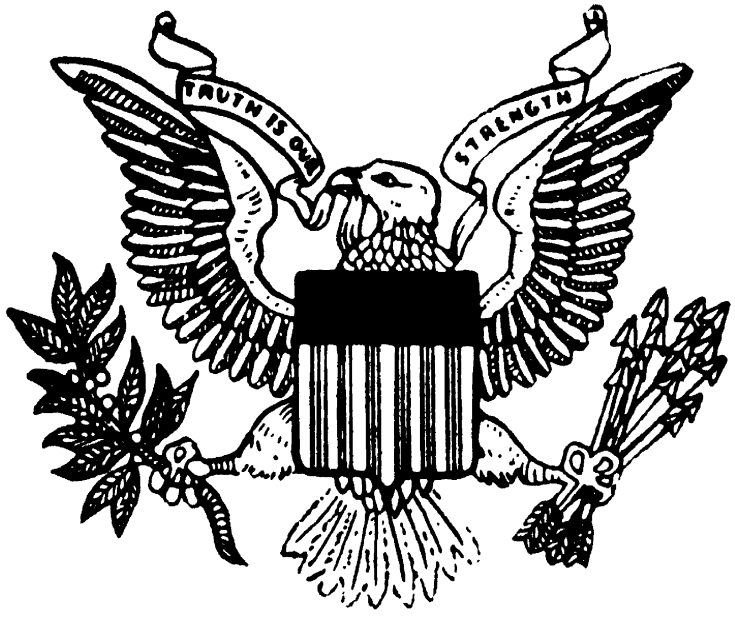
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FUTURE FOOD AND AGRICULTURE POLICY

FUTURE FOOD AND AGRICULTURE POLICY

A Program for the Next Ten Years

by JOHN DONALD BLACK

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INTERNATIONAL EMERGENCY FOOD COMMITTEE OF FAO,
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FUTURE FOOD AND AGRICULTURE POLICY

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PREFACE

This book is a joint undertaking of the two authors and the National Planning Association, with the help of three committees. The first of these committees was a special joint subcommittee of the National Planning Association that worked under the chairmanship of the senior author in the preparation of *National Planning Pamphlet No.* 46, "A Food and Nutrition Program for the Nation" (May, 1945). This book is an expansion of that pamphlet. The members of that committee were

Marion Hedges, International Brotherhood of Electrical Workers.
Jay C. Hormel, George A. Hormel and Company.
Donald Montgomery, United Automobile Workers.
Lydia J. Roberts, University of Chicago.
Elmo Roper, New York City.
Mrs. Raymond Sayre, Iowa Farm Bureau Federation.
Vernon Stouffer, Stouffer Corporation.

The second committee was a special committee of the American Farm Economic Association created by Dr. Fred V. Waugh when president of that association. This committee conducted a round table on the subject of food and nutrition policy at the 1946 annual meeting of the association, and all its members read and criticized most of the manuscript of this book. The active members of the committee, in addition to the senior author, were as follows:

Helen Farnsworth, Food Research Institute, Stanford University.
L. A. Maynard, director, School of Nutrition, Cornell University.
Margaret Reid, Bureau of Nutrition and Home Economics, U.S. Department of Agriculture.
Rainer Schickele, Production and Marketing Administration, U.S. Department of Agriculture.
Herman Southworth, Production and Marketing Administration, U.S. Department of Agriculture.

The third committee is the Committee on Food Economics of the Food and Nutrition Board of the National Research Council, whose membership now includes the senior author as chairman and

D. A. FitzGerald, secretary-general, International Emergency Food Council.
W. E. Krauss, Ohio Agricultural Experiment Station.
L. A. Maynard, director, School of Nutrition, Cornell University.
H. R. Tolley, chief, Division of Economics and Statistics, Food and Agriculture Organization.

Three members of the committee have read and commented upon this book in manuscript or galley-proof form.

Neither the National Planning Association nor any of the committees is responsible for the conclusions reached in this book or for the policy recommendations. They may have tried to modify these conclusions and recommendations, but by no means did they always succeed. And the thinking of some members of these groups diverges considerably from that of the authors on important points.

The authors are also under special debt to Dr. Willard W. Cochrane, now of the Food and Agriculture Organization, for help on several problems of analysis as well as for criticizing the manuscript; to Dr. W. R. Aykroyd, chief of the Division of Nutrition of FAO, and several members of his staff for supplying additional data; to James Maddox, now at Harvard University working under a grant from the Carnegie Corporation, for many valuable criticisms and suggestions; to Dr. Jane A. Ogle of Radcliffe College for help in several analyses; and to Althea MacDonald, secretary of the Committee on Research in the Social Sciences of Harvard University, for much hard work in assembling and analyzing materials for tables and charts and for reading of manuscript and proof.

The principal difference between this book and the National Planning Association pamphlet, other than filling in supporting data and analysis, is that the pamphlet limited itself largely to the consumption phases of food policy, whereas this book undertakes to include production and distribution and to integrate all three of these into a balanced program and policy. It has seemed to the authors that at this time particularly it is highly important that food and agriculture policy and programs be considered in their entirety. The steps actually taken in the next two years are unlikely to be final ones, but sober-minded agricultural leaders should have a chance to see how each step leads to the goal. The authors do not expect this program to be adopted in full in the near future. What they believe is that if by the end of the next ten years the country can adopt this program approximately as outlined in this book, it will be well on the way toward a solution of its food and agricultural problems.

JOHN DONALD BLACK
MAXINE ENLOW KIEFER

CAMBRIDGE, MASS.
February, 1948

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I. THE ASSIGNMENT

THIS is a book on the food and agricultural problems that face the United States and the world in the next ten years. Its orientation is primarily that of the United States, but it includes other countries because they have the same problems and much of the time are part of the same problem. The measures discussed and proposed in this book thus have international significance far beyond the boundaries of the United States.

Much was written after 1920 in this and other countries concerning the problems of agriculture as such.[1] The simple fact is that in the interwar years the agriculture of much of the world was out of balance with the rest of the world economy—as it had been in the period from 1879 to 1890. Also, in the past decade or two there has been an increasing amount written for the general public on the subject of food and human nutrition. The urgency of the wartime needs for food increased the volume of such writing after 1940.[2] The war made the statesmen and ruling classes conscious as never before of the weaknesses and dangers caused by malnutrition of large population masses. This book undertakes to combine these two important interests, the well-being of farming folk and the better nutrition of mankind, and outlines methods and procedures in both the national and international spheres of action that will achieve these two objects together.

It must not be inferred that nothing of this sort has been attempted before. As far back as 1935 the agricultural, labor, and health sections of the League of Nations set up a Mixed Committee, which in 1937 made a report recommending national and international programs designed to make agriculture more prosperous and at the same time provide more and better food and nutrition. The 1943 Hot Springs Conference on Food and Agriculture grew out of this movement initiated by the League. And we now have as a result a Food and Agriculture Organization (FAO) of the United Nations dedicated to the twofold objective.

But before an international organization can hope to accomplish much in integrating food production, distribution, and consumption among nations, the separate nations must each go a good way in finding out how

[1] For example, the senior author's "Agricultural Reform in the United States," 1929, and his "Parity, Parity, Parity," 1942.

[2] For example, Sir John Orr, "Feeding the People in Wartime," 1940; John D. Black, "Food Enough," 1943.

to accomplish it within its own boundaries. All but a small fraction of the food consumed in the world is produced in the country where it is consumed, much of it in the same community. If the food produced and the food consumed locally and within the nation cannot be adjusted in such a way as to achieve well-being for both its producers and its consumers, the chances are slim that this will be accomplished among nations. The integration on the national level must be looked upon only as supplementing and complementing the local effort; that on the international level as supplementing and complementing the national effort. The FAO will best promote its ends by encouraging local and national undertakings directed to the same end.

The problem before us is one of finding ways in which the individuals and groups involved can unite their efforts toward one end. No major economic group in any forward-looking nation, certainly not agriculture, or business, or labor, has any interest in keeping part of the people underfed or malnourished. The common local and national interest in better nutrition can be stated as follows:

First and foremost: Better nutrition makes better human beings, which is the principal object of civilization.

Second: Not only does it reduce greatly the amount of suffering and misery of people who are sick or half sick, but it increases incalculably the satisfaction and enjoyment in the experience of life.

Third: It increases the output of the individual by making him more productive and thus enables him to secure more goods and services, or work fewer hours, or, more likely, to some degree both.

Fourth: It accomplishes this last result particularly by increasing the proportion of productive years in a lifetime. It broadens out the span of life in the working years around the prime of life.

The special interest of farmers in better nutrition is mainly in the enlarged demand that it provides for their products. They have come to realize during the war years the importance to them of such demand. They see in the near future a considerable slackening of this demand unless means can be devised for maintaining it.

The special interests of the labor groups in better nutrition are not only in better health and living for themselves directly but also in the increased demand for the products of labor that comes with increased productivity and purchasing power. With improved diets the employer finds himself with a labor force able to turn out more work in fewer working hours. This may not mean much to the usual employer in the more prosperous sections of the United States. It has large meaning for those who had the experience of directing labor in other countries during the war or, especially, after it. The manufacturer, too, is interested in the higher purchasing power of consumers.

The mutual interest of laborer and employer in the well-being of the agriculture of this country is in the more and better food that such an agriculture can provide at less cost to them, at the same time with higher returns to the farmers, and in the better rural market that such higher incomes support. There can be a conflict of interests between farmer and urban laborer in the matter of prices of farm products, but not over the prices that come to prevail as a result of better health, increased productivity, and increased buying power of farm and urban workers.

All these groups also have a mutual interest in the healthy functioning of the general economy. Although this book does not outline measures for the general economy, it looks at food and agriculture as part of a closely interrelated and interacting general economy. It recognizes, on the one hand, the dependence of agricultural prosperity and the well-being of rural populations upon full employment in manufacturing industry and trade and high and stable national incomes and, on the other hand, the ways in which improvements in the agricultural arts and a high level of well-being among rural people contribute to mankind in general.

Agriculture as discussed in this book centers primarily in food and only this part of the problem is analyzed in detail. But the over-all purview takes in the other products furnished by agriculture, such as cotton, wool, and the other fibers, linseed and soybean oil for paints and other products, and wood for lumber and fuel. The measures outlined, moreover, apply equally to these and to the other sources of food, such as the sea.

Part I of this book undertakes to present the main facts about the economic condition of agriculture and about food consumption and nutrition as they were in 1947 or could be expected to be in the succeeding ten years. Part II then divides the over-all problem of food and agriculture into its parts and examines each with some care. Part III begins by outlining the food and agriculture programs in operation in 1947, first in the United States, and then in other countries; follows with an attempt at a program that selects from these the elements that are useful in a continuing program and fits these together into an integrated whole, with careful attention as to how this program can be executed; and concludes with an attempt to show how such a program could be adapted to some other countries and fitted into the international undertakings with respect to food and agriculture then being considered. The appendixes show some of the details of application of these measures to timber products, fish, and cotton and other fibers.

Although the program outlined in this book is a program for the next ten years, some parts of it need to be undertaken at once. During any year of the next two or three, while recovery is still under way, the crops of Europe may be short owing to the weather. In any of these years the

wheat crops of the United States and Europe may be poor at the same time. Both the United States and Europe, therefore, need to plan production each year against the possibility of such crop failures. Not until large reserves are built up will it be safe to plan for reduced acreages of staple food crops. Should the world be so unfortunate as to have another poor crop year in 1948, more drastic measures may be necessary than any mentioned in this book.

Accompanying such a provision for possible short crops, however, must be a provision for unusually large crops. As stated before, we already have overly large supplies of some foods in the United States. The last monthly announcement of prices received by farmers reports prices per box of lemons at the orchard at 28 per cent of parity as now figured, oranges per box at 49 per cent of such parity, and potatoes per bushel at 84 per cent. While parity as now figured is by no means the ultimate standard by which to judge whether a price is too high or too low, the fact that some prices are this low as compared with an average of 120 for all farm products in the same month is highly significant. Raisins, prunes, and other dried fruits are also in oversupply, and, in general, canned vegetables. There is no doubt that all these foods would be consumed if they were distributed among those who need them most. Taking our distribution system as it is, however, they are surpluses in the economic sense of that term. We are likely to have more foods in oversupply each succeeding year in spite of over-all food shortages for several years. We therefore need to begin at once to provide more adequately for sound methods of utilization of such surpluses and prevent their recurrence year after year, not only within the United States but internationally. Legislation to provide for such distribution should be the first order of business in the agricultural field.

If such provision is not made, our government will be under constant and damaging attack in the press for allowing food to go to waste in the midst of hunger.

Storage can be made available if existing stocks are moved into consumption. With short crops always possible in important producing sectors of the world, the only safe procedure is to plant more than will sell at good prices in the ordinary markets if the weather proves to be favorable. Only by developing effective methods of moving possible oversupplies into consumption by underfed families in the same or in other countries, and in some cases even into industrial uses, can the markets of the United States and the world be kept open and the farmers free to produce the supplies that may be needed in other years or in other parts of the world.

PART I

THE SITUATION IN 1947

II. FOOD IN THE UNITED STATES

SINCE food is the central theme of this book, let us begin with a simple summary of the facts with respect to food consumption and food supply, in this chapter for the United States, in a later chapter for the rest of the world.

The simplest form in which food consumption can be stated is in calories of food energy per person per day. The "World Food Survey" reports 3,250 calories as such a figure for the United States in the prewar years 1935 to 1939.[1]

But, standing by itself, this figure means nothing to the average citizen of the world. How does it compare, first, with the calorie consumption of other countries? The only countries reported with a higher prewar count in the "World Food Survey" were Denmark, Argentina, and New Zealand. All the countries of western Europe, however, had close to this number; Belgium with 2,780, Germany with 2,920, and the United Kingdom with 3,000. The figure for Canada was 3,110 and for Australia 3,130. The lowest calorie consumptions reported were around 1,900 for Mexico, Colombia, and Korea and only a little higher for the other Central American republics and for Puerto Rico, India, Java, the Philippines, Iran, and Iraq. The figures given for China and Japan were around 2,250. Between these extremes, with estimates around 2,400 to 2,600, were the countries of southern Europe (Spain, Italy, and Greece), Brazil and Chile in South America, and Turkey and Palestine. The eastern European countries ranged around 2,800 calories, with Russia at 2,830.

