cotton. After 1920, the comparatively stable and reasonably high prices of dairy products no doubt contributed to the comparatively slight decline shown in Northeastern values. In the Southern States, the sharp recovery in cotton prices in 1922 and the subsequent 3 years of prices nearly double pre-war, no doubt were, in part at least, responsible for the abrupt flattening in the curve of average values there until the drastic cotton price-break of 1926. Prices of the principal products of the Middle West enjoyed no such recoveries as cotton, but fell to and maintained levels but little over pre-war for a number of years. No doubt the continuously sharp decline in Middle West land values throughout the early depression period was in part at least a reflection of this fact.

Other considerations may be mentioned at this point. Prices of the same product, as Dr. Warren has pointed out, rose more in the Middle West during the war period than in the Northeast, and after the war, fell more in the Middle West than in the Northeast.[8] Furthermore, as Mr. Hill pointed out, farmers in a large "deficit" area in the Northeast were able to share the higher post-war retail prices because of favorable location near markets, to a greater degree than in other sections of the country.[9] Another factor more important in the Northeast than elsewhere is the movement of city workers to the country and the conversion of farms to other uses, essentially residential, which apparently gathered momentum subsequent to 1920 and tended to bring into values in many areas an upward influence.

Inadequate though these observations are, they indicate a rough relationship between the behavior of farm realty values and the behavior of the prices of the principal products to which these lands are devoted. But the movement of products prices obviously falls far short of adequate explanation. Over against these, of course, must be placed the continued high levels of prices of

[8] Warren, G. F. and Pearson, F. A. The Agricultural Situation.
[9] Mr. Hill's paper appears elsewhere in this volume.

cost goods, of farm wages, and of taxes, which require little comment. The extent to which these have been offset by greater efficiencies is difficult to estimate. The apparent inability of farm taxes to recede in particular is a growing discouragement to land ownership. During 1929 the national farm tax index of the Bureau of Agricultural Economics rose again, to 267 per cent of pre-war from a 1928 position of 263 per cent. The rise was pretty generally distributed throughout the country. The corresponding 1920 figure was 155. The immediate tax outlook gives scant hope of recession, continued increase rather than decrease being expected.

But it is difficult, for lack of data, to infer what the net earnings of farm real estate have been, as compared with pre-war. We have no farm real estate income indexes. Were adequate data available, however, and assuming that the many other factors were known and measurable, it might still be difficult to know how changes in realized income would affect market judgments and action, particularly year to year fluctuations. Land yields its services year after year. A single year's increase or decrease in value possibly may or may not be reflected in a change in value, at least not immediately. How great that year's increase or decrease is, for example; what its relationship is to the course of realized incomes over preceding years; how it accords or differs with what is looked upon as the normal or usual or expected income experience as regards trend and variability about that trend; the extent to which it is considered more or less temporary or as an indication of the future trend—these and other considerations as regards realized incomes affect those market judgments which are necessarily prerequisite to the bids and offers out of which market prices are made. Realized incomes may serve as a point of departure, at least, for estimating what buyers and sellers are willing to pay or accept, *i.e.*, what they think "land is worth." But to the extent that farms are bought largely by farmers, realized incomes serve also as a basis for what farmers are able to pay. Farm real estate dealers now, for example, not infrequently remark that on an earnings basis, farm prices now seem attractive: but prospective purchasers have insufficient funds with which to negotiate purchase.

However, the statement just made regarding realized incomes affording a basis for estimating what land is "worth" probably is, strictly speaking, correct only to the extent that realized incomes

are used as a guide to estimates of the future. Strictly and logically speaking, values can be based only on future earnings or rather, ideas about them, for realized earnings are a thing of the past. Entering into this estimate of the future, rough or subconscious as it may be, is also, of course, the element of comparison of rewards in agriculture with probable returns in other lines of endeavor which may be considered to offer alternative employment of one's capital, management and labor. Since 1920, the question of alternatives has been presented with a force not equalled in recent years. Such a readjustment affecting as it does the desirability of farm ownership may show itself in falling values even though no great change in earnings had been apparent.

In any case average farm real estate values have continued to decline to levels below what the comparative post-war levels of products-prices, relative to pre-war, and the post-war recovery in incomes from the low points of 1921 and 1922, had led some observers to expect. Other factors apparently are involved, although their importance is difficult to estimate. One such factor, at least in certain states of the Middle West, where data on that subject are available, is suggested by the fact that farm real estate values since 1920 have fallen faster than have farm real estate incomes as measured by cash rents, whereas prior to 1920, values rose faster than rents. In Iowa, for example, where our data on this subject are most adequate, the ratios of gross cash rent to value since 1900 averaged as follows: 1900, 7.7 per cent; 1910, 4.3 per cent; 1920, 3.6 per cent; 1925, 4.9 per cent; 1929, 5.6 per cent; 1930, 5.9 per cent.

The available net cash rent data, after the deduction of taxes and building depreciation, showed an average ratio of 2.6 per cent net in 1920, and 3.4 per cent in 1925, also an increase.

The current rate of return, in other words, has been widening or one may say that values are being written down, in the direction of giving a current ratio of income to value more in line with that obtainable on alternative employments of capital. If the conclusions of Chambers were correct, namely, that the tendency of land values to rise faster than rents prior to 1920 was owing primarily to a progressively increasing capitalization of anticipated future increases in income, then basically this process would seem to be largely a matter of counting less generously than formerly upon

future increases in income.[10] In an area which included Iowa, the northern half of Illinois, southern Minnesota, southeastern South Dakota and eastern Nebraska, Chambers estimated that in 1920, 56 per cent of the average current valuations of farm real estate was based on anticipated future increases in income, or, to state it another way, 56 per cent of the current value was not paying interest at the current average first mortgage rate of 5.5 per cent. The process may in some degree involve the oft-heard comment that farmers of today, especially the "younger generation" are insisting on a better living than used to be acceptable. Perhaps they are not as content as they once were to dig into the share of their income which should go to living in order to get money to pay off 6 per cent mortages on land priced to yield only half that much. The tendency to take "earning power" into greater account than formerly in appraisal for mortgage purposes may also have been a contributing influence.

Yet another factor apparently still exerting pressure upon values in some sections, more especially in the Middle West and South, is a large amount of foreclosed and other distress land thrown on the market or hanging over it—how large is not known. The wave of forced sales apparently has not yet run its course as is indicated by figure 3. In some sections, as in the Middle West and Southeast, more forced than voluntary transactions are taking place. In general, forced sale rates as yet seem little disposed to turn downward very rapidly. We also know, of course, that mortgages may and do postpone foreclosure. Undoubtedly an appreciable amount of excessive indebtedness remains to be adjusted. In some sections complaint has been made of price cutting by competing mortgagees seeking to get involuntarily acquired real estate off their books.

Another influence, of which real estate dealers seem to have been considerably more apprehensive during the last year than in preceding years, is that the principal sources of mortgage credit are placing their money much more conservatively than formerly. All phases of the extension of mortgage credit, generally speaking, have been revised toward greater strictness; applications are subjected to greater scrutiny, loan limits have been reduced, efforts to scale down renewals have been reported, loan territory has been

[10] Chambers, C. R. Relation of Land Income to Land Value. U. S. Dept. of Agr. Bulletin No. 1224.

contracted, and, in addition, interest rates recently have risen. Although the long time result of this more conservative attitude no doubt is for the better, the short time result during the transition from higher to lower value levels brings its problems. In any case, the change can hardly react otherwise at this time than to retard buying, temporarily at least.

Although perhaps a minor factor so far as the country as a whole is concerned, yet in some areas the element of physical deteriora-

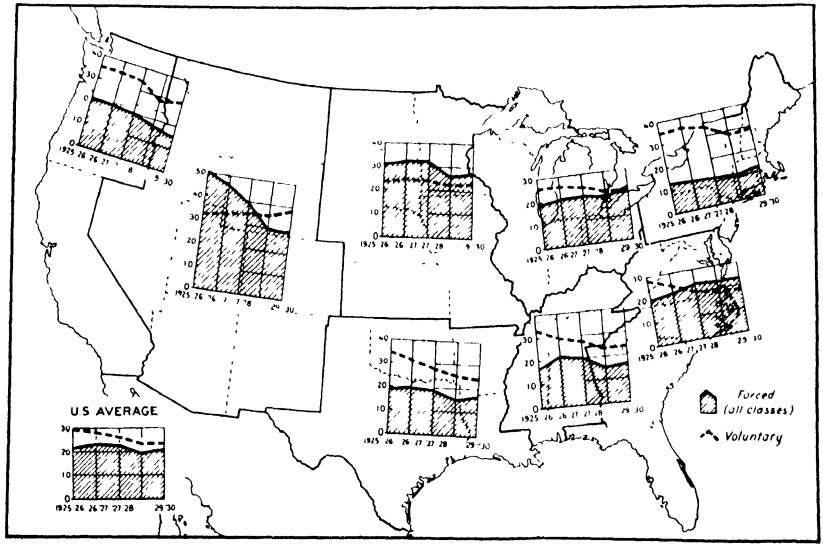

FIGURE 3. NUMBER OF FORCED AND VOLUNTARY SALES PER 1,000 FARMS, YEARS ENDING MARCH 15, 1926-1930

In some parts of the United States, the volume of mortgage foreclosures and other "forced" sales of farms has equalled or exceeded the number of voluntary sales in recent years. The large number of forced sales has exerted heavy pressure on farm real estate values.

tion of the land, the buildings and fences, and of other facilities is reported to be exerting an appreciable downward influence on values. In times of depression adequate farm maintenance becomes difficult.

In closing, mention at least should be accorded to changes in the utilization of land to higher uses, even under depression conditions, as has been shown for example in the transition from grazing to cotton and wheat growing in areas of the Great Plains. The rise of values there since 1920 has been a conspicuous contrast to the

declines which took place elsewhere. Recognition should also be made of especially adverse production conditions, as for example, the unparalleled boll weevil damage in Georgia and South Carolina in 1921 and following, which, directly and indirectly through other adverse conditions it helped to engender, was an important factor in the very severe declines shown in average farm real estate values since 1920 in those states.

THE RELATION OF VARIOUS FACTORS TO FORECLOSURES OF FARM MORTGAGES IN THE NORTHEASTERN UNITED STATES

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THE MATERIAL presented in this paper is based on the loaning operations of the Federal Land Bank of Springfield from organization in 1917 to May 31, 1929. The Federal Land Bank of Springfield is one of the twelve federal land banks authorized to make loans on farm mortgage security as provided for by the Federal Farm Loan Act of 1917. It is authorized to operate in the territory designated as the first Federal Land Bank District, comprising the six New England States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut, and the Middle Atlantic States of New York, and New Jersey (figure 1).

From organization in 1917 to May 31, 1929, the Bank made 20,186 loans in the amount of $64,836,200. Of these loans 17,098 or 84.7 per cent were outstanding as of May 31, 1929, 2,413 or 12.0 per cent had been paid in full, while 675 or 3.3 per cent had been foreclosed.

The Federal Land Bank of Springfield is the smallest of the twelve federal land banks. Six of the twelve banks have loans outstanding in excess of 100 millions of dollars. The six remaining banks vary in size from the Springfield Bank which has outstanding approximately 50 millions of dollars in loans to the Spokane Bank which, as of December 31, 1929, had a little over 94 millions of dollars in loans (table 1).

One measure of the financial success of land bank operation is the degree to which the various banks have escaped the necessity of taking over farms through foreclosure. The ratio of real estate owned to net mortgage loans outstanding provides a rough index of the ratio of frozen assets to earning assets and affords at least one measure of the success with which the various federal land banks have been operated. In interpreting the figures for an individual bank or for the system as a whole, it must be kept in mind that these banks started operations in 1917 in a period of agricultural prosperity and, in many areas, of inflation in land values. It was inevitable that a certain number of mistakes should have been made. However, mistakes in making farm loans during

this period were not confined to the federal land banks as many loaning agencies, some with years of experience behind them, could testify. Unfortunately, published figures showing the relation of farm real estate acquired to farm loans outstanding are not available for the majority of private loaning agencies. It may be

FIGURE 1. FIRST FEDERAL LAND BANK DISTRICT

The continental United States, excluding Alaska, is divided into twelve federal land bank districts, with a federal land bank in each district. The Federal Land Bank of Springfield is authorized to make loans in the First District which comprises the states outlined in the above map.

noted in passing that the ratio of real estate owned to net mortgage loans outstanding for the 48 joint stock land banks (*excluding* the 3 banks in the hands of receivers), as of December 31, 1929, was 2.40 per cent compared with a figure of 1.39 per cent for the twelve federal land banks. Joint stock land banks are private organizations operated for private profit. They are, of course,

subject to the supervision of the Federal Farm Loan Board as are the federal land banks.

COMPARISON OF FEDERAL LAND BANK LOSSES AND LOSSES OF NATIONAL BANKS

While the two forms of business are not strictly comparable, it is interesting to compare the losses of national banks operating

Table 1. Net Mortgage Loans Outstanding and Real Estate Owned as of December 31, 1929, for Each of the Twelve Federal Land Banks

Federal land bank	*Net mortgage loans as of December 31, 1929*	*Real estate owned as of December 31, 1929**	*Per cent which real estate owned is of net mortgage loans*
Omaha.	$165,717,281	$582,203	0 35
Houston	150,725,922	70,004	0.05
Louisville .	123,642,799	714,954	0.58
St. Paul . .	123,025,878	3,890,207	3.16
New Orleans .	109,655,523	1,492,717	1.36
St. Louis.	107,242,914	802,924	0.75
Spokane	94,326,576	4,270,661	4.53
Wichita .	88,983,871	848,310	0.95
Baltimore	69,937,488	412,128	0.59
Columbia .	62,448,934	2,671,046	4.28
Berkeley	52,264,080	359,348	0.69
Springfield	50,542,650	573,444	1 13
Total	$1,198,513,916	$16,687,946	
Average .			1.39

* Carrying value. Real estate is carried on the basis of the unpaid balance of the original loan or the re-appraised value of the farm, whichever is the lower

Important—Formerly, at least, it was the practice in certain of the federal land bank districts for national farm loan associations to take title to foreclosed properties. To the extent that this has been done in some districts and not in others, the figures in the above table relative to real estate owned are not strictly comparable. In no case, however, does this materially affect the relationships brought out in the above table.

in the First Federal Land Bank District with losses of the Federal Land Bank of Springfield. Most of the national banks in the First District are old well-established organizations and, I suppose, are as conservative as the banks in any section of the United States. However, whether measured by the ratio of losses to total loans outstanding, or by the percentage of gross earnings charged off as losses, the losses of the Federal Land Bank of Springfield have been smaller than the losses of national banks operating in the same territory (tables 2 and 3). Losses of the Federal Land Bank of Springfield were negligible prior to 1925 while losses of na-

tional banks were higher during the period 1921-1924 than during 1925-1928, which is the period covered by the data in tables 2 and 3.

RELATION OF VARIOUS FACTORS TO FORECLOSURES OF FEDERAL LAND BANK LOANS

An analysis has been made of the 20,186 loans made by the Federal Land Bank of Springfield from organization in 1917 to May 31, 1929, with the object of determining the classes of loans

Table 2. Losses of National Banks Operating in the First Federal Land Bank District Compared with Losses of the Federal Land Bank of Springfield, 1925-1928*

Year	*Per cent which losses of national banks were of loans and discounts outstanding at end of year*	*Per cent which losses of the Federal Land Bank were of mortgage loans outstanding at end of year*
1925	0.67	0 10
1926	0 45	0 10
1927	0 59	0 12
1928	0 59	0.17
Average	0 58	0 13

* Net losses on loans and discounts were not available for 1925 and 1926 for national banks. Charge-offs were itemized, but recoveries from all sources were reported as a single figure. The above figures are based on estimates, assuming that recoveries for 1925 and 1926 bear approximately the same relation to gross charge-offs as they did in 1927 and 1928 Data for national banks are from reports of the Comptroller of the Currency. Losses for the Federal Land Bank include actual losses on real estate acquired and sold, prospective losses on farms owned as of the end of each year, and all miscellaneous charge-offs.

Figures for national banks refer only to the banks operating in the First Federal Land Bank District, exclusive of banks in Boston, Albany (except in 1928), Brooklyn, Bronx, Buffalo, and New York City

in which the percentage of foreclosures has been highest and the classes in which losses have been heaviest. This study was undertaken by the Bank with the hope that an analysis of past loaning operations might prove of some assistance in shaping future loaning policies.[1]

[1] The data presented in this paper are from research investigations undertaken and financed by the Federal Land Bank of Springfield, Massachusetts. The bank, operating as it does in the Northeastern States which is a district where farm mortgage financing has been done almost entirely by local banks and individuals, was in a way a pioneer in this field. The purpose of the Bank's studies was to analyze its loaning experience over the first twelve years of its operations.

It should be understood that the writer alone is responsible for the statements made in this paper and that the opinions expressed and the conclusions reached do not necessarily agree with those of the directors, officers, or members of the Bank's staff.

Table 3. Percentage Distribution of Gross Earnings of National Banks Operating in the Springfield Land Bank District, and of the Federal Land Bank of Springfield, 1925 to 1928*

	1925		1926		1927		1928		Four-year average	
	National banks	Land Bank	National banks	Land Bank	National banks	Land Bank	National banks	Land Bank	National banks	Land Bank
Interest charges	37.7	77.0	39.4	75.4	39.6	78.2	40.2	77 9	39.3	77.2
Operating expense	31.9	10 9	31 8	9 9	31.6	11 0	31 0	10.6	31.5	10.7
Net charge-offs	8.9	1.8	5.8	1.7	8.7	2 5	7.8	3 2	7.8	2.2
Net additions to undivided profits	21 5	10.3	23.0	13 0	20.1	8.3	21 0	8.3	21.4	9.9
Total	100 0	100 0	100 0	100.0	100.0	100 0	100.0	100.0	100.0	100.0

* Figures for national banks *do not include* banks in the following cities: Boston, Albany (except in 1928), Brooklyn, Bronx, Buffalo, and New York City.

Interest charges for national banks include interest and discount on borrowed money, and interest on deposits. Interest on farm loan bonds and interest on borrowed money are included for the Federal Land Bank of Springfield.

Net charge-offs for national banks include depreciation on buildings, furniture, and fixtures, etc., in addition to losses on loans and discounts. In order that the figures might be as nearly comparable as possible, the corresponding items were transferred from operating expense to "Net charge-offs" for the Federal Land Bank. In addition to the actual losses on acquired real estate "Net charge-offs" as reported for the Federal Land Bank include prospective losses on farms on hand as of the end of each year. Prospective losses represent the difference between the Federal Land Bank's investment in real estate and the re-appraised value or asking price of the Land Sales Department.

Figures for national banks are for the years ending June 30. For the Federal Land Bank, they are for the years ending May 31.

THE DATA

The data used were confined to those available in the files of the Bank. These were not entirely satisfactory. It was not possible, for example, to determine the class of milk market in which dairy farmers sold milk, that is, whether it was sold to a Grade A or Grade B fluid milk plant, or to a cheese factory or condensery. The market in which milk is sold in the Northeast has an important bearing on returns. Again, soil maps are not available for the major portion of the District and only the most general conclusions could be drawn as to the relation of soil type and foreclosures. It was not possible to make satisfactory analyses of the relation of types of farming and foreclosures, from the data at hand. There is need for further and more detailed studies of the relation of certain of these factors to foreclosures and losses.