The question that one is immediately moved to ask is whether the people of any country can possibly live at calorie levels only a little more than half that of the United States—such as those reported for Mexico and India. The answer is, of course, "No." The estimates in the "World Food Survey" are of food *at the retail level* and include varying amounts of waste, a large amount in the United States and scarcely any in some of the countries. The wastes from spoilage may be large in warm climates.

How much is wasted in the United States may be judged from this simple analysis: If we allow 3,000 calories as the actual intake of a mod-

[1] The "World Food Survey" was released by the FAO of the United Nations in July, 1946.

erately active man of average weight in the United States, and proportionately less for the average woman, and proportionately less or more for children of different ages from one year to twenty, and also less or more for different levels of activity from idle and sedentary to the hardest physical labor, we shall come out with an average figure of only 2,540 calories. The difference between this and the 3,250 calories at the retail level is about what is wasted in the retail stores, or in the cooking, kitchen, and table losses of households, restaurants and hotels, or by the overeating of our corpulent citizens.

In the second place, the statistics of food at the retail level cannot possibly include some food that a hungry people obtain by foraging. The statisticians of the FAO did their best to count in home-produced foods of all kinds, but surely some of it escaped them, probably relatively more in the low-calorie countries than elsewhere and also probably more in some of the Latin-American countries.

After full allowance for all these wastes and omissions, there still remain large differences between countries in actual intake of foods, possibly as much as 700 calories in normal times.[2] If the actual intake in the United States is 2,540 calories, that of countries like India and Korea may be as low as 1,850 calories But it is more likely to be around 2,000 if the omitted foods are counted in, on the one hand, and the wastes subtracted on the other. The reasons why the actual calorie intakes of some countries are lower than those of others are as follows:

1. Hungry persons adjust the amount of work that they do to their energy intake. They cannot do otherwise. Women even limit the number of steps that they take in looking after themselves and their families. Children play very little. American soldiers stationed in India during the war have reported that the small boys who hung around their camps did not even cry until they were fed for several weeks.
2. Some peoples are smaller than others and require less for maintenance.
3. Those who live in hot climates need less fuel to keep them warm.
4. The high birth rates and infant and child mortality rates of many countries reduce their average food intakes. Large numbers are born and die long before a man-sized diet is needed. This is a minor factor.

Another way of judging a consumption figure like 3,250 calories per day is to compare it with consumption in other years. By years since 1935, the calorie consumption of this country at the retail level has been as follows:[3]

[2] In starvation periods when the mass of the population is losing weight, as in many European cities in 1946 and 1947, the range will be wider than this.

[3] These data and others in this chapter are drawn from the current numbers of *Nat. Food Situation*, an excellent quarterly publication of the Bureau of Agricultural Economics.

1935	3,170	1941	3,420
1936	3,270	1942	3,360
1937	3,240	1943	3,390
1938	3,260	1944	3,460
1939	3,330	1945	3,350
1940	3,350	1946	3,300

Thus the gain has been very little since the prewar years; 1945–1946 consumption has averaged only 100 calories higher than 1935–1939.

Much more important than the changes in calories were those in composition of the diet. The 1945 diet contained 29 per cent more fresh milk and cream than the 1935–1939 diet, 31 per cent more eggs, 45 per cent more poultry meat, 9 per cent more of other meats, 5 per cent more fruit, and even 4 per cent more wheat flour. The only important foods showing decreases were fats and oils (excluding butter)—12 per cent—and sugar—24 per cent. When these increases and decreases are combined on the basis of their relative prices and values in the retail market in 1935–1939—*i. e.*, according to what consumers were willing to pay for them in those years—the 1945 diet was 14 per cent better than that of 1935–1939 and the 1946 diet 18 per cent better.

Following are the percentages of the 1935–1939 average by individual years:

1935	96	1942	108
1936	99	1943	107
1937	100	1944	112
1938	100	1945	114
1939	104	1946	118
1940	105	1947	117
1941	108		

Expressed in terms of nutrients, the 1945 diet had almost exactly the same amount of the carbohydrates (starches and sugars) and the fats as the 1935–1939 diet, but 13 per cent more protein, 21 per cent more calcium, 35 per cent more iron, and more of all the vitamins by percentages ranging from 17 to 44. Part of the increase in vitamins resulted from the "enrichment" of flour and bread. The carbohydrates and fats are for the most part obtained from cheap foods; the proteins, minerals, and vitamins more largely from the more expensive foods. To buy the better diets of the war years, the people of the United States had to have higher incomes. Their higher demands for meat, milk, eggs, and fruits raised the prices of these articles and caused more of them to be produced. Without the higher prices, the farmers could not have afforded to produce more of them.

Only a little can be said at this point about differences between countries in the composition of the diets. The prewar protein ration of the United States was around 88 grams per day. That of several meat and/or milk-consuming countries such as Argentina, Uruguay, New Zealand, and Switzerland ran over 100 grams. The lowest estimate was 43 grams for the rice eaters of Java. The protein rations of the low-calorie countries named above ranged from 50 to 70 grams.

But fully as important as the total protein consumption is the amount of it from animal sources—50 grams in the United States and 63 in Argentina as compared with 4 in Java, 5 in China, 9 in India, 12 in Japan, 20 in Mexico, and 26 in Brazil. The cereal-eating peoples of eastern Europe were eating as much protein as those of the United States, but they got only 19 grams of it from animal sources (Russia only 17) and 70 grams of it from corn, wheat, rye, and barley mainly.

To complete the picture of the food situation in the United States, we need to tie in a few of the major facts about food production, imports, and distribution. Food production by 1944 had risen to 38 per cent above the 1935–1939 average. Part of this increase was due to unusually good weather in 1944, but 1945 and 1946 production also averaged 38 per cent above the 1935-1939 base, and 1947 production has been fully as large in spite of the smaller corn crop.

The 1935–1939 food supply (disappearance) came 93.6 per cent from domestic production and 6.4 per cent from imports. The volumes of food imports held well up to the prewar level during most of the war years, but the percentage of total supply declined somewhat—to as low as 4.3 per cent in 1946.

In the period 1935 to 1939, all but 2.6 per cent of the United States food supply—production plus imports—was consumed at home. During the war years of 1943 to 1945, however, the civilians received only 80 per cent of the supply, the remainder being divided 12.2 per cent for military use, 6.2 per cent purchased by the government for Lend-Lease and related purposes, and 1.5 per cent for commercial export. By 1946, the civilian use had stepped up to 89.4 per cent of the total. Military use had fallen to 3.0 per cent and government purchases for shipment abroad to 4.7 per cent, and commercial shipments had risen only to 2.9 per cent. But total supply in 1946 was 4 per cent down from the wartime peak.

The question that was disturbing the farmers of the United States in early 1947, before the reports came in on impending short crops in Europe, was simply this: If food production and imports in 1947 to 1949 held up to 1946 levels, and with government purchases for the United Nations Relief and Rehabilitation Administration out of the picture, how much would commercial exports expand to take their place? And if they did

not expand, how much would food prices need to decline to move the additional food available into domestic consumption. The short crop in Europe in 1947 has changed the outlook only for the next year or so.

Some light is thrown on this question by the following facts about the composition of the export trade of the United States: The prewar export of foods averaged around 4 million tons; that of the fiscal year 1945–1946, over 18 million tons. The prewar exports were divided roughly one-fourth each of wheat and flour, corn, and fruits, with rice and other cereals, fats and oils, meats, canned fish, and refined sugar making up the bulk of the remaining fourth. The largest wartime increases were in dairy products and eggs—over a hundredfold—and in beans and peas—forty-fold. But the wheat and flour and meat exports increased more than tenfold, and the vegetable exports increased sevenfold. The increases in the rice, fats and oils, and canned-fish exports were about threefold. Of the dairy exports, over half went through UNRRA and a fourth to the United Kingdom and British Overseas Services. The eggs went largely to the British areas. Half the beans and peas went to military civilian feeding and the rest mainly to the UNRRA and the United Kingdom groups. Less than a third of the wheat and half of the other grain exports were commercial, UNRRA and military government being the other large claimants. In the period 1946 to 1947, UNRRA and the military took less grain, but total exports were higher. A third of the meats went to UNRRA, mostly as transfers from military stocks. The other large takers were the United Kingdom, France, and Russia. About the same description covers the fats and oils, except that a fourth went through commercial channels.

It is apparent that much of the 1945–1946 export of food products was of a sort that will not be continued when government purchasing for export ceases, when the substantial loans made by the United States are exhausted, and especially when agricultural production is restored in Europe. Shortage of dollar exchange will be a limiting factor in 1947–1950, except as it may be relieved by European recovery plans.

The answer is, of course, not complete in terms of foods alone. Let us look at our other agricultural exports and imports. It can be assumed that imports of jute, hemp, sisal, and flax fiber will not be affected much by any food surpluses that may develop. Nor, for that matter, will the imports of tea, coffee, cocoa, bananas, and other so-called "complementary" or noncompeting products. If we bring these into our export and import totals and exclude the noncompeting foods and fibers, the imports of 1935–1939 were only 5.9 per cent of the total supply and the exports 7.2 per cent. In the peak year of the wartime export of farm products, fiscal year 1944–1945, these two figures changed only to 4.4 and 8.3 per

cent, respectively.[4] In these terms, and these are really the terms in which the comparison is most significant, the over-all impact of the war on our import-export position was not great, and the postwar readjustments do not seem large. But there is room for wide differences within these totals that may affect parts of our agricultural economy seriously.

[4] The percentages exported would be lower—perhaps around 5 instead of around 8 per cent—if the quantities exported and those consumed at home were both priced in the same market, either at the farm or at the point of export.

III. AGRICULTURE IN THE UNITED STATES

LET us now turn to the agricultural side of our problem and see what happened to farming during the war and after and where agriculture stood in 1947. We have already noticed that food production in the United States increased to 38 per cent above the prewar 1935–1939 average by 1944 and held that level in 1945 and 1946. The following details of these increases by years, for crops and livestock products separately, and for all farm products combined, are worth noting carefully:

TABLE 1

Year	All food	Food crops	Livestock	All agricultural products
1935	93	91	93	91
1936	97	85	101	94
1937	101	110	98	106
1938	103	109	102	103
1939	106	105	106	106
1940	111	109	112	110
1941	115	116	115	113
1942	125	124	126	124
1943	133	116	138	128
1944	138	129	141	136
1945	138	129	141	133
1946	139	144	138	136
1947	140	148	137	136

First to be observed is that 11 per cent out of the 38 had already taken place by 1940 and 6 per cent by 1939. Anticipations of higher wartime demands and prices arising out of the war, already in full swing in Europe, and the defense program under way in the United States no doubt stimulated some of this early increase. The farm-products price index, which is calculated on the 1910–1914 base and had stood at 95 in 1939, had risen, however, only to 100 in 1940; and it will be remembered that farmers in 1939 and 1940 were generally being cautioned against losing their heads and rushing into all-out production. It was pointed out that the agri-

culture of the United States was entering this war period with large surpluses, in contrast with the shortages of wheat and other crops in 1917. Even after Pearl Harbor, it was difficult for many of those who had been engaged in the administering of the Agricultural Adjustment Administration (AAA) program to change their thinking.

It was really the extraordinarily good weather of 1942 that accounted for the sudden jump in food-crop production in 1942. If the weather had been equally good in all years, probably we should have had a steady but rapid rise in production from around 108 in 1938–1939 to close to 130 in 1944 and a flattening out later slightly above that level—not more than a 25 per cent increase for the whole period.

The course of livestock production was somewhat different. It became apparent early that warring Europe was going to need meats whether it needed wheat or not. Meat prices broke sharply upward in 1941. The production program adopted in this country called for a rapid conversion of the stores of feed on hand into poultry meat, eggs, and pork because these were the products whose output could be expanded most quickly. Our war food administrators of 1941 set their production programs indeed as if they expected the war to end in 1943. The big feed crop of 1942 and the feed reserves of former years, plus 500 million bushels of United States and Canadian wheat, were fed to 37 per cent more hogs than prewar and 800 per cent more broilers. The result was the phenomenal livestock production of 1943 and 1944. Beef-cattle herds were at an all-time high, and dairy herds were 6 per cent larger than prewar, but they did not contribute much to the increase.

By 1944, however, it became painfully apparent that the livestock herds of the United States were larger than could be maintained without taking cereals away from more essential direct human consumption. The livestock farmers of this country therefore had to retrench a little in 1945 and 1946. This meant heavy slaughterings in 1945. The level of livestock production that can be maintained at 1947 levels of feed-crop production is not over 138, on the 1935–1939 base, unless the feed is more efficiently used than in recent years. This 138 represents an increase of 30 per cent over a 1938–1939 normal compared with 25 per cent for crops.

The index numbers in the last column for total agricultural output, which includes cotton, wool, etc., rose 2 points less by 1944 than the food index, mainly because cotton production declined during the war. The 1946 United States cotton crop was the smallest since 1921. The 1946 acreage was down 27 per cent from 1938–1939, and the yields were about the same. The wool production of 1946 was under that of 1938–1939 by 17 per cent.

The production changes by individual food products from prewar to 1946 are significant when brought into relation to the facts as to exports presented at the end of the last chapter.

Take first the dairy-products group. Total milk production in the United States was only 14 per cent higher in 1946 than in the period 1935 to 1939. As pointed out a few pages back, the war food administrators were unable to look far enough ahead to see the need for stimulating milk production right from the start of the war. They did set what seemed like high milk-production goals in 1942—an increase of 9.2 billion pounds, or 8 per cent, over the preceding year. But they put all the price inducements on hogs and poultry. The hog-corn ratio hovered around 16 in 1942, compared with a normal of 11.6.[1] The spring pig crop of 1943 was 68 per cent above that of 1935 to 1939.