MARKETS

In the states of Massachusetts, Rhode Island, Connecticut, and New Jersey, in the counties in New York State along the lower Hudson and on Long Island, and in the southeastern counties of New Hampshire, farmers, for the most part, have access to excellent markets. In 1925 there were approximately 30 persons in cities in this area to every person on a farm.[2] This large city population provides excellent markets for the products of the area, particularly perishable products such as fluid milk, fruit, truck crops and so forth. Changes in habits of consumption and general prosperity in the cities, at least until a comparatively recent date, has doubtless tended to increase the demand for such products. The supply of these products produced locally is insufficient to meet local needs. The development of hard-surfaced roads and motor truck transportation has enabled producers in such areas to greatly reduce transportation costs, and in most cases to eliminate one or more of the usual steps in getting products from the producer to the consumer. They have, in effect, been able to sell their products in a retail market. The advantage which they have had over the producer less favorably situated, who has

[2] See figure 1 for area referred to. Data as to the total estimated population of this area in 1925 were taken from the Statistical Abstract of the Department of Commerce. Figures as to the farm population were taken from the 1925 Census of Agriculture. The term "city population" as used here refers to the difference between the total estimated population in 1925, and the farm population as reported by the Census.

had to sell his products at a farm price representing the price paid by the consumer less high costs of distribution, is difficult to estimate Such price series as are available indicate that producers in this area have received considerably better prices for their major farm products than have producers in areas less favorably located with respect to markets.[3] Rarely, if ever, are price differentials of this sort fully offset by increased costs of production. I think it may be said that with the exception of the tobacco industry in the Connecticut River Valley, there has been no real agricultural depression in the territory which I have chosen to designate as the major deficit area of the First Federal Land Bank District.[4]

The above statement would seem to be substantiated by the loaning experience of the Federal Land Bank of Springfield. The Bank had made 7,140 loans in this area as of May 31, 1929. Of these loans, 108 or only 1.5 per cent had been foreclosed as of the above date, compared with 4.3 per cent foreclosures among the 13,046 loans made in the balance of the District. Losses have been negligible. It should be stated further that a larger percentage of the loans in the deficit area were made during the period from 1917 to 1922 than was the case for loans made throughout the balance of the District. The smaller percentage of foreclosures in the deficit area is not to be explained, therefore, by the fact that more of the loans in this area were made during recent years. Furthermore, there is no reason to believe that *all* of the

[3] Statistical Bulletin No. 14, United States Department of Agriculture, January, 1927.

Warren, G. F., and Pearson, F. A.: Farm Economics, No. 64, page 1233, February, 1930. New York State College of Agriculture, Cornell University, Ithaca, New York.

For prices of individual farm products in Connecticut, New Jersey and New York, see the following publications:

1. Economic Digest for Connecticut Agriculture, Connecticut Agricultural College, Storrs, Connecticut.
2. Economic Review of New Jersey Agriculture, New Jersey State College of Agriculture, New Brunswick, New Jersey.
3. Farm Economics, New York State College of Agriculture, Cornell University, Ithaca, New York.

For differences in prices received by farmers for milk sold in the Connecticut and in the New York markets for the period 1922-1926, see Storrs Agricultural Experiment Station bulletin 146, November, 1927, pages 143-145.

For differences in prices received for eggs by producers on Long Island and in upstate New York, see Economic Studies of Poultry Farming in New York, I and II, May, 1927, and October, 1927. New York State College of Agriculture, Cornell, University, Ithaca, New York.

[4] The term "deficit area" is used here in a restricted sense. It refers to any area in which the supply of the major products produced is not sufficient to meet the needs of the area.

22 appraisers who made loans in this territory were keener students of land values than were the 38 appraisers making loans in other parts of the District.[5]

While the importance of markets as a factor affecting farming returns, and indirectly the percentage of foreclosures in the deficit area, is emphasized, there are other important factors which must not be overlooked. There are, within this territory, areas of excellent soils such as in the Connecticut River Valley, which are well adapted to the economical production of intensive cash crops. It should be pointed out on the other hand that there are also areas of rather poor soils on which it is doubtful if a profitable agriculture could be carried on if the location of the farms relative to markets were less favorable.

An additional factor has undoubtetdly had a stabilizing influence on land values in this area, namely, the increasing demand for farms to be used as homes by persons working in cities. This movement has resulted, of course, from the development of hard-surfaced roads and automobile transportation. City workers may buy homes, five, ten, or even fifteen miles from their place of work. Small, well-located properties, which in some cases are not particularly desirable as farms, are often readily saleable as homes for city workers who desire to live in the country. However, the influence of this factor is, in the opinion of the writer, frequently over-emphasized in explaining trends in land values in such states as Massachusetts, Connecticut, Rhode Island, New Jersey, and in the counties in New York along the lower Hudson River. Prices received for the major farm products of these areas have been relatively good, as have farming returns. In most discussions of farming returns, emphasis is placed on the problem of maintaining low cost of production. The fact that a farmer with average costs of production who is in a position to market his products at better than average prices may make a better return than a farmer with lower than average costs of production, but who must sell at lower than average prices, is frequently overlooked. Second class land, advantageously located with respect to markets, may, as a matter of fact, be worth more than first class land at a considerable distance from markets. Distribution costs have been

[5] The number of appraisers referred to above includes only those appraisers who had made 50 or more loans as of May 31, 1929.

high relative to the prices of farm products since the war.[6] Never has the producer located close to large urban centers had so great an advantage over the producer less favorably located, as during the past ten years. In the outlying districts, the producer whose farm is located on a hard-surfaced road near a shipping point has had a corresponding advantage over the producer located on a dirt road far from markets. Such advantages are seldom fully reflected in land values. It is cheaper to buy location than to buy transportation.

ROADS

It is difficult to estimate the full effects on the agriculture of the Northeast of the development of hard-surfaced roads and motor truck transportation. The farmer whose farm is located on a hard-surfaced road has many advantages over the farmer whose farm is located on a dirt road. Milk truck routes tend to follow the hard-surfaced roads. Feed dealers will frequently deliver quantity purchases of feed at little or no additional cost to a farm on a hard-surfaced road, where they will not make delivery if they have to truck over dirt roads. The farmer whose farm is on a hard-surfaced road is frequently able to sell his produce directly to a buyer who will take delivery at the farm. Furthermore, farmers have frequently been able to make profitable changes in their farming practices following the construction of an improved road. Studies which have been made of the seasonal production of market milk, for example, show that the farmer whose farm is on an improved road tends to produce a larger percentage of his total yearly production during the fall and winter months when prices are relatively high, than does the producer whose farm is located on a dirt road, presumably, because he has somewhat less difficulty in hauling feed and milk during the winter months.[7]

As previously pointed out, location relative to markets has never been so important as during the past ten years. A farmer whose farm is five or six miles from market on a hard-surfaced road may actually be closer to market in point of time than a farmer

[6] Warren, G. F., and Pearson, F. A.: Farm Economics No. 64, February, 1930, p. 1417.

[7] For advantages of location on a hard-surfaced road in New York State, see Tennant, J. L.: The Relationship between Roads and Agriculture in New York, Cornell University Agr. Exp. Sta. bull. 479, pp. 31-34, May, 1929.

who is located only one or two miles from market but whose farm is on a dirt road. As Dr. J. L. Tennant points out in his bulletin on the relationship of roads to agriculture in New York, distance to market is no longer measured in terms of miles, but rather is it measured in terms of hours.

Aside from the advantages of location on a hard-surfaced road as affecting income, a farm on a hard-surfaced road is a more desirable place to live than is the farm on a dirt road. The farmer whose farm is on a hard-surfaced road and who owns an automobile is no longer isolated at any season of the year. This is a factor which cannot be overlooked in making mortgage loans. The majority of farmers are no longer willing to live on isolated farms where they are shut in, due to impassable roads, during a large part of the year.

Farmers are coming more and more to appreciate both the economic and social advantages of good roads. For this reason, farms located on hard-surfaced roads are much more readily sold than are farms on dirt roads. The marketability of the farm is an important consideration in making mortgage loans. In last analysis, the average lender on a farm mortgage is interested in the farm primarily from a security standpoint. Assuming equal earnings, a security which is readily marketable is a more desirable security than one which is more difficult to sell, whether the security in question be a share of stock in an industrial corporation or a farm.

The Federal Land Bank of Springfield had made 6,725 loans as of May 31, 1929, on farms which were located on improved roads at the time the loan was made. Of these loans, 130 or 1.9 per cent had been foreclosed as of the above date, compared with 4.0 per cent foreclosures among the 13,396 loans made on farms located on unimproved roads (table 4). Of the loans made in New York State on farms located on improved roads 2.1 per cent had been foreclosed as of May 31, 1929, compared with 5.2 per cent foreclosures among loans made on farms located on unimproved roads.

It should be pointed out that part of the above difference in the percentage of foreclosures among loans made on farms located on improved and on unimproved roads is due to factors other than the type of road. In the Northeast, there is a certain correlation between improved roads and other favorable factors.

This is particularly true in such an area as southern New York State. This is a glaciated area of rough topography. Railroads as well as roads tend to follow the valleys. In this area, the better soils are to be found at the lower elevations. A relatively large percentage of all farms on improved roads in this area are valley farms, which means that they are on the better soil types and in addition are more accessible to shipping points, social centers and so forth. This probably explains to a large degree the fact that there is a greater difference between the percentage of foreclosures

Table 4. Relation of Type of Road and Foreclosures Among Loans Made by the Federal Land Bank of Springfield**

Area, and type of road	*Number of loans made*	*Number foreclosed*	*Per cent foreclosed*
New York State:			
Improved rads*	3,065	63	2.1
Unimprovedo roads	6,078	319	5.2
First District:			
Improved roads*	6,725	130	1.9
Unimproved roads	13,396	542	4.0

* Includes concrete, brick, and macadam roads

** The above figures refer only to the type of road passing the farm at the time the loan was made Hard-surfaced roads have since been built past many of the farms reported above as being located on dirt roads For this reason the actual difference in the percentage of foreclosures among loans made on farms located on improved roads and loans made on farms located on unimproved roads, is greater than the above figures would indicate.

among loans made on farms located on improved and unimproved roads in New York State, than in the District as a whole. It is a significant fact, however, that considering the District as whole, the percentage of foreclosures has been a little over twice as great among loans made on farms located on unimproved roads, as among loans made on farms located on improved roads.

QUALITY OF THE TILLAGE LAND

As previously stated, satisfactory data as to soil type were not available. The appraisers were asked, however, to appraise the land separately from the buildings. While admittedly an unsatisfactory measure, the appraised value per acre of the tillage land affords at least a rough index of soil quality. Such a figure is, of course, open to several objections. Two appraisers might very

well place different values on the same piece of land at a given time. The same appraiser would doubtless have appraised a given property at a lower figure in 1930 than in 1920. The appraised value per acre of the tillage land is affected to some extent by the size of the farm, its location, and even such factors as the kind and condition of the buildings. Any factor which affects the value of the farm as a whole is almost certain to affect the value of all of its component parts, even though the increased value may be due to one or two factors. Even admitting all of the above weaknesses of the appraised value per acre of the tillage land as an index of soil quality, it may still be assumed, I think, that 1,000 farms with tillage land appraised at less than $40 per acre would represent a poorer lot of farms as regards soil type, than would 1,000 farms with tillage land appraised at from $40 to $80 per acre. At least differences in the appraised value per acre of tillage land represent differences which, in the opinion of the appraisers, are of economic significance.