The milk that was produced during the war went into an increase of 57 per cent in cheese, of 51 per cent in evaporated and condensed milk, of 1,100 per cent in whole-milk powder, of 37 per cent in fresh-milk and cream consumption, and a decrease of 33 per cent in butter, which before the war was using 40 per cent of the total milk supply. In the same period there was an increase of 430 per cent in output of skim-milk powder, a by-product of butter production. The war food administrator encouraged, first, the diversion of milk from butter to these other uses and, second, the diversion of skim milk from use as livestock feed to use in powder by paying a subsidy ranging from 30 to 50 cents per hundredweight on milk delivered as whole milk instead of cream. This was excellent food strategy.

The total exports of dairy products in 1946, in whole-milk equivalents, represented only 5 percent of 1945 production. The 1946 per-capita deficit in butter consumption, compared with prewar consumption, was over half of 1946 production. Exports could disappear altogether, and we should still be short of butter. Butter prices in September, 1947, stood at 36 per cent above "parity."[2] The increased supply of skim-milk powder could nearly all be used to advantage simply by adding it to bakery products.

The beef production of 1947 was 28 per cent above prewar, and the pork production 21 per cent. The 1946 exports of all meats, although ten times as high as the prewar, were only 5.8 per cent of 1946 production.

[1] The hog-corn ratio is the ratio of the price of a hundredweight of live hog to the price of a bushel of corn.

[2] The parity price for a farm product is the price which will buy exactly as much of what farmers characteristically buy as the same unit of the product bought in the base years, which are commonly 1910 to 1914. It is computed for any month or year by multiplying the average price in the base years by the index number of prices paid by farmers in the given month or year.

With employment at near 1947 levels, the domestic market could, if need be, absorb all these exports at a small decline in price. Meat-animal prices in September, 1947, averaged over half above parity.

The outlook is less favorable for poultry production. The 1946 output of poultry meat was 45 per cent above prewar; of eggs, 48 per cent above prewar. The United States production of egg powder at its peak in 1944 was forty-five times that of the prewar. This fell off only a half after the war. The hundredfold over prewar exports of eggs in 1946 were 8.6 per cent of the production of that year. As other meats become available at lower prices, the demand for poultry meat will decline. Prices had already declined to 103 per cent of 1910–1914 parity in September, 1947, and egg prices to 98 per cent of it.[3] Export demand for egg powder will decline as the poultry flocks of Europe get back to normal. Egg powder will have a larger than prewar domestic use in food preparations, in bakeries, and in hotels and restaurant cooking, but by no means enough to absorb potential output.

The 1946 output of edible fats and oils, excluding butter but including lard, was only 16 per cent above prewar. The exports of 1946 were 13 per cent of domestic production and almost three times the prewar exports. The imports were negligible. Separating edible from other fats and oils, however, does not have much meaning. The major types of vegetable oils—cottonseed, soybean, peanut, and coconut—are normally used in soap and other industrial products as well as in foods. This country before the war was a large importer of tropical oils and an exporter of lard, soybean, and cottonseed oil. On balance, imports were three times as large as exports. A major factor in the fats-and-oils situation is the failure of tropical production to return to prewar levels in many areas. European production of animal fat is also still below prewar. The increase in domestic supply from the expansion of soybean-oil and peanut-oil production was offset somewhat by the decline after the 1937–1939 period in the supply from cottonseed. Imports will need to return toward prewar levels to take care of the population increase of 10 per cent over 1940 expected by 1950.

The 1946 production of wheat was 45 per cent above prewar. The 1945–1946 and 1946–1947 exports of around 400 million bushels of wheat were more than half of prewar production. The 1946 crop was grown on 14 per cent more acres than prewar production, and the yield per acre was 35 per cent higher. The 1947 crop was nearly a fourth larger than the big 1946 crop. Exports from the United States before the war averaged only 40 million bushels. Hence wheat growing in the United

[3] In September, 1947, poultry and egg prices stood at 87 and 144 per cent, respectively, above prewar.

States will surely have to contract, once Europe's crops return to normal, unless costs can be reduced to a point where wheat can be fed to livestock economically *or methods can be developed for disposing of part of the crop outside the usual channels of international trade.*

The only fruits that may present a problem are the dried and citrus groups. While 1946 fruit production was 40 per cent above prewar, exports of fruits in 1946, all forms combined, were a fourth below prewar.

Canned-vegetable output in 1946 was two-thirds higher than prewar, and all truck-crop production a half higher. The sevenfold increase in exports does not bulk large against these totals, and vegetable production was probably overexpanded at this time.

Domestic sugar production slackened during the war because of labor shortages but was expected to reach its prewar level by 1947. Beet-sugar production may reach new levels before long, but cane production was not expected to return to normal before 1948–1949—it was only a fraction of prewar in the Dutch East Indies and the Philippines.

Production of dry beans and peas increased 410 million pounds between prewar and 1946, but exports increased 786 million pounds. The pea crop is principally involved. The increase in rice production in the same period was 530 million pounds, but the increase in exports was 550 million pounds.

The average cotton crop in 1935–1939 was 13.1 million bales; and 5.3 million bales, or 40 per cent of it, was exported. The 1946 crop was only 8.7 million bales, and the cotton export for the fiscal year 1945–1946 was 3.5 million bales. The 1947 crop was over 3 million bales larger, and exports slightly less. Wool imports were likely to continue somewhat large only while the wartime stockpile, equal to 2 or 3 years' world consumption, then being held internationally by the British Joint Disposal Organization, was being dissipated. Plans in 1947 were to feed this into the market gradually over the following 10 to 15 years.

From this review of the outlook, product by product, one could only conclude that, on balance, agricultural output was then at a level that would not fully sustain existing price levels after the 1947 crop was harvested *unless the season was unfavorable and export demand was unexpectedly strong.* The short 1947 crop in western Europe has changed the outlook for the time being.

Farm income, of course, rises and falls with prices as well as with production, and it is apparent in Chart I that prices have played the larger role in the years since 1935–1939. In December, 1946, the index of prices of farm products on a 1935–1939 base stood at 247, compared with 218 for the whole year of 1946. In September, 1947, it stood at 267. The preceding May, before price control was removed, it was at 197.

The index number of hourly wage rates of factory workers stood at 220 in June 1947.

However, it is generally agreed that prices of farm products were definitely low in 1935–1939. They had recovered only partly from their bad slump of 1930–1933. They had averaged 29 per cent below 1925–1929 in the 1935–1939 period, whereas hourly factory wages were 10 per cent higher than 10 years earlier. This adds up to a difference of almost 40 per cent.

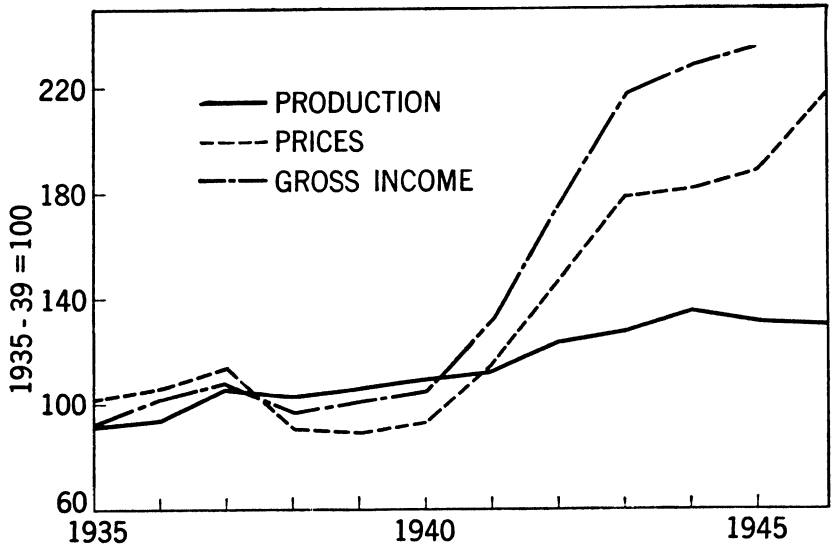


CHART I.—Index numbers of prices received by farmers, physical volume of agricultural production, and gross farm income, by years, 1935 to 1946 (1935–1939 = 100).

Gross farm income, however, does not tell the full story. Farm wage rates by 1946 had trebled over the 1935–1939 rates, and they rose 22 points more in 1947. But seed and feed prices had only about doubled, and the cost rates for all supplies and services entering into the expenses of farm production had risen by the end of 1946 only to 62 per cent over 1935–1939—with taxes, interest, and insurance counted in, only to 51 per cent. Net farm incomes, with all these expenses deducted, by 1946 were up 217 per cent above 1935–1939 and rose further in 1947.

The parity ratios commonly cited move up and down closely along with net farm incomes. They are ratios of indexes of prices received to prices paid. They averaged 116 in 1945 and reached a peak of 132 in October, 1946, compared with 84 in the 1935–1939 period. They were back down to 120 in April, 1947, and stood at 121 in September. These parity ratios, however, do not take account of changing physical outputs

or changing amounts of equipment, labor, feed, fertilizer, and other supplies used in production. Therefore they are not as good a measure of agricultural prosperity as net farm incomes.

For similar reasons, hourly wage rates fail to tell the whole story of earnings of industrial workers. Urban workers were much more fully employed during the war than before and still are, and some of them put in much overtime during the war years. If total wages and salaries of factory, transportation, and mining workers are divided by the number of persons employed to give earnings per worker and reduced to percentages of the 1935–1939 average, the results are as appear in the

TABLE 2.—CHANGES IN AGRICULTURAL AND INDUSTRIAL EARNINGS PER WORKER SINCE THE PERIOD 1935–1939

Year	1935–1939 = 100		1925–1929 = 100		1910–1914 = 100	
	Agricultural	Industrial	Agricultural	Industrial	Agricultural	Industrial
1935–1939	100	100	82	88	140	197
1940	103	111	85	97	145	219
1941	142	130	117	114	199	257
1942	201	161	166	140	283	317
1943	266	189	219	165	374	373
1944	288	202	237	177	405	399
1945	301	196	248	171	423	386
1946	330	190	272	166	464	375

first section of Table 2.[4] The gains for agricultural workers have been much larger than for industrial workers. Some of this advantage has been due to increased output per farm worker in the war years, but most of it was because farm expenses had not risen as fast as prices of farm products.

One could argue from the index numbers in the first section of the table that net farm income per worker could drop as much as 42 per cent (from 330 to 190) and farm earnings would still be in line with industrial-worker earnings. We have already stated that farm prices were unduly low in the 1935–1939 period. But if the standard taken were 1925–1929 instead, as in the fourth and fifth columns, the comparison would be about the same. Only by going back to 1910–1914, as in the last two columns of the table, can one find a basis for arguing that 1946 farm earnings were not too high by a relatively wide margin. Using even this base would allow an 18 per cent decline in farm earnings below 1946.

[4] Net farm income plus payments to hired labor on farms divided by the average number of workers employed in each year.

Moreover, there is little room for doubt that industrial-worker earnings were inordinately low in 1910–1914. Only when the earnings of the two groups are put on an hourly basis does the industrial group appear to have fared clearly the better of the two.

A drop of 42 per cent in farm earnings from 1946 levels, which is what would be called for if 1935–1939 is taken as a standard—if it all were to come from price reductions—would bring farm prices down to 85 per cent of parity, as parity is now figured, on the 1910–1914 base. A drop halfway between the 42 per cent on the 1935–1939 base and the 10 per

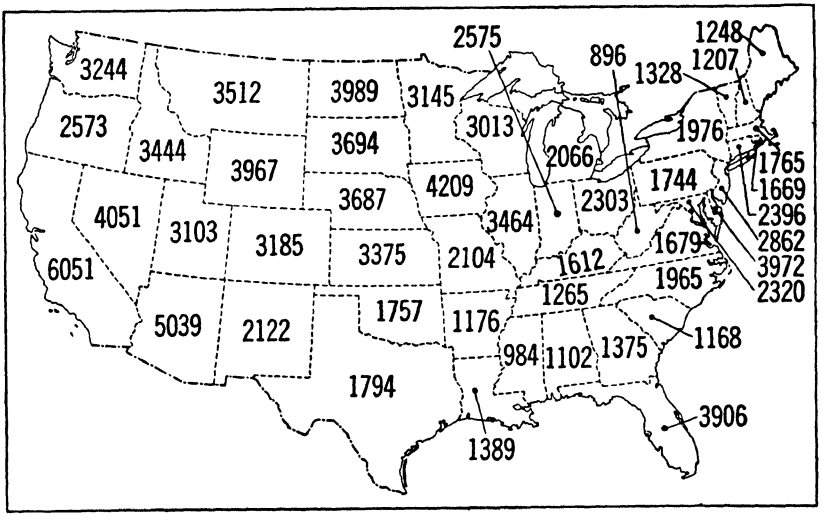


CHART II.—Average realized net income per farm operator, by states, 1945. (*Farm Income Situation, June*, 1946.)

cent of the 1910–1914 base would call for farm prices at 95 per cent of parity, and it is somewhere within this range that prices on farm products can be successfully maintained in the next ten years. Of course, 95 per cent of parity is much below the prices prevailing in the latter part of 1947 and when this book went to press. It will be noted that earnings of industrial workers had already fallen off a few per cent below the wartime peak.[5]

Concerning farm wages, which in 1946 were 217 per cent above this 1935–1939 level, it needs to be pointed out that in periods of depression and high unemployment, when the surplus populations of farms cannot migrate to the cities, they tend to follow closely and converge toward net farm incomes. In periods of general prosperity, high employment, and rising wages, as since 1941, they tend to follow closely and converge toward

[5] This analysis is resumed and expanded in Chap. IX.

urban workers' wages. Their remarkable rise since the 1935–1939 period is explained by the shift from the first to the second of these two situations. Wageworkers on farms not only had higher wages after 1941 but had steadier employment.

Up to 1945, cash-renting landlords had not benefited as much from the rising prosperity of agriculture as had their tenants; net cash rentals had risen only 60 per cent, while net farm incomes had risen 150 per cent.