There is a close relationship between the appraised value per acre of the tillage land and foreclosures. Of 841 loans made on farms with tillage land appraised at less than $25 per acre, 43 or 5.1 per cent had been foreclosed as of May 31, 1929, compared with 1.0 per cent foreclosures among the 314 loans made on farms with tillage land appraised at $295 or more per acre (table 5).

BUILDINGS

Buildings are an important consideration in the First Federal Land Bank District. In none of the other eleven land bank districts does the value of the buildings represent so large a percentage of the total value of the farm. The 1925 Census of Agriculture reported the value of the buildings in the First District as equal to 53 per cent of the total value of the land and buildings, while in the United States as a whole, buildings accounted for only 23.7 per cent of the total value of land and buildings.[8]

[8] Any attempt to evaluate land and buildings separately is always unsatisfactory, since farms are sold as units, and not in separate parts. The value of buildings as reported in the Census represents the estimated value of the buildings as reported by the farmer. The value of the land is obtained by deducting the value of the buildings from the value of the farm as a whole, as reported by the farmer. If the farmer had been asked six months after the Census was taken to estimate the value of the land separately, it is doubtful if the figure reported would agree with that derived by the Census. However, since all of the Census figures are on the same basis, they are fairly satisfactory for purposes of comparison as between different areas.

The proportion of the total value of the farm represented by the buildings is, of course, largely dependent on the type of farming practised. In the Northeast, dairying and poultry farming require relatively high investments in buildings. It does not follow that because a relatively high percentage of the total value of a farm is represented by buildings that it is necessarily a poor loan risk. It is true that buildings may be allowed to depreciate but it will be found that this occurs, in general, only in regions where agriculture is unprofitable. Land may also be allowed to depreciate in such regions. Again, it is frequently stated that buildings are destructible while land is not destructible and therefore it is not safe to loan in a region where buildings represent a

Table 5. Relation of the Appraised Value Per Acre of the Tillage Land and Foreclosures Among Loans Made by the Federal Land Bank of Springfield

Appraised value per acre of the tillage land	*Number of loans made*	*Number foreclosed*	*Per cent foreclosed*
Less than $25	841	43	5.1
$25–$54	7,592	352	4.6
$55–$94	5,896	174	3.0
$95–$194	4,523	86	1.9
$195–$294	967	13	1.3
$295–over	314	3	1.0
Total.	20,133	671	
Average .			3 3

large proportion of the total value of the farm. It may be pointed out that land as well as buildings may be "destroyed" from an economic standpoint. Soil erosion due to water or winds, insect pests such as the boll weevil or corn borer, and weeds such as the Russian thistle or sow thistle may effectively "destroy" land from an economic standpoint. Buildings may be insured against destruction by fire and as long as the type of farming followed is profitable it may be assumed that buildings are likely to be kept in good repair. At least the chances that they will be kept in repair in a good region are as good as the chances that a piece of land in a good farming area will be properly cultivated. In making a long-term loan on a farm property, the important consideration is not as to the percentage of the total value of the farm represented by buildings and the percentage of the value represented

by land. The important consideration is whether the farm as a *unit* is likely, over a series of years, to be able to successfully compete for the labor of the average farmer against other farms and other occupations. If the average farmer can make a living, retire his mortgage, and have enough left over to keep the buildings in repair, the farm may be assumed to be a satisfactory loan risk, whether 20 per cent or 50 per cent of the value of the farm is represented by buildings. True, the outlay for building repairs will be higher in the latter case. However, the outlay for fertilizer is higher in Aroostook County, Maine, than in Orange County, New York, which is in a dairy region, but so long as the returns from potato growing will pay operating expenses including the cost of fertilizer, with enough over to provide a living for the farmer and his family and to permit of retiring the mortgage, a potato farm in Aroostook County, Maine is a good loan risk. On the other hand, we would expect a relatively high expenditure for feed on a dairy farm in Orange County, New York, as compared with a potato farm in Aroostook County, Maine. Such differences do not indicate that a farm in Aroostook County, Maine is necessarily a better loan risk than a farm in Orange County, New York, or *vice versa.* The percentage distribution of fixed capital as between land and buildings is no more important in determining the security value of a given farm than is the percentage distribution of operating expenses between feed and fertilizer in determining farming profits.

The important consideration is whether or not *the farm as a unit* is likely to be able to successfully compete against other farms and against other occupations for the labor of the farmer. In other words, can the average farmer make a living from the farm and retire his indebtness over the life of the loan.

When low values are placed on buildings by appraisers in the Northeast it is due to either one of two reasons: (1) Either the buildings are not adapted to the needs of the farm, or (2) they are in poor repair. A shift in type of farming has been made necessary in some regions due to the loss of the hay market following the advent of the tractor and automobile. Large hay barns which can be converted into dairy barns only at a very considerable expense are, of course, necessarily valued at a low figure in making an appraisal. Where buildings are valued at a low figure because they are in poor repair, it may be assumed, in general, that they

are on the poorer class of farms. It is recognized, of course, that during the past ten years, building costs have been high relative to farming returns, and that even on the better class of farms, returns have not permitted of making heavy outlays on buildings. However, when the loans which the Bank has made are sorted on the basis of the appraised value of the buildings at the time of making the loan, the loans falling in the low-value group are, in general, on the poorer farms. Such farms may very well have been above the margin of profitable production prior to 1920, but during the unfavorable period following, they went below the margin. Where a loan was made on a farm with low-value buildings in the first instance, trouble has frequently developed, since returns, in many cases, have not been sufficient to pay operating expenses, living expenses, and payments on the mortgage, to say nothing of making building repairs.

Of 5,251 loans made by the Federal Land Bank of Springfield from organization in 1917 to May 31, 1929, on farms with buildings originally appraised at less than $3,000, 222 or 4.2 per cent were foreclosed, compared with 2.5 per cent foreclosures among the 2,203 loans made on farms with buildings appraised at $9,000 or more (table 6). There is rather a close relation between the appraised value of the buildings and foreclosures.

RELATION OF THE APPRAISED VALUE PER ACRE OF THE FARM AND FORECLOSURES

The percentage of foreclosures has been much lower among the loans made on farms located in areas with large city populations, than in areas located at a distance from large consuming centers. The percentage of foreclosures has been relatively low among loans made on farms located on improved roads, on farms with high-acre-value tillage land, and on farms with high-value buildings. The appraised value per acre of the farm as a whole furnishes a rough index of the general desirability of the farm from the standpoint of markets, roads, soils, and buildings, at least as it appeared to the appraiser at the time the loan was made.

If we may assume that, in general, the farms appraised at a relatively high value per acre represent the better class of farms, then foreclosures in the First District appear to have come about through loaning money on second rate farms, rather than from loaning too much money on good farms. Of 3,274 loans made

on farms appraised at less than $30 per acre, 200 or 6.1 per cent were foreclosed, compared with 1.3 per cent foreclosures among the 1,418 loans made on farms appraised at $200 or more per

Table 6. Relation of the Appraised Value of the Buildings and Foreclosures Among Loans Made by the Federal Land Bank of Springfield

Appraised value of the buildings	*Number of loans made*	*Number foreclosed*	*Per cent foreclosed*
Less than $3,000	5,251	222	4.2
$3,000–$4,999	6,438	234	3.6
$5,000–$6,999	4,189	114	2.7
$7,000–$8,999	2,063	47	2.3
$9,000–over	2,203	55	2.5
Total.	20,114	672	
Average			3.3

acre. There is a very close inverse relationship between the appraised value per acre of farms on which loans were made and foreclosures (table 7).

Just here I would like to digress for a moment to point out what to me seems to be a significant relationship, or rather I should say lack of relationship, between farming returns and land values. There has been, I believe, too great a tendency to overrationalize the process by which land values are determined, at

Table 7. Relation of the Appraised Value Per Acre of the Farm and Foreclosures Among Loans Made by the Federal Land Bank of Springfield

Appraised value per acre of the farm	*Number of loans made*	*Number foreclosed*	*Per cent foreclosed*
Less than $30	3,274	200	6 1
$30–$59.	6,884	268	3.9
$60–$99	4,770	111	2.3
$100–$199	3,781	73	1 9
$200–over	1,418	19	1.3
Total.	20,127	671	
Average			3.3

least within restricted areas. We have assumed that land values represent the reduction to a present worth of prospective future incomes, with some adjustment, perhaps, under conditions where

there has been a continued rise or fall in land values over a period of years in which case the element of speculation may enter in. We have assumed that the estimated future incomes referred to, would be largely influenced by past returns, particularly returns during recent years, and that land values roughly represented, therefore, a capitalization of net income after all expenses, including a charge for labor and management of the operator and his family, have been deducted from the receipts.

There is, of course, a rough relationship between land values and net returns from farming, but the relationship is not sufficiently close to provide a safe basis for making long-term loans. Reliable information as to returns over a period of years is usually not available, so that the prospective purchaser of a farm, particularly if he is from outside the region, has little means of arriving at the amount he can afford to pay for a farm on the basis of its probable earnings over a period of years. The price at which a particular farm sells is usually influenced to a great extent by "going" values in the community. This results in a tendency for all farms to sell at a common figure. A certain allowance is made, of course, for the size of the farm, its location relative to improved roads and markets, the suitability and condition of the buildings, the quality of the soil, and so forth. However, without reliable information as to returns over a series of years it is to be expected that frequent errors would be made in estimating the business possibilities of a given farm. Unfavorable factors are not sufficiently discounted. Favorable factors are not sufficiently appreciated. The poorer farms tend to be *over-valued* in relation to the opportunities offered, as compared with the better farms. This is particularly true in the Northeast where wide variations in soil types occur within short distances, and where location relative to hard-surfaced roads and to markets has so important a bearing on farming returns.

A second factor enters in. It is difficult for the majority of persons to realize that there is some land which is valueless for farming purposes under present economic conditions. Even in abandoned farm areas in New York State, land continues to be sold at figures far beyond what it is worth for growing timber, the one use to which it is adapted at the present time.