Only brief note can be taken of regional differences in the farm-income pattern for the United States. The best measure of net farm income now prepared by the Bureau of Agricultural Economics is called "realized net income of farm operators." It was made up as follows for the average farm in the United States in 1945:

Cash receipts from farm marketings	$3,579	
Nonmoney income	516	
Government payments	117	
Total income		$4,212
Production expenses		1,958
Realized net income		$2,254

The nonmoney income in this calculation consists of the value of home-produced foods and fuel consumed by the farm household plus a rental allowance for the use of the farm dwelling. Chart II presents the average realized net farm income, state by state, for 1945. The principal factor in the differences by states is the size of the farm business.

The increase in net farm income can be compared only with the 1939 prewar year. Increases are shown by states in Chart III. The range is extremely wide. Contrast, for example, the gains for the two smallest states in the Union, Rhode Island and Delaware, and for the Northern Great Plains states and the cotton states, and even for the cotton states and the tobacco states just north of them. High feed prices partly explain the small gains made in some of the dairy states.

Very vital to the continued prosperity of the farm population is the behavior of land values in a period of war-supported rising farm incomes. In the First World War and the 2 years following, farm real-estate values rose finally to 70 per cent above the prewar of that period. They slumped by 1928–1929 to a new level about 16 per cent above prewar and fell to 27 per cent below it in 1933. They had recovered only to 16 per cent below it by 1940. On Nov. 1, 1946, farm real-estate values stood at 90 per cent of their first World War peaks. They had risen slowly at the start of the war, as on the last occasion, but jumped 20 per cent in the 12 months preceding November, 1946,[6] and were still rising in Oc-

[6] They were 8 per cent more by October, 1947.

tober, 1947. They rose 30 per cent, however, in 1 year after the First World War, March, 1919, to March, 1920, and then fell 31 points in the 2 years following.

An alleviating circumstance is that farm mortgage debt has been declining during this period, until very recently, whereas it rose sharply during the First World War and immediately following. Over half the farms purchased have been entirely for cash. Only one-seventh of those purchased in 1946 were mortgaged for more than their prewar value. This means that agriculture was in a better state to withstand a recession in 1947 than in 1920.

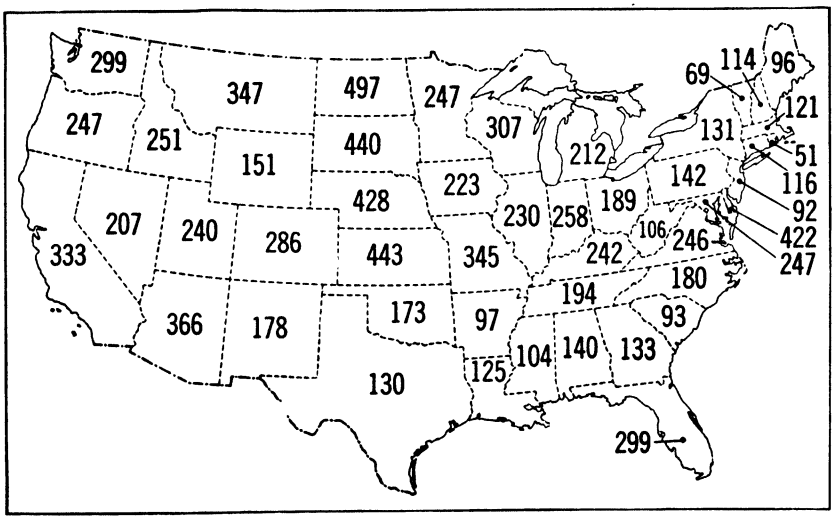


CHART III.—Percentage increase in realized net farm income per farm operator, 1935 to 1945.

The advances in farm real-estate prices have been very uneven geographically, from around 40 per cent over prewar in the Northern Great Plains states (North and South Dakota and Nebraska) and in five of the New England states, around 50 per cent in three of the leading dairy states (Wisconsin, New York, and Vermont), and around 100 in the central Corn Belt, in several of the Cotton Belt states, and in the Pacific states, to 125 to 143 in tobacco states along the North-South border (North Carolina, Tennessee, and Kentucky). This pattern of change resembles that of the 1917–1920 land boom except that Iowa, Nebraska, and the Dakotas were riding the crest when the First World War started, whereas these were still suffering from the aftereffects of the prolonged droughts of the 1930's, with income still very low, in 1939.

Other recent developments in the agriculture of the United States that need to be reckoned with have to do with population and tenure. The

large movement of farm populations to cities during the war and transfer to the armed services reduced the farm population living on farms by the end of 1945 to 25,990,000, or 18.5 per cent of the national total. This was a decline of 15 per cent from April, 1940. But the movement has been reversed since the war. The farm population rose 1,510,000 in the year from April, 1945, to April, 1946, and 900,000 of this increase was of persons in the age groups from twenty to forty-four, about a fourth of these being veterans. The farm population, however, was still 11 per cent under that of April, 1940. Also, by April, 1946, a fifth of the number of farm households lost during the war had been regained, and the average size of the farm household had risen from 3.95 to 4.07 persons.

The average size of farms rose from 174 to 190 acres between 1940 and 1945, and the number of farms decreased 1.4 per cent. The percentage of farms reported as rented changed from 38.7 to 31.7 in the same period. Sixty per cent of the rented farms of the United States are in the two southern divisions, South Atlantic and South Central, where 1945 net farm income per farm averaged $1,720 and $1,405, respectively. A third of these tenants are sharecroppers, who furnish little besides their labor and in effect receive their wages in the form of a share of the crop.

IV. NUTRITION IN THE UNITED STATES

THE next step to be taken in our analysis is to find out how well or ill fed are the people of the United States and of the world and how much more food they could use to good advantage. Until this is done, we shall not know the dimensions of our problem. Let us begin with the United States and devote all of this chapter to it.

We must confess at the outset that this assignment is not simple and easy. No way has yet been devised of finding out what persons are not as well as they could be because of not eating enough of the right foods. First of all, in a country like the United States very few persons actually die of starvation or of some specific nutrition-deficiency disease like pellagra. In fact, the official mortality records of 1940 reported only 2,133 deaths from pellagra, 63 from beriberi, 26 from scurvy, and 161 from rickets. Most of those who die from malnutrition die from an illness induced or seriously aggravated by malnutrition and are reported on death certificates as dying from this illness.

The commonest cause of death to which malnutrition contributes in a large way is old age. Malnutrition in old persons simply makes them die sooner than otherwise. In India, to take one of the more extreme cases, where the expectancy of life of males at birth as last figured was 26.7 years, large numbers who survive childhood die from malnutrition between 35 and 50 years of age who ought to live to 75 to 80 years of age. In the United States, where the life expectancy at birth for the white population is 65 years, a sizable number die for the same reason at 50 to 65 years who ought to live for 80 to 90 years. Much malnutrition is concealed in the mortality records under such headings as diseases of the circulatory system, diseases of the heart, cirrhosis of the liver, senility, and even alcoholism and tuberculosis. Thus the report of the Mixed Committee on Nutrition of the League of Nations states that "every tuberculosis specialist is convinced that the appearance of tuberculosis before the twentieth year is due to two main causes—overwork and malnutrition." It may well be that the difference in the death rates per 100,000 from tuberculosis of the lungs of 27 for Portland (Ore.), 57 for New York, and 124 for New Orleans may reflect in large measure differences in nutrition. At any rate, the countries with the lowest death rates from tuberculosis, New Zealand, the Netherlands,

and the United States, are, as we shall see later, among the best-fed countries.

The prevalance of actual dietary deficiencies in the United States, however, is greater than was thought ten years ago, according to Dr. W. H. Sebrell of the United States Public Health Service. Not only are the four deficiency diseases named above found to a greater or less extent, but all the other deficiency types. Large sections of the South have some nutritional edema, from lack of protein and other factors, or anemia, from lack of iron or minute quantities of other minerals in the food. Cases of all these, plus night blindness from lack of vitamin A, and of lip lesions and related skin defects, due to lack of riboflavin and other factors, are being encountered frequently in schools, hospitals, and doctors' offices. Thus 40 per cent of the ward patients in a New Orleans hospital showed niacin or riboflavin deficiency. But only 3 per cent of a hospital group at Stanford University had any form of nutrition-deficiency disease. The usual hospital group in the United States, especially outside of the South, will be somewhere between these extremes.

The usual nutrition-deficiency states in the United States, it is now generally agreed, are of another form. First of all, they are chronic. They started some time ago and have been slowly developing. The tissue changes resulting from inadequate diets accumulate over the years, gradually becoming more severe and persistent. It follows that such states are slow to respond to treatment. Second, true chronic deficiency states may range all the way from mild to severe, depending upon the extent of the deficiencies in the diet and the period for which they have continued. Even those who have had adequate diets most of the time may still show some effects in their tissues of the periods when they have lapsed from good diets. Such effects are easily confused with senescence or old age.[1]

Some of the effects of poor feeding, however, appear early in life, notably the effects on the teeth and the eyes. Sizable percentages of the school children now being examined increasingly as part of the school health programs of some cities show swollen and bleeding gums and pronounced dental caries. Of the young men and women who reported to Selective Service, 11.6 per cent had disqualifying eye defects, 14 per cent serious defects in the teeth, 6 per cent defects in mouth and gums, 10 per cent defects of the circulatory systems, and 10 per cent defects in the muscular and skeletal systems. How many of these defects were due

[1] See the discussion of this in the *Nat. Research Council Pub.* 109, "Inadequate Diets and Nutritional Deficiencies in the United States." Many nutrition scientists consider that this report overstates the case somewhat.

to poor feeding cannot be determined, but obviously it was a large factor in many of them. Prof. L. A. Maynard of Cornell University, one of the thoroughly responsible workers in the field of nutrition, concludes from an examination of these data that "approximately one-third of the rejections were due to causes directly or indirectly related to nutrition."

The most comprehensive attempts to determine the extent of malnutrition in the United States have taken the form of measuring the food intake and comparing it with standards of adequacy that have been defined. Such an attempt was included in the Consumer Purchases Study made in 1936 by the Bureau of Home Economics and the Bureau of Labor Statistics in collaboration with the Works Progress Administration (WPA). This covered more than 50,000 families in all sections of the country. Data on food expenditures, plus home-produced food for farm families, were collected for all these families; and over half of the families were also asked the amount of their consumption in the week just ending of each food in a long check list. As a final check, over 5,000 families were asked to record their food consumption daily for a week. These foods were then converted directly to calories, grams of proteins, and milligrams of the minerals and vitamins according to generally accepted tables of food composition, no deduction being made for kitchen, cooking, and table losses and wastes, and the results were compared with standards of food adequacy recommended at that time, for example, the Sherman standards for proteins and minerals. Later they were compared with the original Recommended Dietary Allowances of the National Research Council of the National Academy of Science.

This survey indicated that as an *average*, excluding families on relief and not taking account of household wastes and losses, the national diet measured up to the Recommended Allowances in everything except the two vitamins riboflavin and niacin and the mineral calcium. The deficit was considerable only in the case of riboflavin.[2] *But averages, even averages by income and other groups, have little meaning for such a purpose, for the large amounts above the average consumed by many do not help in the least those who consume less than the average.* One need not argue long, for example, that the extra calories ingested by our plump or corpulent friends are of no use to our hungry and underfed. Very few of the families studied, however, were deficient in calories. The situation is best summarized in another way. Four families in five studied consumed less than the Recommended Allowances of one or more of the following seven food elements: protein, calcium, iron, vitamins known as A, thiamine, riboflavin, and ascorbic acid. Also, three-fourths of the families consumed less than the Recommended Allowances of riboflavin, one-half consumed less than

[2] The riboflavin allowance has been reduced about one-fourth since then.

the Recommended Allowances of calcium, thiamine, and ascorbic acid, and one-fourth consumed less than the Recommended Allowances of protein, vitamin A, and iron.

We are not yet ready to say, however, that all these families were *malnourished* in the usual sense of that term. First, we need to inquire into the nature of the National Research Council standards: what do they represent? The reader will note at once that they are not called "requirements." If they had been, one would at once have asked the question: Requirements for what? For freedom from *obvious* deficiency diseases? For freedom from deficiency diseases that can be determined only by medical or clinical tests? Or for the optimum of health, working efficiency, and length of life?

The Recommended Allowances[3] are best described as meeting the second of these tests, with liberal additions as safety factors to take care principally of the circumstance that a large fraction of the population has already accumulated chronic deficiency states that need to be cor-

[3] Many readers will be helped in judging the Recommended Dietary Allowances when they are told that they were followed as a standard by the armed forces of the United States in the Second World War. The table following, prepared by Col. Paul E. Howe of the Sanitary Corps of the United States Army, chief of its nutrition branch, shows the results of surveys made of food supplied in army camps:

APPROXIMATE NUTRITIVE VALUES OF FOOD PRESCRIBED AND CONSUMED BY THE UNITED STATES ARMY AS DETERMINED BY NUTRITIONAL SURVEYS, AUGUST, 1941, TO JULY, 1942

	Nutritive value of food issued, average of 117 surveys	Nutritive value of food consumed, average of 117 surveys	Daily allowances of specific nutrients recommended by the National Research Council, for the average man weighing 154 lb.	
			Moderately active	Very active
Calories	4,101	3,888	3,000	4,500
Protein, g.	130	124	70	70
Fat, g.	193	193		
Carbohydrate, g.	460	415		
Calcium, mg.	954	883	800	800
Phosphorus, mg.	1,946	1,882		
Iron, mg.	25	28	12	12
Vitamin A, I.U.	10,760	9,255	5,000	5,000
Thiamine, mg.	2.2[a]	2.1[a]	1.5	2.0
Riboflavin, mg.	3.0	2.3	2.0	2.6
Niacin, mg.	32.0	27.4	15.0	20.0
Ascorbic acid, mg.	93.2[a]	86.0[a]	75.0	75.0

[a] Corrected for cooking losses.

rected and that this calls for extra intakes over a long period. These additions may also serve to good effect in illness and convalescence or in periods when the body is under unusual stress. One who has been adequately fed from birth will not regularly need as much as these Allowances—probably not more than 65 to 70 per cent—to show no malnutrition effects in a clinical examination except in the case of calories of food energy. Probably as little as half of the Allowances, again except in the case of calories, will keep any obvious deficiency disease from appearing. The Recommended Dietary Allowances for calories for a man weighing 154 pounds, if very active, is 4,500 calories; if moderately active, 3,000 calories; if sedentary, 2,500 calories. The comparable figures for a woman weighing 123 pounds are 3,000, 2,500, and 2,100 calories. All these also have a margin of safety, but a much smaller one than for vitamins and minerals—not over 10 per cent probably. A man who works very hard, however, may actually need 5,000 calories or even more for short periods of extreme exertion.