A striking example of the tendency for inferior land to be overvalued with relation to good land within a given area is pointed

out by Professor G. P. Scoville in his studies of farming returns in one of the fruit producing areas of western New York. Records of farming returns have been taken each year in this area since 1913. There are two soil types in the area studied, one of which is adapted to the production of orchard crops while the other, due principally to poor drainage, is not. The latter soil is dark, appears fertile, and will produce satisfactory crops of grain and hay. However, as Professor Scoville points out, due to the fact that such good returns have been made from the production of fruit on the better soil type, orchards have been set out on the poorer soils. The sales prices and estimated values of the inferior soils have been materially affected by returns on the better soils. While in terms of actual dollars, the land adapted to the production of orchard crops is valued by the owners at a higher figure ($292 per acre as against $182 per acre), it is not valued *enough* higher so that the increased interest charges on the higher valuation offsets the advantages offered by the better land. As a matter of fact, 731 farm business records, covering a period of 13 years (1913-1925), indicate that a farmer could better afford to pay $292 per acre for the average farm on the better soil type rather than take a farm on the poorer soil type as a gift. The above statement is based on the fact that during the period 1913-1925, farms on the better soil type paid operating expenses, including interest on working capital, interest on an average real estate investment of $26,341, and had left $719. Farms on the poorer soil type had left only $532 after operating expenses were paid to say nothing of interest on the investment in real estate.[9]

The same relation is illustrated in a study made by Professor Scoville of returns on hill and valley farms in Chemung County, New York, covering the years 1911 to 1917.[10] The valley farms, which made the higher net returns, were valued at a higher figure, but not enough higher to offset the advantages which they offered. Studies of returns on dairy farms with different markets for milk, made in 1921 by Professor E. G. Misner, show the same general relationship. Farms with access to a Grade A milk market were valued very little higher than farms where the only market was a cheese factory or a condensery although the net returns were

[9] Scoville, G. P., Spencer, Leland, Rasmussen, M. P., Harriott, J. F., and Oskamp, J. The Apple Situation in New York. Cornell Ext. bul. No. 172, September 1928, pages 7 to 12.

[10] Scoville, G. P., Farm Economics No. 28, September, 1925, page 342.

markedly higher on the farms selling fluid milk.[11] Mr. S. W. Warren's studies of returns for the year 1928, in northern Livingston County, New York, show the same general relationship between land values and farming returns.[12] Professors Davis and Hendrickson make the following comment on the relation between land values and returns in the town of Lebanon, New London County, Connecticut for the year 1923.[13]

"Farms in the various soil areas in Lebanon are apparently neither valued nor taxed in accordance with their earning power and desirability as agricultural lands. Valuations per farm are almost alike for both soil areas. This lack of adjustment between the earning power and value of the land on the two soil types is partially responsible for the wide discrepancy in labor incomes in the two soils."

There are, of course, circumstances under which the better farms, as measured by the quality of the markets, roads, soils, and buildings, are over-valued in relation to the poorer farms. A really good farm, for example, may have buildings which are more elaborate than are actually required for the efficient operation of the farm. The increased overhead under such circumstances may reduce the returns to a figure below those of a farm which is poorer as regards soil type, or location, but where buildings are more nearly in keeping with the needs of the farm. Just here it should be stated that if a really good farm is over-valued in relation to a poorer one it is usually due to some such factor as buildings or location. Differences in buildings and differences in location relative to roads, schools, and trading centers are more or less obvious and may command a premium from the average purchaser. Differences in soils are not so apparent, and it is doubtful if in many cases the difference between really good soils and poor soils are fully reflected in land values in cases where they are in close proximity to one another.

As previously pointed out, farm business surveys made by Scoville, Misner, S. W. Warren, and others in New York State, and by Davis and Hendrickson in Connecticut, indicate that there is a distinct tendency for the values of inferior farms to be greater

[11] Misner, E. G., Economic Studies of Dairy Farming in New York, I, II and V, Cornell Univ. Agr. Exp. Sta. buls. 421, 433, and 442.

[12] Warren, S. W., Preliminary Report of a Farm Management Survey of Northern Livingston County. Farm Management Department, Cornell Univ., 1930 (mimeographed).

[13] Davis, I. G. and Hendrickson, C. I., Soil Type as a Factor in Farm Economy, Storrs Agr. Exp. Sta. bul. 139, April, 1926, p. 95.

than the production would suggest, as compared with the values and production of the better class of farms. The loaning experience of the Federal Land Bank of Springfield lends support to this view. If there were a perfect adjustment between farming returns and land values, there should be, roughly at least, as high a percentage of foreclosures among loans made on high-acre-value farms as among loans made on low-acre-value farms. On the other hand if the poorer farms tend to be over-valued in relation to earning power then we should expect to find the highest percentage of foreclosures among loans made on the low-acre-value farms since a loan representing 50 per cent of the probable sale price of such a farm would have less earning power behind it than a loan representing 50 per cent of the probable sale price of a high-acre-value farm. The highest percentage of foreclosures has occurred among the loans made on the low-acre-value-farms, which would indicate a relative over-valuation of the poorer farms. (table 7). The prospective purchaser of a farm should keep this fact in mind. As previously stated, it is cheaper to buy location than to buy transportation. Similarly, it is cheaper to buy fertility in the form of a good soil than to buy it in the form of fertilizer.

It is recognized that the lack of adjustment between land values and farming returns has probably been greater since 1920 than at any previous time within recent years since returns on the poorer farms have decreased to a much greater extent than have land values. However, it is pointed out that Professor Scoville's study of farming returns on hill and valley farms in Chemung County, New York, covered the period 1911-1917, and that this study showed a decided tendency toward over-valuation of hill farms as compared with valley farms on the basis of actual returns. Furthermore, the relation between returns and land values on the two soil types in the town of Newfane, Niagara County, New York, was the same prior to 1920 as subsequent to that date. Earlier studies by Professors G. F. Warren and K. C. Livermore bring out the same relationship.[14]

It must also be recognized that the wide variations in soil types occurring in the Northeast within short distances and the extreme importance of location relative to markets in this area tend to prevent as close an adjustment of earning power to land values as

[14] Warren, G. F., and Livermore, K. C. An Agricultural Survey of the Townships of Ithaca, Dryden, Danby, and Lansing, Tompkins County, New York. Cornell Univ., Agr. Exp. Sta. bul. 295, March, 1911.

would be found in an area where more uniform conditions exist. Furthermore, the relationship pointed out above between earning power and land values does not necessarily apply as between widely separated areas. For example, it does not follow that because land values are, in general, higher in the Middle West than in the Northeast, that the percentage of foreclosures in the latter area are likely to be higher than in the former. Other factors enter in when comparisons are made between widely separated areas. Considering the Middle West alone, however, the heaviest losses on farm mortgage loans have resulted primarily, as in the Northeast, from loaning on low-acre-value farms, rather than from loaning on high-acre-value farms. This statement is based upon conversations which the writer has had from time to time with representatives of various agencies loaning on farm mortgage security in the Middle West. Unfortunately, figures are not available to substantiate the statement.

It was formerly the practice of certain loaning agencies to place an *upper* limit on the amount which they would loan per acre on a given farm. For example they would in no case value a farm at more than $200 per acre, nor would they loan more than $100 per acre on any farm. Such analyses as have been made show that exactly the opposite procedure should have been adopted. If a loaning agency plans to loan fifty per cent of the probable sale price of a farm, rather than place an upper limit on the amount which they will loan per acre on a farm, regardless of what its probable sale price might be, it would be better business to refuse to loan anything on farms which are appraised *below* a certain value per acre. The Federal Land Bank of Springfield would have been dollars ahead today if every application had been rejected where the value of the farm was placed at less than $30 per acre by the appraiser.

EQUITY

The relationship between earning power and land values, pointed out above, has an important bearing on the question of the equity which the applicant for a loan should have in a farm before a loan can be safely granted. On the basis of the figures previously presented, a loan on a farm on the better soil type in the town of Newfane, Niagara County, New York, to a borrower with *no* equity would be a safer loan than a loan of any size, no

matter how small, on the poorer soil type, assuming the living expenses of both borrowers to be the same. Other factors, of course, enter in. A certain equity is necessary in order that the borrower may have something at stake in the business. Obviously, it is not good business for a loaning agency to furnish all the capital. However, it may be said that a loan to a borrower with a relatively small equity in a good farm is a better risk than a loan to a borrower with a relatively high equity in a poor farm. The usual rule-of-thumb requirement is that the borrower should have a fifty per cent equity in the farm. It is the opinion of the writer that if loans were limited to farms with an appraised value per acre (as determined by a competent appraiser) of say 20 per cent above the average value per acre of all farms in the county in which the farm is located, as reported by the Census, that loans could be made up to 70 to 75 per cent of the appraised value of the farm with smaller losses than those which result from following the 50 per cent equity rule and loaning on good, bad, and indifferent properties.

An analysis was made of the relation of equity to foreclosures among 1,214 loans in south-central New York which is the center of the "trouble" area in the First District.[15] The percentage of foreclosures among loans made to persons with an equity of less than 45 per cent in farms with tillage land appraised at $55 or more per acre, was only 3.8 per cent compared with 4.1 per cent foreclosures among the loans made to persons with an equity of 65 per cent or more in farms with tillage land appraised at less than $55 per acre (table 8). While the figures for both groups of farms show that the percentage of foreclosures is markedly lower among loans made to borrowers with relatively high equities, than among loans made to borrowers with relatively low equities, it is equally clear that a loan to a borrower with a relatively low equity in a good farm is a better risk than a loan to a borrower with a relatively high equity in a second rate farm.

FARMING EXPERIENCE OF THE BORROWER

Nothing has been said as yet with regard to the relation of farming experience and foreclosures. Borrowers were classified as experienced or inexperienced farmers. Experienced farmers included both natives and persons of foreign extraction who had experience

[15] See footnote at bottom of table 8.