What might optimum requirements be? The science of nutrition has not advanced far enough to tell us. For part of the nutrient elements, the body needs enough material each day to replace the body cells that are used up each day. Apparently the optimum in such cases is enough to maintain the body in equilibrium at all times. Practically speaking, this means setting a higher limit than just enough to maintain equilibrium each day, unless the diet is watched very closely and each day's meals are well balanced, since very high intakes later do not compensate for previous periods of low intake. This description fits closely the proteins, calcium, and iron, all of which are parts of the structural material of the body, and the water-soluble vitamins, ascorbic acid and the members of the B complex, which are incapable of being stored to any great extent. Of the fat-soluble vitamins, particularly vitamin A, the body stores enough in the liver to last through several weeks of severe depletion so that the margins need not be so large. In the case of calories of food energy, large resources can be stored as fatty tissue, but these can be drawn upon only rather slowly, so that the body suffers unless it receives some new food energy regularly, especially if it engages in severe physical labor.

To this extent, the science of nutrition is on fairly safe ground in defining optimum nutrition. Some of the scientists in the field, however, are not satisfied to stop here. They believe that they see indications that still larger amounts of some foods, in ways not yet explained, add still something more to the life span and to health and working efficiency. Sometimes this group of scientists is playfully referred to as holding a "superman" theory of nutrition. Their fellow scientists are not willing, however, to go along with them in setting higher optima. What the scientists

on the Food and Nutrition Board did was to choose a standard that they could pretty well agree upon, because it was based on laboratory tests, and add liberal factors of safety, for the reasons indicated. The result was a set of standards that approaches the optimum and conceivably may exceed it if it is followed consistently from birth on through life. The National Research Council therefore did well to use the term "allowances" and not "requirements." The Allowances are best looked upon as practical *working goals* or *targets.*

It also follows from the foregoing and from evidence presented later, that these Allowances cannot be used exactly as they are to determine the amount of underfeeding in a country. If the food intake of a whole population is being considered at one time and the standard sought is food enough to keep the population from showing any malnutrition in physical examinations or in clinical tests, *the factor of safety is needed only for those who have not been fed up to this standard and until such time as the effects of past malnutrition are corrected insofar as reasonably possible.*[4] Therefore, any standards set much higher than the 65 to 70 per cent of the Recommended Allowances, except for calories, must be considered as approaching optimum rather than clinical standards. Perhaps for a population as well fed as that of the United States, 75 per cent of the Recommended Allowances is a reasonably high working standard, except for the nutrients required for growth, pregnancy, and lactation. A somewhat higher standard would be needed for a population with a large backlog of deficiency states to be corrected.

But there is one other important qualification, introduced earlier, which now needs to be examined more carefully. The Recommended Allowances theoretically apply to food actually eaten. The data collected in the retail market or in surveys from homemakers are of edible food as it enters the kitchen. The losses and wastes in households and other eating places may equal a considerable part of the difference between 75 and 100 per cent of the Recommended Allowances. Hence the Allowances may prove to be not much too high in some population groups.

Malnutrition was not, of course, determined by actual clinical evidence of nutritional deficiencies in the Consumer Purchases Study. The evidence of malnutrition was only indirect—the amount of food eaten. If clinical tests had been applied, what would they have been like?

The test for vitamin C is the level of ascorbic acid in the blood plasma; a level of 0.6 milligram per 100 cubic centimeters of blood is often considered a "fair state of saturation." Iron deficiency is determined by

[4] Also for those persons with inefficient metabolisms who do not obtain full use of their food.

the hemoglobin level of the blood. Protein inadequacy is also determined by the amount in the blood plasma, plus the appearance of edema, evidenced by skin pitting, in extreme cases. The lack of vitamin A is is judged by chapping and reddening of the skin and by the ability of the eyes to adjust themselves to changes from light to darkness. Riboflavin and niacin deficiency can be determined by urine analysis. The evidence formerly accepted was lip lesions and related skin defects, and the appearance of blood vessels in the whites of the eyes, but these are now considered as caused also by other nutrition deficiencies. By no means do all scientists agree as to the validity and interpretation of these tests and evidences.

Question also arises as to the timing of the Consumer Purchases Study. It was made in 1936 when unemployment was still high and farm incomes were low. A less comprehensive study, covering 1 week's consumption of food, was made by the Bureaus of Nutrition and Home Economics and of Labor Statistics in the spring of 1942 when per-capita food expenditures were 8 per cent higher after allowing for 20 per cent higher food prices. Significantly, more milk and green leafy vegetables were being consumed by nearly all groups. As a result, less than one-half were low in riboflavin, less than one-third in calcium, one-fourth in thiamine, and one-tenth in protein, ascorbic acid, vitamin A, and iron. Reduction of supplies of a few foods after 1942 offset somewhat these early gains, but rationing provided a more even distribution, and the general enrichment of flour and bread increased the consumption of thiamine, riboflavin, niacin, and iron.

On the other hand, the diets of 1936 were better than those of a few decades earlier. It was as late as 1925 that E. V. McCollum[5] wrote as follows in his "Newer Knowledge of Nutrition."

> We have been trying an experiment in human nutrition on a nation-wide scale, with a dietary which is of a kind which no people in history ever tried to live upon before. There was no way in which the results of such an experiment could have been foretold, for the dietary properties of individual foods were not understood, and the nutritive requirements of the body were essentially only half understood. It is possible, however, after approximately two generations of experience with a diet of the white bread, meat, sugar and potato type, with small, but generally inadequate additions of other foods of kinds which are capable of correcting the defects of the principal components of the food supply, to attribute certain unfortunate effects definitely to an unsatisfactory dietary. All the information available seems to warrant attributing in great measure the high incidence of malnutrition among children of preschool and school ages, the faulty bone growth,

[5] McCollum, E. V., and Nina Simmonds, "Newer Knowledge of Nutrition; the Use of Foods for the Preservation of Vitality and Health," 3d ed., p. 528, New York, 1925.

bad teeth and faulty postures, to inadequacies in our national dietary, and to perverted appetities resulting from pampering and the formation of a liking for sweet foods.

Diets have been improved since McCollum wrote by an increased consumption of citrus fruits, tomatoes, green and leafy vegetables, and milk and eggs and more recently by the enrichment of flour and bread and by a decreased relative consumption of flour, sweet potatoes, and other carbohydrate foods. Chart IV shows that this improvement was well under way when the big depression struck in the period 1930 to 1933. A careful comparison of available data on food consumption indicates that over the whole period from 1920 to 1943 the per-capita intake of thiamine increased around 33 per cent, of calcium and riboflavin by around 20 to 25 per cent, of ascorbic acid and vitamin A by 20 per cent, and of niacin by 16 per cent.[6] To the extent that these gains are of wartime origin, they may, of course, be lost in part, at least temporarily, if employment and incomes presently decline toward prewar levels.

Most of the statements about diets in the foregoing pages are for the United States as a whole. We now need to take cognizance of the wide differences between regions and income and cultural groups. The 1936 survey indicated that diets were generally better in the North and West than in the Southeast, only part of the difference being due to difference in the income level. Negro families in the Southeast were found to have poorer diets than white families, but not appreciably poorer than white families of the same income level. Half the Negro farm families studied had diets that failed to meet the specifications for "fair" diets, as that term is used in reports of the Consumer Purchases Study.[7] In the Southern Piedmont and Mountain Regions, the diets of many families consist chiefly of fat salt pork, corn meal and wheat flour intensively milled, and sirup. Such a diet has an excess of calories from fats and carbohydrates and severe deficits of vitamins and minerals. It is in this region that pellagra, a disease resulting from deficiency in niacin and other B-complex vitamins, is prevalent. The amount of pellagra has been reduced, but it is still a major problem. Legislation in several Southern states that requires oleomargarine to be enriched with vitamin A and white-flour bread and cornmeal to be enriched is resulting in dietary improvements. The bad diets of this region should by no means

[6] See "The Nutritive Value of the Per Capita Food Supply," *U S. Dept. Agr. Misc. Pub.* 616.

[7] Diets classified as "good" measured fully up to the Recommended Allowances of the National Research Council. "Fair" diets had calories enough in most cases but in general only 50 to 70 grams of protein per day instead of the 75 or more in the good diets, only 0.45 to 0.65 gram of calcium instead of 0.68 or more in good diets, etc.

all be attributed to low incomes. Other factors are ignorance concerning food needs, failure to produce for home use, the overrefinement of staple foods, and the absence of some needed foods in rural trading centers.

The consumption pattern of families living in cities differs in several respects from that of families on farms. Both the 1936 and the 1942 surveys showed that urban families used more tomatoes and citrus fruits,

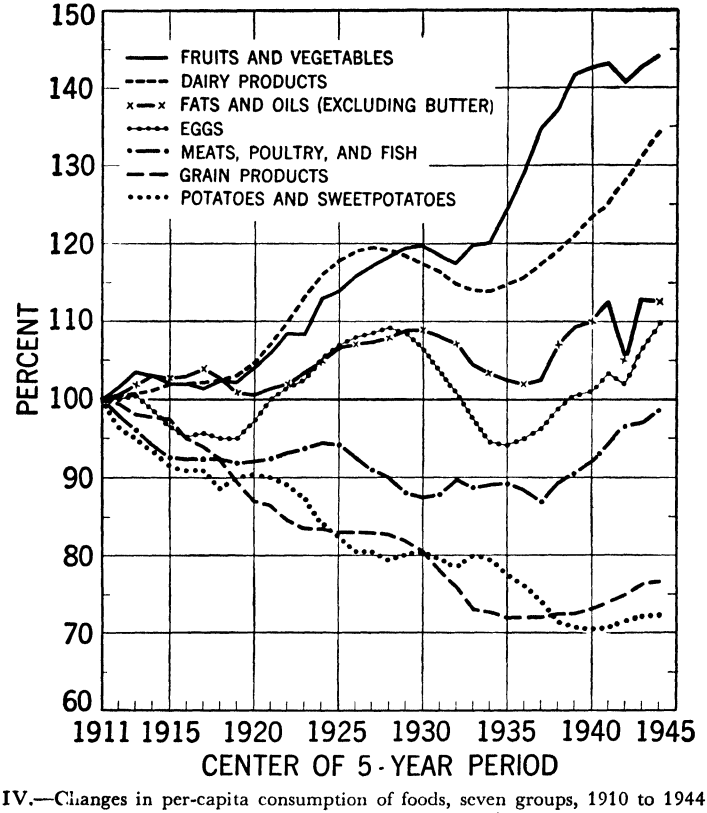


CHART IV.—Changes in per-capita consumption of foods, seven groups, 1910 to 1944 (5-year moving averages, 1909–1913 = 100).

more meat, poultry, and fish, more green and yellow and other vegetables, and more fruit than farm families and that farm families used more milk, sugars and sweets, grain products, dry beans, peas and nuts, potatoes, fats and oils, and eggs. In general, the farm diets were better. In the 1936 study, one-half the farm diets and only one-fifth the nonfarm diets were rated "good." Altogether, one-fourth the farm families but only one-seventh the nonfarm families had diets that met the original National Research Council's Recommended Allowances. In the 1942 study, the average farm diet contained 30 per cent more calcium than the average

nonfarm diet, but the average urban diet was 20 per cent higher in niacin and 25 per cent higher in ascorbic acid than the farm diets. Food produced on the farm for home use accounted for at least half of the average quantity of each nutrient: for calcium, vitamin A, and riboflavin, 75 per cent of the total; and for protein, ascorbic acid, and thiamine, approximately 60 per cent of it.

Surveys of particular groups and areas may be more meaningful than broad regional surveys. In the Milbank Foundation study of the food intakes of a group of high-school pupils in New York City, a major fraction of the low-income public-school group showed deficiencies in vitamin A, riboflavin, and ascorbic acid, judged by the Recommended Dietary Allowances, whereas only 10 per cent of the private high-school pupils had deficiencies in these nutrients. The group of Works Progress Administration (WPA) workers who helped with this study had more serious deficiencies than the low-income pupils and hence were given clinical examinations. These showed that over half had substandard ascorbic and blood-plasma levels and that most of them had diseased eyelids (conjunctivitis). As workers, they tired easily and were irritable. Had they become workers on relief because of their condition? And why had they fallen into this condition?

A survey of food consumption of children made by the Maine Agricultural Experiment Station in 1934 to 1936 in sections typical of Maine with respect to agriculture, industry, and climate showed a high average consumption of milk, citrus fruits, tomatoes, green and yellow vegetables, and whole-grain bread and cereals. But the families living distant from a railway or trucking route had to buy their food from small country stores that often had no fresh fruit and vegetables. Also, not enough milk was produced in all communities. Finally, few children were receiving cod-liver oil or other vitamin-D supplements during the period September to May, as is almost necessary in these northern latitudes. As a result of these conditions, low intakes of vitamins C and D and calcium, and a restricted intake of vitamin A, thiamine and riboflavin were found in many families; also bone defects resulting from rickets, and much dental caries.

Surveys made in Tennessee by Youmans and associates, and in North Carolina by Milam and associates are notable in that they combined clinical examination with the collection of data on food consumption. Sizable deficiencies in diets were found in most of the areas, even in calories in some parts of them, as measured against the Recommended Allowances. But evidences of malnutrition, such as underweight, edema (from low protein intake) or even low serum protein levels, or subnormal adaptation to dim light, or anemia, were much less frequent than the ap-

parent deficiencies in the diets would indicate. Clinical evidence such as low plasma levels of ascorbic acid, or eye defects, or diseased gums (gingivitis) was more common. But few of these evidences appeared to be closely related to deficiencies in diets. The reasons for these results are probably a combination of the following:

1. The Recommended Allowances really do have the wide margin of safety that has been indicated earlier. Perhaps it is wider than suggested above.
2. Surveys of food intake may not include all the food actually eaten.
3. A record of food intakes for one short period is not likely to be a very accurate indicator of chronically inadequate diets or of frequent or occasional lapses from good diets. Correlations between food intake thus measured and bodily evidences of malnutrition are therefore likely to be poor.
4. Many of the families in some of the communities surveyed were undoubtedly malnourished, but not enough so to produce clinical evidence or at least to cause deficiency diseases to appear.

A regular and adequate supply of the principal vitamins and minerals is most readily obtained by consumption of certain types of foods in sufficient amounts each day, such as the following sample dietary patterns based on the needs of an average adult, developed by the National Research Council to meet its Allowances:

Milk	1 pt.
Egg	1 daily, if possible (on eggless days, substitute beans, peanuts, cheese, or more milk or meat)
Meat, fish, or fowl	1 or more servings
Potato	1 or more servings
Vegetables	2 or more servings (1 green or yellow)
Fruits	2 or more (1 citrus fruit or tomato or other good source of vitamin C)
Cereals and whole-grain or enriched bread	
Other foods needed to complete the meals	

Surveys have been made to determine the extent to which food consumption among groups conforms to this model pattern or one similar to it. One such study, made by Dorothy Wiehl, covered 1,100 aircraft workers in southern California. Weekly consumption records indicated that of the men only 2 per cent had diets which met or approximated the model diet and 87 per cent had diets which were decidedly unsatisfactory in one or more of the food groups. Over 55 per cent of the diets were poor in milk, and about a fifth were low in eggs. Most of the workers, however, consumed sufficient lean meat.

The eating habits of 6,708 grade and high-school students—5,255 white, 1,453 colored—in Louisiana in 1942 were evaluated with reference to this same pattern, with adjustments toward less expensive foods, by a

group of workers at Louisiana State University. Only 11 per cent of the white and 3 per cent of the Negro children received a diet adequate in all essential food factors. The diets were definitely deficient in one or more essential nutrients for 29 per cent of the white and 62 per cent of the Negro children and borderline for 60 per cent of the white and 35 per cent of the Negro.

One other set of relationships needs to be explored in this chapter—those between income and diets. Even in normal times, several million families in the United States have so little to live on that not even the wisest use of this little would give them fully adequate diets. Any of several circumstances may account for their low incomes: no able breadwinner in the family, a poor job or no job at all, misplacement in society, poor land or too little of it, poor use of the land, too little working capital, poor health from malnutrition and other causes, drunkenness, or just plain shiftlessness. Better incomes will not alone ensure these families adequate nutrition, although it will help greatly. In the Consumer Purchases Study, one-fifth of the nonfarm families in the highest of the three income groups had poor diets, and one-half had only fair diets, as these terms were defined earlier. The other side of the picture is that one-sixth of the families in the lowest income third had good diets, and two-fifths had fair diets. These low-income families with good and fair diets achieved this in some cases by spending more than the usual fraction of their incomes on food but in more cases by buying the right foods and making appetizing meals of them. But it is not reasonable to expect any large fraction of the families unable to earn a good income to be especially gifted in handling their food problems.

How per-capita consumption of the different foods varied with family income at the time the Consumer Purchases Study was made is indicated in Chart V. The families in the $3,000 to $4,000 group were actually consuming less flour and cereals and dry peas, beans and nuts than the families in the two groups below $1,000. The largest increases with more income were in the consumption of fruits and vegetables and meats, poultry, and fish. Some of the food groups—particularly milk and eggs—showed considerable increase in the lower-income groups but little increase farther up the scale. Butter would have shown more increase if it had been separated from the cheaper fats. The lines in the chart represent *average* variation, of course. The pattern of behavior varies considerably for families in the same income group because of different composition of families, different occupations, different family and cultural backgrounds, and the like. But it is clear that in general, with higher incomes, the diets include larger percentages of the fruits, vegetables, milk, eggs, and meat which are required for high-quality diets.

Combine with the foregoing relationships of food consumption to income the simple fact that even in the United States a large group of the people is too poor to buy enough good food, and we arrive at the most important of all truths about the food problem, that the great increase of food consumption that this country is looking for must come among the great

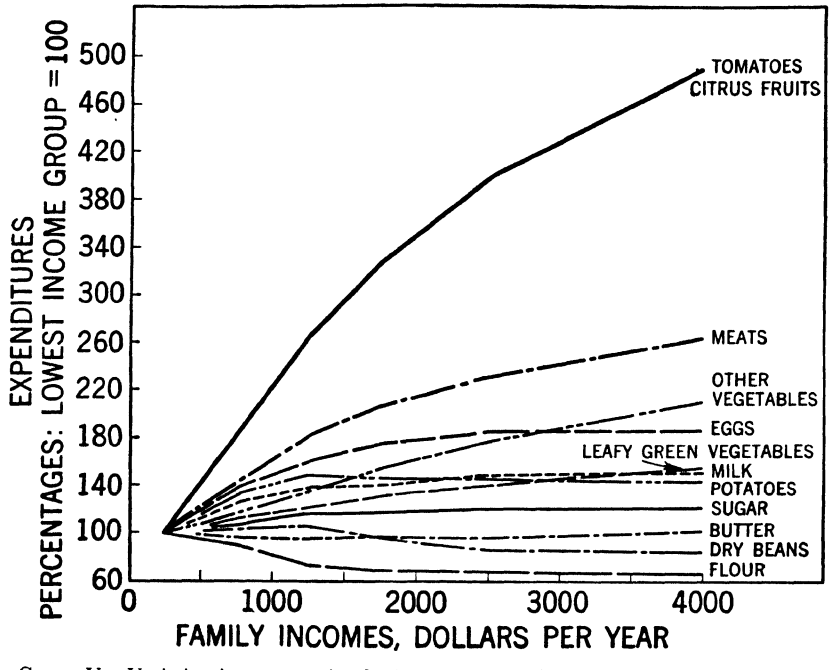


CHART V.—Variation in consumption by income groups, for 11 food groups. (Based upon 1935–1936 data furnished by the Bureau of Agricultural Economics.) (Consumption for income group under $500 = 100.)

masses of low-income people. This is even more true of most other countries. A corollary is that the opportunities for expansion of food consumption are very great.

Still, we must not think that better nutrition is *only* a matter of income. There is a vast amount of poor nutrition that must be blamed on factors other than lack of ability to buy or produce the needed foods. This is the other part of the problem. Thus one part of the nutrition problem is *increasing* or *supplementing* the incomes of large masses of populations. The other part is inducing families to use their energies, resources, and buying power to obtain good diets for themselves.

V. FOOD AND NUTRITION AND AGRICULTURE IN THE WORLD AT LARGE

WITH the food and nutrition and agriculture of the United States as a bench mark or standard, let us now look at the situation in some other parts of the world. As we said in Chapter I, we must do this because to an important extent the problem we are considering is one problem for the whole world. Obviously it will not be possible in the space available to review the food and agricultural situation in the rest of the world in other than broad outlines or to deal specifically with more than a few countries that may be taken as types. It should also be clear by this time that nothing very precise can be said as to the absolute amount of malnutrition in a country. Few countries have more and better data on the subject than the United States, and most have less and poorer data. We shall be able only to review what information there is.

Clearly we should begin this review with the conclusions reached by the League of Nations Mixed Committee on the Relation of Nutrition to Health, Agriculture, and Economic Policy for the period before the war. The "Final Report" of that Committee put western Europe in the same group with the United States and concluded that the low-income groups in all these countries included many malnourished, probably enough to make between 20 and 30 per cent of the entire population. For the British Dominions, the report concluded that, although food consumption was relatively high, considerable malnutrition existed, particularly among children. Eastern and central Europe suffered much more malnutrition and in some sections even a lack of staple foods at times. The most conclusive general statement about the Far East is that made by the Inter-Governmental Conference on Rural Hygiene, convened by the League of Nations in Bandung in 1937. This conference stated that the diets of the great masses of the population in the East, meaning two-thirds or more, are grossly deficient in terms of any standards of adequacy put forward by nutrition workers. In Asia and in the tropics, about 75 per cent of the 1,150 million inhabitants have diets much below the standard for health.

These very general statements can best supplemented in more definite terms in the form of the vital statistics that are most closely related to malnutrition. F. L. McDougall presented a table of such statistics in

his report to the Interim Commission on Food and Agriculture in 1944, entitled "Food and Health: The Quantity and Quality of Life in Relation to Poverty and Nutrition." Table 3 presents these data for 22 countries taken from his list.

TABLE 3.—BIRTH AND DEATH STATISTICS, SELECTED COUNTRIES

Country	Rates per 1,000 population, 1938		Infant deaths per 1,000 live births, 1938	Expectation of life at age 1, males	
	Births	Deaths		Date	Years
Netherlands	20.5	8.5	37	(1931–1940)	67.8
Denmark	18.1	10.3	59	(1931–1935)	66.5
Australia	17.5	9.6	38	(1932–1934)	65.49
Canada	20.5	9.5	63	(1930–1932)	64.46
Germany	19.6	11.6	60	(1932–1934)	64.43
United States (white)	17.6	10.6	51	(1930–1939)	63.3
England and Wales	15.1	11.6	52	(1930–1932)	62.25
Eire	19.4	13.6	67	(1935–1937)	62.21
Belgium	15.8	13.1	73	(1928–1932)	61.25
Czechoslovakia	16.8	12.8	121	(1929–1932)	59.90
France	14.6	15.4	66	(1928–1933)	58.63
Argentina	24.1	12.3	106		
Spain	19.0	18.4	120		
Poland	24.5	13.8	140	(1931–1932)	56.9
Bulgaria	22.8	13.7	144	(1925–1928)	54.37
Japan	27.0	17.6	114	(1933–1936)	51.95
Rumania	29.6	19.2	183		
Mexico	43.9	23.1	125		
Chile	32.1	23.5	236		
Costa Rica	43.1	16.7	122		
Philippines	32.4	16.5	139		
Venezuela	34.3	18.6	139		
India (British)	34.1	24.3	167	1931	34.68

These data indicate a steadily increasing birth rate and decreasing death rate as one moves from the wealthy to the poor countries. The infant deaths (within the first 12 months) per 1,000 live births in 1938 were 30 to 40 in the more prosperous countries or sections of large countries and over 100 in the poor countries of Europe and the Far East. The highest infant death rate was in Chile (236), and the rate in British India was 167. Expectation of life at age 1 (among males) before the war ranged from above 60 years in the more prosperous countries such as the United Kingdom, Australia, Canada, and those of northwestern Europe to rates in the 50's in the poorer countries of Europe and down to less than 35 years in British India. McDougall concludes: "The

countries that had by 1938 achieved an average life expectancy of 64 years or over together made up some 12 per cent of the world's population, while 70 per cent of the world's peoples lived in countries where the average span of life was under 50 years and frequently well under 40 years."

The prewar mortality rates from tuberculosis of the lungs, which were mentioned earlier as indicators of malnutrition, range in another of McDougall's tables from under 40 in the Netherlands, Denmark, New Zealand, and Australia, to around 55 in the United States and England and Wales, to around 100 in France and Greece, 127 in Hungary, 152 in Japan, and 233 in Chile.

As to the significance of the vital-statistics data for our present problem, McDougall writes:

> It is not claimed that differences in diets alone account for the extraordinary contrasts in vital statistics. In many parts of the world, poor sanitation, impure water supplies, ineffective control of infectious diseases, bad housing, and ignorance combine to maintain death rates at abnormally high levels. But there is irrefutable evidence that poverty leads to untimely death and that among the disabilities of poverty, inadequate diets are a major factor. Contrasts between the vital statistics of areas within the same country also furnish evidence on this point. Thus in all urban areas of Great Britain, conditions with regard to water supply, general sanitation, and control of infectious diseases are very nearly equal, and only two principal factors remain which can account for such marked differences as are to be found there—nutrition and housing.

But vital statistics, after all, are only indicators of inadequate feeding. Let us now explore the actual data on food consumption. The problem with them is their inaccuracy and incompleteness of coverage. For example, data on the intake of wines, beer and other alcoholic beverages are available for only some of the countries under consideration. Around 300 calories are obtained from this source in France, and half as much or more in Italy, Spain, and Portugal.[1] Livestock foods in many countries had to be estimated entirely from numbers of head of livestock reported on farms, little of it passing through the markets. Few data are available for the large quantities of small fish caught and consumed along the shores of many countries or for the wild fruits consumed in the tropics. The working party that compiled the data for the "World Food Survey" made the best possible use of such data as were available, but its members are fully aware of their shortcomings. Table 4 presents their data on consumption by food groups for a few representative countries.

The most significant data in this table are found not in the total cal-

[1] There is also question as to whether calories from alcohol are used for body processes —for work production and for fat formation.