Table 8. Relation of the Original Borrower's Equity in the Real Estate, the Appraised Value Per Acre of the Tillage Land, and Foreclosures, 1,214 Loans Made by the Federal Land Bank of Springfield in South-Central New York*

Borrower's equity in the real estate	Appraised value per acre of the tillage land					
	Less than $55			$55 and over		
	Number of loans	Number foreclosed	Per cent foreclosed	Number of loans	Number foreclosed	Per cent foreclosed
Less than 45	228	33	14.5	80	3	3 8
45–64.	531	51	9 6	255	11	4 3
65-over .	97	4	4 1	23		
Total	856	88		358	14	
Average			10 3			3 9

* Note that the figures in the above table are based on the Bank's loaning operations in south-central New York which is the area in which the per centage of foreclosures has been highest. Only 6.0 per cent of all the loans made by the Bank were in south-central New York, while 15.1 per cent of all foreclosures were in this area. The percentage of foreclosures shown in the above table is not, therefore, to be taken as representative of the Bank's operations. Of all the loans made by the Bank, only 3 3 per cent had been foreclosed as of May 31, 1929

in farming in the Northeast. Inexperienced farmers included persons from other parts of the United States, and persons from cities in the Northeast, whether native or foreign. Of 4,105 loans made to inexperienced farmers, 201 or 4.9 per cent had been foreclosed as of May 31, 1929, compared with 3.0 per cent foreclosures among the 15,819 loans made to experienced farmers.

A very considerable part of the higher foreclosure rate among the inexperienced operators is explained by the fact that a large percentage of such persons were on the poorer farms. A combination of an inexperienced operator, a poor farm, and general economic conditions such as we have had since 1920, could be expected to result in but one thing, namely, failure. The percentage of foreclosures among loans made to inexperienced operators on good farms has not been unduly high (table 9). There is a sufficient margin to permit of making a few mistakes on a really good farm. No such margin exists on a poor farm.

It must not be overlooked, of course, that there may have been a higher percentage of failures among inexperienced operators on the better farms than the figures presented would indicate. On the better farms there is a good chance that the second mortgagee or some other interested party will take over the farm if the original borrower fails, in which case, of course, the farm would never actually come into the hands of the Bank even though the original borrower lost his equity in the farm.

SUMMARY

The loaning experience of the Federal Land Bank of Springfield brings to light some interesting facts. Probably at no time has the producer located near large city markets had a greater advantage over the producer less favorably situated, than during the past ten years. The costs of distribution have been high, and the producer who has been able to escape the major part of such costs has secured enough more for his product to spell, in many cases, the difference between success and failure. The percentage of failures since 1920, as measured by foreclosures of federal land bank loans, has been less than one-half as great in the major deficit area of the First Federal Land Bank District, as in the balance of the District. Much of the advantage which producers in this area have enjoyed has been due to the development of hard-surfaced roads permitting them to truck products long distances at relatively

Table 9. Relation of the Appraised Value Per Acre of the Tillage Land, The Appraised Value of the House, the Type of Road, the Farming Experience of the Original Borrower and Foreclosures Among Loans Made by the Federal Land Bank of Springfield**

Type of road, and farming experience of borrower	Appraised value per acre of the tillage land			
	Less than $55		$55 and over	
	Appraised value of the house		Appraised value of the house	
	Less than $2,500	$2,500– over	Less than $2,500	$2,500– over
	Per cent foreclosures	Per cent foreclosures	Per cent foreclosures	Per cent foreclosures
Unimproved road:				
Inexperienced borrowers*.	8.3	7.8	4.6	2.1
Experienced borrowers..	5.2	2.9	3.2	2.1
Improved road:				
Inexperienced borrowers*	4.4	2.0	2.8	2.5
Experienced borrowers..	2.5	0.8	1.8	1.5

* Includes all westerners and southerners as well as inexperienced easterners and foreigners. Since the westerners and southerners gained their farming experience outside the District they were classified as inexperienced.

** The above table is based on 19,924 loans made by the Federal Land Bank of Springfield from organization in 1917 to May 31, 1929. In none of the above classes is there less than 100 loans.

low costs. The development of hard-surfaced roads has had a most important bearing on agriculture in all parts of the District. It is significant that the percentage of foreclosures among loans made on farms located on improved roads is less than one-half the percentage of foreclosures among loans made on farms located on dirt roads.

If we may assume that the appraised value per acre of the farms on which loans were made provides a rough index of their quality, then the percentage of foreclosures among loans made on the really good farms has been low. Foreclosures have resulted from loaning on poor farms rather than from loaning too much on good farms.

It is to be remembered, of course, that conditions as they have existed since 1920 have greatly increased the range of farm incomes on differenent classes of farms. Farmers on the really good farms in the Northeast have made as good returns, or nearly as good returns, as before the war. Returns on the poorer farms have been much lower than before the war. Farms on which a reasonable loan would have been safe during the period from 1900 to 1920 are no longer good security for a loan of any sort. These farms were never really comparable with the best farms, but they did yield a living for the operator and his family with enough more to permit the retirement of a reasonable indebtedness prior to 1920. It must be taken into consideration that farms which might have been classed as "fair" prior to 1920, would be classed as "poor" since that date.

The lack of adjustment between land values, at least nominal values, and returns has been greater since 1920 than ever before. This has meant that in general, there has been a great deal more earning power behind loans made on high-acre-value farms than among loans made on low-acre-value farms, which in turn has resulted in a relatively low percentage of foreclosures on the former class of farms. Loans on the really good, well-located farms in the Northeast, have been first class investments.

In making farm loans, the farming experience of the borrower and his equity in the farm are important considerations, but they are secondary to the question of whether or not the mortgaged farm provides an opportunity for the average farmer to make a living and retire his indebtedness over the period of the loan. Due to the lack of adjustment between earning power and land values,

loans on high-acre-value farms have been far better loan risks than have loans on low-acre-value farms. For the same reason, it is safer to loan to a borrower with a relatively small equity in the average high-acre-value farm, than to a borrower with a relatively high equity in the average low-acre-value farm, assuming, of course, that the appraised value per acre of the farms in question closely approximates the probable market value at the time the loans are made Again, a long-term loan made to an inexperienced borrower on a really good farm is a better risk than a loan made to an experienced borrower on a second class farm.

APPENDIX

Minutes of a Business Meeting of Members of the Conference, held at Cornell University, Ithaca, New York, U.S.A., on Thursday evening, August 26, 1930, John P. Maxton presiding.

A. W. Ashby on behalf of the committee presented the resolutions, containing the constitution and the provisions for the temporary organisation of The International Conference of Agricultural Economists:

"Those who formed the scheme for this Conference and arranged the first two meetings have desired to put the organisation on a more formal basis. No one, I think, wants anything like that amount of formality that leads to stagnation. All of us want such an amount of clarity and certainty as will lead to confidence and enterprise. We hope the Conference will grow in strength and in representative character, and we hope that it will become permanent. Hence, we want to give it that amount of foundation constitution on which it may develop.

"The committee was extended last week to consider and bring forward a set of foundation rules. Representatives of six countries, I believe, sat on the committee. There are three organised National Societies of Agricultural Economists, and these were represented. I say represented advisedly, for no one attended as a delegate or with any kind of instructions.

"Now, we cannot wholly formalise the proceedings at this moment, or, I think, even work within permanent rules. In the interval between this meeting and the next Conference we have to develop from the stage at which this Conference was organised to the stage of working under a set of simple rules.

"The documents before you provide for this. The longer document sets out the foundation rules under which the next Conference would be organised, and, if they prove to be satisfactory, the following Conferences. The shorter document provides directions for organising and working until the more permanent rules can be brought into full operation.

"The drafting of the rules proved more complicated than I expected. We have to consider how best to bring together the people concerned. We want to combine three things—a truly international organisation, individual membership, and effective local organisation—in order that the Conferences may serve their objects. We have to face the fact that at the end of this week we will be scattered over the face of the earth—some have already scattered—and yet that we must give to officers authority to act for the Conference, and give them also the support of the wisdom and activity of a committee which fully represents the common interests of all members. This the committee has tried to arrange."

The draft constitution was duly put to the meeting clause by clause, and each clause was approved by the meeting.

The meeting then proceeded to the election of officers. The following were elected unanimously:

President—L. K. Elmhirst, Dartington Hall, Totnes, Devon, England.

Vice-President—G. F. Warren, Cornell University, Ithaca, New York, U.S.A.

Vice-President—Max Sering, University of Berlin, Berlin, Germany.

Secretary-Treasurer—J. R. Currie, Dartington Hall, Totnes, Devon, England.

CONSTITUTION OF THE INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS

The name of the organization shall be The International Conference of Agricultural Economists.

The object of the Conference is that of fostering the development of the sciences of agricultural economics and of furthering the application of the results of economic investigations of agricultural processes and agricultural organization in the improvement of economic and social conditions relating to agriculture and rural life.

Meetings: Meetings shall be held at a time and place determined by the Council. No two successive meetings shall be held in any one country

The Conferences of 1929 and 1930 shall be called, respectively, the first and second International Conferences of Agricultural Economists.

Membership: Membership shall consist of individuals who pay 20 Rm, $5, or £1, or the monetary equivalent of £1, for the period of a Conference and the interval extending to the succeeding Conference.

Libraries, corporations and similar institutions may become members if a duly accredited representative is appointed by such institutions.

Those who become members within one year from the date of the adoption of this constitution shall be considered charter members.

Officers: The officers shall be a president, two vice-presidents, and a secretary-treasurer. The officers shall hold office for a period ending with the close of the next succeeding Conference.

Election of Officers: The council shall nominate officers to be elected by the Conference.

Council: The members of the Conference in each country or group of countries may provide for the election of members of a council as here-in-after provided:

(a) Each country or group of countries with five or more members may elect one member to council. An additional member of the council may be elected by each country or group of countries for each additional ten members with a maximum of three members of council from any one country or group of countries.

(b) Members of the council shall be elected prior to or during each Conference for the succeeding Conference. The council elected in 1930-31

shall continue in office for the purpose of the next Conference until the end of that Conference, and the council constituted in the early part of each subsequent Conference shall nominate officers and executive committee for the ensuing Conference.

It shall be the duty of the members of the council to elect an executive committee of eight members, to nominate officers of the Conference, and to promote the interests of the Conference in the respective countries.

Executive Committee: The executive committee shall consist of the four officers and eight members elected by the council. The executive committee shall arrange programs and otherwise conduct the business of the Conference. The executive committee shall fill any vacancies which may occur in any office.

Amending Constitution: The constitution may be amended by a majority vote at any Conference provided the amendment has previously received the approval of a majority of the council.

PROVISIONS FOR THE TEMPORARY ORGANIZATION OF THE INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS

Since the constitution does not make all necessary provisions for immediate organization, the committee submits the following suggestions for the guidance of the Conference until the provisions of the constitution can be made effective.

1. (a) The officers for the period of the third Conference shall be elected by this Conference.

(b) Persons who signify their intention of becoming members of the Conference before the Conference proceeds to the election of officers may vote in the election of officers.

2. (a) The members of the council may be elected by members of the Conference in any country or group of countries as provided for in the constitution.

(b) The method of electing councilmen shall be left to the discretion of each electing country or group of countries, but until the original membership is secured a correspondent shall be appointed by the executive committee to canvass his country for members and provide for the election of members of the council.

3. (a) The members of the council when selected shall become members of the executive committee until a total of 16 or more members of the council has been selected by members.

(b) When 16 or more members of the council are selected, the executive officers of the Conference shall arrange for the election of 8 members to the executive committee by the members of the council.

PROGRAM

OF THE

SECOND INTERNATIONAL CONFERENCE OF

AGRICULTURAL ECONOMISTS,

HELD AT

Cornell University, Ithaca, New York,

August 18 to 29, 1930[1]

MONDAY, AUGUST 18

Morning Session

Opening Address. G. F Warren, Cornell University, Ithaca, New York

Addresses of Welcome

A. R. Mann, Dean of the New York State Colleges of Agriculture and Home Economics, and Director of Experiment Stations, Cornell University, Ithaca, New York

H. C. M. Case, University of Illinois, Urbana, Illinois, President of the American Farm Economics Association

Responses to Addresses of Welcome

L K. Elmhirst, Dartington Hall, Totnes, Devon, England

A. W. Ashby, University College of Wales, Aberystwyth, Wales, Chairman of the Executive Committee of the Agricultural Economics Society of Great Britain

Max Sering, Deutsches Forschungsinstitut fuer Agrar- und Siedlungswesen, Berlin, Germany

J E. Lattimer, Macdonald College, Ste. Anne de Bellevue, Quebec, Canada, President of the Canadian Society of Agricultural Economics

K. T. Jutila, Helsinki University, Helsinki, Finland

MONDAY, AUGUST 18

Afternoon Session

Agricultural Economics and the Empire Marketing Board
G. M. Dykes, Empire Marketing Board, London, England

The Problem of Agricultural Surpluses in the United States
Mordecai Ezekiel, Federal Farm Board, Washington, D.C.

MONDAY, AUGUST 18

Evening Session

Causes of the International Depression of Agriculture
Max Sering, Deutsches Forschungsinstitut fuer Agrar–und Siedlungswesen, Berlin, Germany

The German Agricultural Situation
C. von Dietze, Universitaet, Jena, Germany

[1] The various papers were not presented in the exact order given above, due to the inability of certain of the speakers to appear as scheduled.

TUESDAY, AUGUST 19

Morning Session

The Comprehensive Farming Survey
A. N. Duckham, Rowett Institute, Aberdeen, Scotland
Methods and Results of Research Work on the Efficiency of Human Labor on German Farms
J. J. Seedorf, University of Göttingen, Göttingen, Germany
Results of Farm Management Research in the Northeastern United States
W. I. Myers, Cornell University, Ithaca, New York
Research Investigations on the Livestock Ranches of the United States
A. F. Vass, University of Wyoming, Laramie, Wyoming
Tenancy Problems in Japan
Kuro Kobayakawa, Miyazaki College of Agriculture, Miyazaki, Japan

TUESDAY, AUGUST 19

Afternoon Session

Campus Trip
Baseball and Other Sports

TUESDAY, AUGUST 19

Evening Session

The Organisation of Livestock Insurance
Arthur Jones, Midland Agricultural College, Sutton Bonington, Loughborough, England
The Relation of Various Factors to Foreclosures of Farm Mortgages in the Northeastern United States
F. F. Hill, Cornell University, Ithaca, New York
Factors Determining the Value of Farm Real Estate in the United States
E. H. Wiecking, Bureau of Agricultural Economics, Washington, D.C.

WEDNESDAY, AUGUST 20

Morning Session

Rural Credit in China
Paul C. Hsu, University of Nanking, Nanking, China
Agricultural Credit Problems in the United States
A. G. Black, Iowa State College, Ames, Iowa
Farm Credit Problems in the United States with Special Reference to Country Banks
F. L. Garlock, Bureau of Agricultural Economics, Washington, D.C.
Increase in Farmers' Indebtedness in Germany and New Methods of Individual Credit Control
Karl Brandt, Institut fuer Landwirtschaftliche Marktforschung, Berlin, Germany
The Reconstruction of Agriculture in the Soviet Union
A. J. Gayster, Lenin Academy of Agricultural Sciences, Moscow, U.S.S.R.

WEDNESDAY, AUGUST 20

Evening Session

Philippine Agriculture and Its Economic Problems
Francisco M. Sacay, University of the Philippines, Los Banos, P.I.
Types of Farming in Canada
William Allen, University of Saskatchewan, Saskatoon, Saskatchewan, Canada
Types of Farming in the United States
W. J. Spillman, Bureau of Agricultural Economics, Washington, D.C.
The Administration and Control of the International Institute of Agriculture
Asher Hobson, Bureau of Agricultural Economics, Washington, D.C

THURSDAY, AUGUST 21

Morning Session

The Valuation of Farm Real Property for Taxation
W. H. Dreesen, Oregon Agricultural College, Corvallis, Oregon
Proposals for Relieving Farmers of Undue Tax Burdens
B. H. Hibbard, University of Wisconsin, Madison, Wisconsin
Objectives and Methods in the Local Definition of the Extensive Margin in Agriculture
L. C. Gray, Bureau of Agricultural Economics, Washington, D.C.
The Problems of Land Utilization in the Cut-Over Regions of the Lake States
G. S. Wehrwein, University of Wisconsin, Madison, Wisconsin
Selected Features of the Land Utilization Problem Arising in the Older Settled Regions of the Northeastern United States
I. G. Davis, Connecticut Agricultural College, Storrs, Connecticut

THURSDAY, AUGUST 21

Afternoon Session

The National Value of Farm Accounting Data
J. S. King, Department of Agriculture for Scotland, Edinburgh, Scotland
Farm Cost Accounting in the United States
Andrew Boss, University of Minnesota, St. Paul, Minnesota
Some Results of Cost Accounts on New York Farms
J. F. Harriott, Cornell University, Ithaca, New York
Trip to Taughannock Falls for Supper

FRIDAY, AUGUST 22

Morning Session

Maladjustments in the Agricultural Business of the World
F. E. Geldenhuys, Department of Agriculture, Pretoria, Union of South Africa
The Agricultural Depression in East Europe with Special Reference to Poland
S. Schmidt, Cracow University, Cracow, Poland
Causes of the Agricultural Depression in Great Britain

R. R. Enfield, Ministry of Agriculture, London, England
The Economist's Approach to the Agricultural Problem of the United States
E. G. Nourse, Institute of Economics, Washington, D.C.

FRIDAY, AUGUST 22
Evening Session

The Relation of Monetary Conditions to the Agricultural Depression
E. M. H. Lloyd, Empire Marketing Board, London, England
Causes and Probable Duration of the Agricultural Depression
G. F. Warren, Cornell University, Ithaca, New York
A Summary of State Programs in Adjustment to the Agricultural Situation
C. L Stewart, University of Illinois, Urbana, Illinois

SATURDAY, AUGUST 23
Morning Session

Some Results of the Post-War Depression on Farm Organization in Canada
J E. Lattimer, Macdonald College, Ste. Anne de Bellevue, Quebec, Canada
Some Settlement Problems in Australia
Miss Persia Campbell, Bureau of Statistics, Sydney, Australia
The Mobility of Agricultural People
Edmund Whittaker, Edinburgh and East of Scotland College of Agriculture, Edinburgh, Scotland
Population Trends in Relation to Land Utilization
O. E. Baker, Bureau of Agricultural Economics, Washington, D.C.

SATURDAY, AUGUST 23
Afternoon Session

Trip to nearby farms and cooperative organizations

SATURDAY, AUGUST 23
Evening Session

Farm Wages and Wage Regulation in England and Wales
George Dallas, M.P., House of Commons, London, England
The Organisation of Wage Earners in Agriculture
J. F. Duncan, Scottish Farm Servants' Union, Caldercruix, Lanarkshire, Scotland

SUNDAY, AUGUST 24
Afternoon and Evening Session

Trip to an area which New York State is purchasing for reforestation
Picnic at Enfield Park

MONDAY, AUGUST 25
Morning Session

Cooperative Marketing in Finland
K. T. Jutila, Helsinki University, Helsinki, Finland
Cooperative Marketing in the United States
O. B. Jesness, University of Minnesota, St. Paul, Minnesota

Relation of the Federal Farm Board to Cooperative Marketing
A. W. McKay, Federal Farm Board, Washington, D C.
Research in Cooperative Marketing
H. B. Price, University of Kentucky, Lexington, Kentucky
The Process of Socialization of Agriculture in the U.S.S.R
Leon Kritsman, Agrarian Institute, Moscow, U.S.S.R.

MONDAY, AUGUST 25

Afternoon Session

The Cooperative Marketing of Wheat in Western Canada
Andrew Cairns, Canadian Wheat Pool, Winnipeg, Manitoba, Canada
Wheat Marketing in the United States
L. J. Norton, University of Illinois, Urbana, Illinois
Observations on the Cooperative Marketing of Grain by Farmers' Associations in Canada and the United States
J. F. Booth, Department of Agriculture, Ottawa, Ontario, Canada
The New Forms of Agricultural Production in Mexico
P. Gutierrez, R., Mexican Embassy, Washington, D.C.