TABLE 4.—CALORIES AND PROTEIN FROM PREWAR FOOD SUPPLIES (Per head per day at the retail level)

Country	Calories per day											
	Total[a] calories	Cereals	Roots and tubers	Sugar	Fats	Pulses	Fruits and vegetables	Meat	Milk	Protein		
										Total	Animal	Plant
United States	3,249	887	139	515	502	105	210	524	367	88	50	38
Canada	3,109	943	177	518	464	81	118	442	366	87	47	40
United Kingdom	3,005	898	125	465	509	67	87	585	269	80	43	37
Denmark	3,249	859	220	603	642	16	81	404	390	76	44	32
Germany	2,967	1,117	317	264	528	17	52	399	227	77	34	43
Italy	2,627	1,606	63	80	256	158	52	148	108	81	19	62
Bulgaria	2,831	2,125	18	44	168	50	56	168	159	90	18	72
USSR	2,827	1,837	309	121	131	90	37	153	149	88	17	71
China	2,201	1,552	112	32	72	289	35	95	...	68	5	63
India	2,021	1,306	37	163	71	210	41	37	156	56	9	47
Java	2,040	1,154	490	46	61	178	72	35	4	43	4	39
Iran	1,966	1,317	...	66	34	88	190	85	186	66	17	49
Mexico	1,909	1,004	42	197	106	108	96	197	155	59	20	39
Argentina	3,275	1,240	104	347	241	84	103	755	290	111	63	48
Chile	2,481	1,107	178	283	159	84	112	259	170	70	24	46
Australia	3,128	872	93	582	420	28	106	745	282	90	59	31

[a] Excluding wine, beer, and other foods and drinks for which no estimates could be made for some countries.

ories but in the distribution between food groups. As indicated in Chap. II, the wide range in calorie intake between countries may be almost half explained by differences in completeness of coverage and in the amount of wastes and losses, and the wide differences still left are due partly to differences in the amount of physical effort put forth. Particularly striking are the high cereal consumption in eastern Europe; the combination of roots and tubers with cereals in France, Germany, and northwestern Europe generally, but the absence of roots and tubers in the diets of southern Europe, and the combination of pulses with cereals in China, Italy, and part of Latin America; the wide range in sugar consumption, 14 calories a day in China and 44 in Bulgaria to over 500 in Denmark, the United States, and Australia; the equally wide range in consumption of fruits and vegetables, higher than in the United States only in some tropical countries not included in the table, and only half as high in Canada and Australia as in the United States and less than this in the United Kingdom, Denmark, Germany and Italy; and the relatively high consumption of meat and milk in western and central Europe—almost as high as in the United States. These differences between countries are partly adaptation of food eating to what can be produced to best advantage in the country because of climate, soils, and topography, but they also partly reflect differences in the pressure of the population on the land. The Chinese, for example, if there were only 170 million of them could have as much meat and milk in their diets at least as the Russians.

Data on food consumption by groups can be summarized in convenient form by showing the proportion of calories obtained from cereals and potatoes and also the proportion of total calories from crops as against the proportion from livestock products. Merrill K. Bennett of the Food Research Institute has suggested that, if a nation's diet is composed of cereal-potato calories to the extent of 70 per cent, its people are unlikely to be obtaining an adequate diet. It may be adequate in energy value, in the B vitamins if the cereals are not highly refined and perhaps in vitamin C; but so little room is left for animal products that the diet may be expected to be deficient in high-quality proteins, in at least some of the mineral salts, in vitamin A, and often also in vitamin D. On the other hand, if the proportion of calories derived from animal products is 35 to 50 per cent, mineral and vitamin deficiencies are not likely to be widespread among groups of the population. These two rough measures of national dietaries were applied by Bennett and Tolley to their data for 26 countries as shown in Table 5. Bennett concluded from this analysis that about three-fourths of the world's population lives in countries where the prevailing diets are qualitatively inadequate. Of course,

there are many families in the first group of countries who have good diets, and many in the second who have not.

TABLE 5.—ESTIMATED PROPORTION OF PER-CAPITA CALORIE INTAKE DERIVED FROM VARIOUS SOURCES, SELECTED COUNTRIES, PREWAR YEARS

Country	Calories per day[a]	Per cent of calories from cereals and potatoes[b]	Per cent of calories[d]	
			Crops	Livestock
Canada	3,109	30–40	60–65	35–40
United States	3,249	30–40	60–65	35–40
Brazil, etc.[c]	2,300	50–60	70–75	25–30
Uruguay	2,845	30–40	60–65	35–40
Argentina	3,164	40–50	65–70	30–35
Chile	2,353	50–60	80–85	15–20
United Kingdom	3,005	30–40	55–60	40–45
Eire	3,155	40–50	65–70	30–35
Sweden	3,036	30–40	60–65	35–40
Norway	3,117	40–50	60–65	35–40
Denmark	3,215	30–40	60–65	35–40
Germany	2,921	40–50	75–80	20–25
France	2,714	50–60	70–75	25–30
Spain	2,678	50–60	85–90	10–15
Italy	2,471	60–70	85–90	10–15
Bulgaria	2,788	70–80	85–90	10–15
Greece	2,437	50–60	85–90	10–15
Turkey	2,619	60–70	85–90	10–15
Palestine	2,570	60–70	80–85	15–20
Egypt	2,199	70–80	90–95	5–10
India	2,021	60–70	90–95	5–10
China	2,201	70–80	95–100	1–5
Japan	2,268	70–80	85–90	10–15
Australia	3,128	30–40	55–60	40–45
New Zealand	3,281	30–40	50–55	45–50
Union of South Africa	2,300	70–80	75–80	20–25
USSR	2,827	70–80		

[a] From the "World Food Survey," excluding wine, beer, etc.

[b] Estimated populations in the several percentage groups are

Cereal-potato calories	30–40	40–50	50–60	60–70	70–80	80–90	30–90
Population, millions	205	93	93	204	156	1,344	2,095

[c] Includes Central America, Caribbean, Venezuela, Colombia, Ecuador, and Peru.

[d] Tolley, Howard R., Agricultural Adjustments and Nutrition, in "Food for the World," Chicago, 1945.

There is a way of evaluating the diets of different countries which is still more comprehensive and more accurate than that above. This is

the method that is employed by the Bureau of Agricultural Economics of the U.S. Department of Agriculture for measuring changes in food consumption within the United States. It will be remembered from Chap. II that this index of food consumption, counting 1935–1939 food consumption as 100, rose to 105 in 1940, to 111 in 1944, and finally to 117 in 1947 and that it rose thus because of large shifts toward more livestock products and fruits and vegetables in the diet. This index shows the effects of relative changes in each of the eight food groups. It accomplishes this by weighting each food group according to its price in 1935–1939. In the first column of Table 6, index numbers are computed for the different countries in exactly the same way, 1935–1939 United States consumption again being called 100. These index numbers therefore show the differences in what it would have cost to buy, in the United States in 1935–1939 at United States prices, the diets of the 54 countries listed in the table. They thus show to the people of the United States in their own terms how much better or poorer the diets of these countries are than their own.[2] The comparisons thus obtained are, of course, not highly accurate, but they accord closely with all the known facts about the diets of these countries. Any other country can figure out in the same way what it would have cost in its markets to buy the diets of all the other countries, including that of the United States. The comparisons would run closely like those in the table for all the countries near the top of the list, and not greatly different anywhere, since the prices of the foods in the different groups rank much alike the world over.[3]

It appears from Table 6 that to buy the 1935–1939 diet of New Zealand in this country would have cost 13 per cent more than we paid for ours. A chunk of the United States could easily be carved out, however, that had as good a diet as New Zealand's in 1935–1939. The indexes of western Europe were mostly around 80 to 90 per cent of ours, those of eastern and southern Europe about two-thirds of ours, and those of eastern Asia mostly around one-third of ours.

These index numbers include not only the composition of the diet but also the differences in the total amount of food available measured in calories of food energy. In the second column of the table these are expressed as percentages of the United States calorie consumption con-

[2] In constructing these index numbers, the prices of the nearest United States equivalents of the diets of these countries were taken. Thus the price of wheat was taken for rice.

[3] To illustrate how the index numbers may be affected by using United States prices for constructing an index number for other countries, take the case of potatoes. In Europe generally, potatoes are cheaper relative to wheat than in the United States. The method used, therefore, weights roots and tubers too heavily in the potato-consuming countries and makes this index number a few points too high.

TABLE 6.—INDEXES OF FOOD CONSUMPTION BY COUNTRIES, 1935–1939

Country	Food consumption (1)	Calories (2)	Composition of the diet (3)
United States	100	100	100
New Zealand	113	101	112
Australia	106	96	110
Argentina	104	97	107
Denmark	97	99	98
Sweden	96	93	103
Switzerland	92	91	101
United Kingdom	88	92	96
Canada	87	96	91
Norway	85	96	89
Eire	85	98	87
Netherlands	85	91	93
France	84	84	100
Austria	83	89	93
Germany	81	90	90
Finland	78	91	86
Brazil	76	78	97
Belgium	71	86	82
Spain	69	82	84
Czechoslovakia	67	84	80
Palestine	64	79	81
Rumania	64	86	74
Hungary	63	85	74
Poland	63	83	76
Cuba	63	90	70
Yugoslavia	63	87	72
Chile	60	72	83
Bulgaria	60	86	70
USSR	59	87	68
Turkey	58	81	72
Italy	56	76	74
Siam	56	67	69
Union of South Africa	54	71	76
Greece	54	75	72
El Salvador	54	60	90
Burma	52	72	72
French Morocco	51	74	69
French West Africa	48	71	68
Japan	48	70	68
Mexico	48	59	73
Honduras	47	64	73
Puerto Rico	47	68	69

TABLE 6.—*Continued*

Country	Food consumption (1)	Calories (2)	Composition of the diet (3)
Malay Peninsula	47	72	65
Kenya-Uganda	46	71	65
Madagascar	45	70	64
Philippines	44	62	71
Iran	41	61	67
Peru	39	64	61
Ceylon	38	67	57
Egypt	38	68	56
Korea	37	59	63
China	35	68	51
India	33	62	53
Java	33	63	52

sidered as 100. Then in the third column the index of food consumption in the first column is divided by the index of calories in the second, to give the index of composition of the diet. Thus the 81 for food consumption for Germany divided by the 90 for calories makes an index of food composition of 90, compared with 100 for the United States. Thus Germany's prewar food consumption was 10 per cent lower than ours in calories and also 10 per cent lower in terms of the proportions of foods in the different food groups. The composition index for New Zealand on this basis was 112, for the USSR 68, for Puerto Rico 69, for the Philippines 71, for India 53, and for China 51. The Indians include a little milk in the diet of their children.

There is not, of course, this much difference in the foods actually consumed. Perhaps a third of the calorie differences represent food wastes and losses and possible omissions. Another part represent wastes from overeating in the wealthy countries. On the other hand, part of the wastes and losses in the better fed countries arise from selecting the better portions of foods and discarding the rest; in general, the degree of care that is exercised in saving food is part of the food standard of living. Half, perhaps, of the calorie differences between countries measure actual differences in efficient food consumption.

Table 6 does not include all the countries listed in the "World Food Survey." Some small countries were omitted because they are well represented by neighboring countries; others because the data given in the tables of the survey did not give reasonable results when analyzed in this way. This was especially true of the data for some of the Latin-

American countries. The "World Food Survey" states strongly and repeatedly that the data in its tables are highly tentative.

Let us consider more in detail the evidence as to the quality of the diets in selected individual countries or regions. For three countries—the United States, the United Kingdom, and Canada—carefully refined data, showing the nutritive content of the average per-capita food supply in prewar and war years, are available in the Combined Food Board's joint inquiry on food-consumption levels.[4]

United Kingdom.—The United Kingdom prewar diet ranged only from 10 to 15 per cent below the United States diet in protein and in most of the minerals and vitamins, but it was one-fourth lower in calcium and one-fourth lower in vitamin A. The two diets improved about equally during the war, except that the British brought their calcium intake fully up to the American level. By 1944, the nutritive content of the British civilian food supply met the National Research Council's Recommended Allowances except for vitamin A. Moreover, the foods were distributed fairly evenly according to occupation and physiological need. Several distribution schemes then worked out ensured adequate supplies of protective foods to the more vulnerable groups. Thus, under the national milk scheme, which absorbs virtually all the milk supply, expectant and nursing mothers and infants and preschool children (0 to 5 years) can obtain one imperial pint of milk per day at half price or, if in the lowest income groups, free. The "vitamin scheme" permits the same classes to purchase cod-liver oil in the same way. Expectant and nursing mothers also have priority in the purchase of fresh eggs, dried eggs, and oranges. British school children (6 to 14 or more years) are entitled to one-third imperial pint of cheap or free milk every school day in addition to their home allowance. Three-fourths of the school children of England and Wales had school milk, and about one-third of the school children of England and about one-quarter of those of Scotland received cheap or free school meals every day.

That the United Kingdom diet improved during the war is evidenced by the substantial and nation-wide reduction in the incidence of anemia, due in a large measure to the increased iron content of the wartime bread, by the decline in maternal mortality from 3.1 per 1,000 births in 1939 to 2.3 in 1943, and by the decline in infant mortality from 59 per 1,000 in 1941 to 49 in 1943 and to a still lower level in 1944 and afterward.

Canada.—The prewar Canadian diet was fully equal to that in the United States in everything except ascorbic acid and vitamin A. It im-

[4] "Food Consumption Levels in the United States, Canada, and the United Kingdom: Third Report of a Special Joint Committee set up by the Combined Food Board," Tables 8 and 13, U.S. Department of Agriculture, Washington, D.C., 1946.

proved during the war about the same as that of the United States. The distribution of food in Canada was less even than in the United Kingdom. Dietary surveys have indicated deficiencies in sizable groups of the population. Thus a study by Jean Patterson and associates of food consumption in families in Toronto with incomes between $1,500 and $2,400 indicated a widespread deficiency of thiamine and vitamin C and general deficiencies of calcium in the diets of women and teen-age girls and of iron in the diets of women. In fact, more satisfactory food distribution among income groups and between areas is generally considered to be Canada's primary problem in its national program.

Australia and New Zealand.—The average prewar diet in Australia measured up to the National Research Council's Allowances in every nutrient except calcium, thiamine, and riboflavin. Most of the calcium in the Australian diet comes from milk, and milk consumption is low in many country areas that have to be supplied from great distances. In spite of some improvement in the last decade, a survey made in 1944 showed 68 per cent of 2,730 families studied as consuming less than the Recommended Allowances. The vitamin C intake was also found to be low in certain country areas, especially the more outlying regions with difficult supply and transport and climatic problems. The survey indicated that diets in households with pregnant and nursing women or several young children tended to fall below the levels required by these vulnerable groups.

No such detailed studies are available for New Zealand, but its average diet appeared to be at least as good as and possibly better than that of Australia.

Northern, Western, and Central Europe.—Prewar diets in the Scandinavian countries were very good; they included more milk products than those of the United States, the United Kingdom, and Canada. The other countries in this group had diets somewhat lower in quality, but generally quite adequate. Improvement lay in the direction of more milk, fruits, and vegetables.