MONDAY, AUGUST 25

Evening Session

The Development of Federal Standards for the Certification of Farm Products in the United States
Nils A. Olsen, Bureau of Agricultural Economics, Washington, D.C
The Purpose and Development of Federal Standards for Certification of Farm Products in the United States
Lloyd S. Tenny, Chicago Mercantile Exchange, Chicago, Illinois
The Possibilities of Agriculture in U.S.S.R.
G. S. Gordeeff, Timiriazev Agricultural Academy, Moscow, U.S.S.R

TUESDAY, AUGUST 26

Morning Session

Factors Affecting the Timing of Wheat Price Movements
R. M. Green, Kansas State Agricultural College, Manhattan, Kansas
E. J Working, Bureau of Agricultural Economics, Washington, D.C
Materials for a Theory of Wheat Prices
Holbrook Working, Food Research Institute, Stanford University, California
Soviet State Farms and Specialization in Agriculture
J. Anissimoff, Institute of Large-Scale Farming, Moscow, U.S.S.R
Machine Production and the Price of Wheat
W. E. Grimes, Kansas State Agricultural College, Manhattan, Kansas

TUESDAY, AUGUST 26

Evening Session

Economic Factors Affecting Milk Supplies of Large Cities
H. A. Ross, The Borden Company, New York City

Factors Affecting the Philadelphia Milk Supply
F. F. Lininger, The Pennsylvania State College, State College, Pennsylvania
Trends in Livestock Marketing
P. L. Miller, Iowa State College, Ames, Iowa
Trends in Marketing Livestock
R. C. Ashby, University of Illinois, Urbana, Illinois
The Development of Agricultural Economics and of Farm Management in the U.S.S.R.
G. S. Gordeeff, Timiriazev Agricultural Academy, Moscow, U.S.S.R

WEDNESDAY, AUGUST 27
Morning Session

World Production and Price of Merino and Crossbred Wool
Herman M. Stoker, University of Pretoria, Pretoria, Union of South Africa
The Relation of Quality to the Price of Farm Products
Frederick V. Waugh, New England Research Council, Boston, Massachusetts
A Survey of Some Public Produce Markets in New York
F. P. Weaver, The Pennsylvania State College, State College, Pennsylvania
Effect of Changes in Daily Prices on the Movement of Farm Produce to Terminal Markets
H. J. Stover, Cornell University, Ithaca, New York

WEDNESDAY, AUGUST 27
Afternoon Session

Doctrines Relating to Agricultural Policy for the United States
John D. Black, Harvard University, Cambridge, Massachusetts
Policies in the United States Affecting Agriculture
H. C. Taylor, The Vermont Commission on Country Life, Burlington, Vermont
Agricultural Economics as Applied Economics
A. W. Ashby, University College of Wales, Aberystwyth, Wales

WEDNESDAY, AUGUST 27
Evening Session

The Application of Economic Research to a Village in Bengal
L. K. Elmhirst, Dartington Hall, Totnes, Devon, England

THURSDAY, AUGUST 28
Morning Session

Recent Developments in European Grain Imports
Rudolf Freund, Institut fuer Weltwirtschaft und Seeverkehr an der Universitaet, Kiel, Germany
Post-War Interrelations between Agriculture and Business
L. H. Bean, Bureau of Agricultural Economics, Washington, D.C.

Theory of Probability and Economic Research
Oskar N. Anderson, Handelshochschule, Varna, Bulgaria
Agricultural and Social Legislation in New Zealand
R. M. Campbell, University of New Zealand, Wellington, New Zealand

THURSDAY, AUGUST 28

Evening Session

International Cooperation in the Field of Market Reporting
Axel Schindler, Preisberichtstelle beim Deutschen Landwirtschaftsrat, Berlin, Germany
Crop and Livestock Reporting
W. F. Callander, Bureau of Agricultural Economics, Washington, D.C.
Agricultural Statistics as a Basis for Agricultural Economic Studies
D. A. E. Harkness, Ministry of Agriculture, Belfast, Northern Ireland

FRIDAY, AUGUST 29

Morning Session

Science and Technique under Conditions of a Socialist Reconstruction of Agriculture
N. I. Vavilov, Lenin Academy of Agricultural Sciences, Moscow, U.S.S.R.
Some Recent Danish Problems in Agricultural Economics
Einar Jensen, Royal Agricultural College, Copenhagen, Denmark
The Economic Classification of Farms as a Basis of Agricultural Advisory Work
C. V. Dawe, University of Bristol, Bristol, England
Advisory Work on Farm Management
Arthur G. Ruston, The University of Leeds, Leeds, England

FRIDAY, AUGUST 29

Evening Session, Banquet 6 o'clock

SATURDAY AND SUNDAY, AUGUST 30-31

On August 30th a trip will be made to farms in western New York producing fruit, milk, poultry, vegetables and certified seed, returning August 31st. W. I. Myers will be in charge of this trip.

TOUR PRIOR TO THE OPENING OF THE SECOND INTERNATIONAL CONFERENCE

In response to the desire of some of the delegates from other countries to see as much of the agriculture of the United States as possible, a tour was organized under the leadership of Professor H. C. M. Case of the University of Illinois. In a period of three weeks a distance of three thousand miles was covered, two-thirds of which was made by bus. Through the sponsorship of Mr. William Butterworth, President of the Chamber of Commerce of the United States of America, the greater part of the finances for the trip were made available by several large implement companies.

In all, twenty-three people from England, Wales, Scotland, Ireland, Finland, Japan and South Africa participated in the tour. After meeting in

New York and spending some time seeing points of agricultural interest in New York and adjacent territory under the leadership of Dr. G. F. Warren, the tour began. The party was directed to Washington, D.C where two days were spent in becoming acquainted with the United States Department of Agriculture and the Chamber of Commerce of the United States of America Some time, of course, was spent in sight seeing

The next stop was at Columbus, Ohio, where the Ohio State University was visited together with some farms, the Ohio Farm Bureau, and co-operative marketing associations The trip continued by train to Indianapolis, from which point the tour was made by bus. At the University of Illinois, a thorough inspection was made of the organization and research work of the Illinois Experiment Station and the College of Agriculture. A number of farms of different types were visited in the vicinity, most of which were cooperating with the University in farm management work. A dinner was held with about thirty-five farm leaders at Bloomington, Illinois.

Following this, visits were made to a large creamery and produce company and to the Holt Caterpillar Company in Peoria. At Moline, Illinois, the plants of Deere and Company, the International Harvester Company, and the Minneapolis Moline Plow Company were visited. The trip to the Iowa Agricultural College at Ames included a stop at the Collins Farm Corporation at Cedar Rapids. After an inspection of the Iowa Agricultural College and Experiment Station a stop was made at Charles City where the Oliver Farm Equipment Company is located.

On the way to the University of Minnesota a stop was arranged by the staff of the College of Agriculture at a farm near Northfield, and a dinner with the local farmers and business men was held At St. Paul, in addition to the University, visits were made to the Pillsbury Flour Mills and the Land O' Lakes Creamery. Besides points of agricultural interest, opportunity was taken to include in the trip as many points of scenic interest as possible. This was especially true of the trip through Minnesota and Wisconsin. At Madison, visits were made to the Experiment Station, the College of Agriculture, and the United States Forest Projects Laboratory, as well as to a farm at Elkhorn.

A full schedule in Chicago included visits to the Union Stock Yards, packing plants, the Board of Trade, the Illinois Agricultural Association, and the International Harvester Company. Plans were revised after reaching Chicago to include a baseball game between the Chicago Cubs and the Brooklyn Robins who were then tied for league leadership and a close game added to the interest. Following a stop at the Oliver Farm Equipment Plant at South Bend and farms in Indiana, the party crossed to Canada to visit the Experiment Station and the College of Agriculture at Guelph as well as farms en route to Niagara Falls, which was the last stop on the trip to Ithaca.

Throughout the trip the group was entertained at dinners by local groups of farmers, luncheon clubs, chambers of commerce, colleges and various companies.

TRIP TO VISIT FARMS IN WESTERN NEW YORK

On the day following the close of the International Conference of Agricultural Economists a group of visitors left Ithaca on a two-day trip to visit fruit and crop farms in western New York. On the first day the group included about thirty persons, but six or eight of these left at Rochester, New York, at the close of the first day's run.

Private automobiles were used and in most cases the drivers were familiar with the roads of western New York. On the back of each car was affixed a placard labeled "International Conference of Agricultural Economists" so that the cars of the party could easily be distinguished from other automobiles that might get into the procession. With one local car to lead and another one to bring up the rear, no difficulty was experienced in keeping the cars together on the entire trip.

The party left Willard Straight Hall about 9:30 A.M. on Friday, August 29, and returned to Ithaca about 9:00 P.M. on the following day. Each member of the party was given a mimeographed schedule of the entire trip. This schedule indicated the exact route from farm to farm, the number of miles and approximate time required. It also gave the approximate time to be spent at each farm and a brief description of the farm including type of farm, location and soil. In most cases a financial summary of the farm business for a recent year was also included which gave details regarding crop and livestock enterprises, capital investment, receipts, expenses and net income.

From one to two hours were spent on each farm. On arrival the farm operator usually conducted the party on a brief tour of the farm to give them a general idea of the crops, soils and layout of the farm. After this an opportunity was given to the various members of the party to ask questions of the farmer regarding details of his business in which they were interested.

On the first day the party travelled a total of about 120 miles and visited four farms. On the second day with an earlier start, 175 miles were covered and four farms were visited. All of the farms visited were successful farms operated by men who were making their entire living from the soil. They were selected so as to include most of the important types of farming in the region covered.

The farms visited included the following:

Fred Smith, Trumansburg, New York—potatoes, beans, milk, hay and grain crops.

J. L. Salisbury, Phelps, New York—apples, cabbage, potatoes, poultry and wheat.

K. C. Livermore, Honeoye Falls, New York,—seed potatoes, seed oats, seed wheat, seed beans and cabbage seed.

J. H. Anderson, Titus Avenue, Irondequoit, New York—an intensive vegetable farm.

Irving Austin, Morton, New York—an intensive apple and peach farm in the best fruit district of western New York.

G. B. LaMont, Albion, New York—apples, peaches, cabbage, tomatoes, cucumbers, and general crops.

R. V. Call, Batavia, New York—potatoes, cabbage, certified grain, canning crops, general crops and fat lambs.

G. F. Britt, Stafford, New York—potatoes, cabbage, cucumbers, general crops and fat lambs.

LIST OF PERSONS ATTENDING THE SECOND INTERNATIONAL CONFERENCE OF AGRICULTURAL ECONOMISTS

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