Southern, Eastern, and Southeastern Europe.—Prewar supplies of food in these areas appear to have been sufficient in calories and total proteins, except in Greece and Italy. Supplies of animal protein were low; in none of the countries did animal proteins contribute more than 15 per cent to the calorie value of the diet. In all these countries the consumption of milk was relatively low, particularly in the southern European countries. However, these countries had a fairly high consumption of pulses, a rich source of the B vitamins and good proteins. An increase in consumption of fruits and vegetables would have improved all the diets. In Poland, potatoes furnished an extremely large part of the calories of the diet.

Russia.—The available data indicate that the energy value of the Rus-

sian diet before the war was adequate but that the consumption of fats, fruits and vegetables, meat, and milk was relatively low.

Middle East.—The extremely low energy values calculated for most of the countries of this area (2,200 or less for Egypt, Iran, and Iraq) indicated that the diets were probably deficient in quantity. Except in Egypt, the consumption of fruits and vegetables and of milk was fairly high, but the consumption of meat, fish, and eggs was generally low, and the diets were low in protein foods. The diet of Egypt was particularly deficient in protective foods, fruits and vegetables, meat, and milk; and pellagra, rickets, anemia, and night blindness were common in many parts of the country.

Africa.—The data indicated that the margin between supplies and intake requirements was inadequate in most African countries. Even in calories, all the countries fell below a reasonable minimum. Fat consumption was low in East and South Africa, and consumption of fruits and vegetables in most of the countries. Meat consumption was extremely restricted in French West Africa and milk consumption in East and South Africa. The diets in North Africa tend to be more adequate in the protective foods, this area normally being a net exporter of agricultural products.

Consumption surveys made in the Union of South Africa, under the auspices of the National Nutrition Council, indicated that malnutrition was widespread. Diets were found to be generally deficient in animal proteins and fruits and vegetables, with some groups of the population obtaining insufficient calories. A 1939 survey of 38,000 school children of European parentage indicated that 40 per cent of the group were malnourished. A survey of 7,000 Bantu (native) children of schoolgoing age showed 71 per cent of the boys and 67 per cent of the girls to be malnourished. The staple diet of the Bantu is corn meal, and there is very little milk and meat and very few vegetables in their diets. Rainfall seriously limits the production of needed foods.

Mexico and the Caribbean.—Francisco De P. Miranda of Mexico has concluded that the diet of the low-income groups in his country (including more than 50 per cent of the population) is insufficient in calories as well as in protective foods. The most common deficiency diseases are pellagra, beriberi, nutritional edema, anemia, and xerosis. Corn is the staple food, frequently providing 70 per cent of the calories. It is reinforced with beans, but still the average diet is low in riboflavin and niacin. The consumption of fruits and vegetables is very low; of milk, fairly low. It is believed, however, that the national nutrition problem of Mexico is one not so much of imbalance as of insufficient calories in the diet.

A recent study made in Mexico City by William D. Robinson and associates is significant in that food consumption and clinical condition were checked against each other, as in the Tennessee and North Carolina studies

in the United States. Except in respect to cereals, sugar, and tomatoes and citrus fruit, the average food consumption of this urban Mexican group was well below the "low-cost adequate diet" defined by Stiebeling and Ward for the United States[5] and below the Recommended Allowances. The investigators found a fifth of the children failing to gain weight normally, even though calcium seemed to be adequate except for children under three years. Crude lime is used in preparing corn for eating in the home. The investigators concluded that lack of calories was the main shortcoming in the diet, except among the more vulnerable groups—infants and preschool children and pregnant and nursing women. There was little outward evidence of deficiencies in vitamins and minerals.

There is abundant evidence of malnutrition in Puerto Rico. A 1943 study of 310 infants and children from a low-income group showed that multiple-deficiency diseases were common; and 11 per cent were suffering from protein deficiencies. Ramón Suárez concluded from a study of vitamin-A deficiency in Puerto Rico that there exists in almost the whole adult population a chronic, latent, and subclinical stage of vitamin-A malnutrition. A study of the plasma ascorbic acid concentration of 366 persons revealed that 58 per cent had a concentration considered to be in the severe deficiency range. The consumption of fruits, vegetables, and milk is very low.

The Cuban diet has enough calories but is very low in fruits and vegetables and fairly low in milk.

South America.—In Argentina, Uruguay, and Paraguay the average diets were of rather high quality, with a very high consumption of animal proteins and a fairly high consumption of milk and fruits and vegetables. Nutritional surveys by DeCastro in 1938 and 1939 in Rio de Janeiro, Brazil, covering 60,000 persons led to the conclusion that diets were sufficient in calories and protein but deficient in minerals and vitamins. A type of iron deficiency anemia is endemic in the northeast coastal area and in the middle west. The middle west also suffers from iodine deficiency. The classical forms of vitamin deficiencies, however, are not common in Brazil. The diets in some other South American countries are less adequate. Surveys in Chile by Mardone and Cox, for example, have indicated a deficiency in milk, particularly for children and pregnant and nursing women, and in vitamin-B-rich foods. Imperfect calcification of bones and teeth among children has been observed.

Asia.—That the diets of most of the Asiatic countries, except possibly Manchuria, are deficient in calories, is confirmed by studies in individual countries as well as by observation. Total protein consumption is relatively low in most of the areas, in spite of considerable use of pulses, and

[5] Stiebeling, Hazel K., and Medora M. Ward, "Diets at Four Levels of Nutritive Content and Cost," *U.S. Dept. Agr. Circ.* 296 (November, 1933).

animal-protein consumption is extremely low. Milk consumption in nearly all the countries is very low, and likewise the consumption of fruits and vegetables.

Malnutrition in China varies with the area. In the west, which is the most fertile area, no serious food deficiencies have normally appeared. In the north, where wheat and maize are the staple foods but millet and kaoliang (sorghum) are also used, deficiencies in vitamin D and calcium are common, and deficiencies in proteins sometimes occur. In the south, where polished rice is a staple, there is severe thiamine deficiency, resulting in frequent cases of chronic and acute beriberi. Mild deficiencies of vitamins A and C are also found in this area.

In Java, acute deficiencies of vitamin A are frequent, causing thousands of cases of blindness. Beriberi is common, and goiter occurs in the eroded mountain regions. The diets are low in calcium and vitamins, as well as in protein and fat.

India.—Dr. W. R. Aykroyd, formerly director of the Nutrition Research Laboratories of Coonoor, India, and now in charge of the Division of Nutrition in FAO, reported to the Food and Nutrition Board briefly as follows on the status of nutrition in India:

> India suffers from a shortage of cow's milk, in spite of having a large cattle population, because the yield of the Indian cow is extremely small. Buffalo milk is more important in the Indian diet than cow's milk. The per-capita consumption varies among the different provinces, being highest in the Northwest and very low in Assam.
>
> Deficiency diseases are found in extreme forms, their prevalence following to some extent the geographical divisions of the country. Keratomalacia is the commonest cause of blindness in South India and a very important cause in other sections. It occurs usually in children of one to three years of age. A recent advance in the therapeutics of this condition is the realization that large doses of vitamin A administered subcutaneously or intramuscularly will often save eyes which would previously have been lost. Children who develop this severe vitamin-A deficiency are for the most part those who have lived mainly on a diet of rice and water.
>
> The most common of the deficiency diseases in India is that due to a deficiency of the vitamin-B_2 complex, particularly riboflavin, and many of the cases respond rapidly to treatment with pure riboflavin. One of the difficulties in treatment is the follow-up. It is difficult to devise a type of diet which would prevent recurrence and still be within the patient's means. Dried yeast is regarded as a possible aid in this situation.
>
> Rachitic diseases are to be found in the north and east, and are common among Mohammedan women who get very little exposure to sunlight and who also have a very poor diet. Various explanations have been offered for the fact that this type of deficiency disease is much less common in the south, the most probable

being that the people are more exposed to sunlight; the diet in each case is extremely low in vitamin D.

A surprising fact is the prevalence of excellent teeth among the people of certain areas where severe vitamin-D deficiency is manifested in the form of osteomalacia and rickets. On the other hand, in an Anglo-Indian boarding school where the children had a much better diet than the majority of Indian children, with plenty of milk but also quite a lot of sugar, only some 17 per cent of the children were free from dental caries, as against about 44 per cent of poorly fed Indian children. No correlation could be found between social status and dental decay, or between dental decay and other signs of deficiency disease.

A very serious goiter problem prevails in certain sections of India, often accompanied by a high incidence of deaf-mutism and of idiocy. A preventive experiment with the use of iodized salt has been running for about two years in one area of the Punjab.

Newfoundland.—Newfoundland has for years been a good field for nutritionists seeking knowledge concerning the relation of disease and diet. The main occupation of the area is fishing, and little land is available for farming or even gardens. The infant mortality rate was 101 per 1,000 live births in 1941, over twice as high as that in the United States. A recent survey by a large Canadian-American group, combining dietary records and medical examinations, indicated that the average per-capita food supply in 1943 was equal to or above the National Research Council Allowances for calories and protein, but less than one-half the Allowances in calcium, vitamin A, and riboflavin, significantly below it in iron, and extremely low in thiamine. If cooking losses are taken into account, the intake of vitamin C would have averaged less than 20 milligrams per day per person. Yet, except for rickets, no cases of classical vitamin-deficiency disease were found. But signs or symptoms of deficiency diseases were encountered in the majority of the people examined. In the clinical examinations, the most common signs were associated with a lack of vitamin A, riboflavin, and vitamin C.

Another survey in June, 1944, was made of a sample of 113 persons in Norris Point. The diets were found to consist chiefly of fish, salt pork, beef, dried beans and peas, and fortified margarine. Fresh fruits and vegetables were not available from October to July, and the families depended chiefly on root vegetables and cabbage. Consumption of milk was low. The results of the clinical survey indicated a general deficiency in vitamin A, riboflavin, and iron. Forty-one per cent of the 113 showed three or more physical signs or two signs and one or more symptoms of a deficiency in at least one nutrient.

The general picture of prewar food consumption provided by the available data is thus one of generally adequate average national diets in the

countries of North America, the United Kingdom, and northern and western Europe and parts of South America—regions containing approximately one-fifth of the world's population—and one of average national diets in the rest of the world that were inadequate in composition if not in amount. In many of the relatively better fed countries, large sections of the population are believed to have inadequate diets; in the poorer fed countries, only a small fraction did not suffer from dietary deficiencies. It is fruitless to try to estimate the numbers of people who were suffering from dietary diseases. It can only be said that the data indicate a great need for improvement in the diets of most of the world before anything like a good adequate level can be reached—and, in some regions, before a minimum diet sufficient to prevent deficiency diseases can be provided.

As to the condition of agriculture as an industry in the world at large, we shall deal with it only in broad general terms at this stage. Details will be brought out in our discussion of particular problems in Part II—details of the ratios of population to the land and the consequence of this for agriculture, of the place of agriculture in the general economy, of the problem of instability in agriculture, of the problem of conservation of the soil, and the like.

First of all, the agriculture of no country, except possibly Russia, escaped the tremendous impact of the world-wide depression that set in in 1929 and lasted in severe form until 1933. Most countries were still in a somewhat depressed condition when preparations for the new world war temporarily revived international trade in 1938 and 1939. World-wide depressions always hit the exporting countries hardest, for they are a long way from the ultimate consumers, and transport and handling charges tend to be rigid. The 1929–1933 depression affected these countries unusually severely because many of the importing countries raised their customs duties, under pressure from their agrarian groups, as a way of supporting domestic prices of farm products. This procedure was followed most drastically in Europe, since many of the foods imported into Europe are also produced somewhere in Europe. Customs duties of $1 a bushel or more were imposed on wheat imports in some of the countries and even higher duties on sugar. Thus in 1932, when the world wholesale price of raw sugar, duty-free, was around 1 cent per pound, the average import duty of the countries of Europe was 6.8 cents per pound. Even the countries with net export surpluses—Germany, Poland, Czechoslovakia, and Hungary—had import duties ranging from 5 to 12 cents. They wanted to keep the domestic prices at these levels above world prices while exporting at world prices. Of course, the agrarians used the convenient argument that it was necessary to support domestic food production, so as to keep their country as nearly self-sufficient as possible in the event of war. The United States

raised its customs duties at about the same time, but only because the Republican party had won another election—tariffs had been only a minor issue in the campaign.

World trade in farm products as a result of the foregoing was therefore still at a very low level in the recovery years 1934 to 1937, although it had improved a little along with rising purchasing power. And most of the exporting countries had large stocks, which they were striving desperately to move into foreign markets. In the end, the United States began to resort to competitive export subsidies along with the rest.

In spite of import duties and other restrictions on imports, however, the farmers of Europe also suffered greatly from the depression. Unemployment in cities reduced domestic purchasing power for their products and also forced large numbers of workers to remain on farms or to return to rural areas that they had earlier left. Only in countries engaged in rearmament, large-scale public works, heavily subsidized industralization, or the like, was the surplus population of the farm able to migrate to the cities in its usual numbers.

The first impact of the war on the agriculture of the exporting countries was to shut off part of their export markets. Presently shipping difficulties arose, with similar effect. A number of the Latin-American countries whose economies are based largely on one or two export crops had their hardest times in this period. Some of these obstacles lasted throughout the war, but in general by 1943 most of the countries had worked out adjustments that in large measure overcame these handicaps. Also a few of the nations, especially the neutrals, found themselves unusually well situated to take advantage of the stepped-up wartime demands, as did producers generally in the warring countries.

The total effect of the war on agricultural production was, of course, to cause it to expand to meet the larger wartime needs for foods and fibers. Early in the war, these needs were met in some measure out of the stocks that had been accumulating in the 1930's and that were still hanging over the markets in 1939–1940. C. M. Purves, of the Office of Foreign Agricultural Relations in the U. S. Department of Agriculture, has estimated the increases and decreases in food production, measured in calories up to 1943–1944, by major geographic groupings. His total figures for all food products was an increase of 5 per cent over prewar, the range being from a decrease of 1 per cent for sugar, to an increase of 2 per cent for dairy products, 5 per cent for cereals, 7 per cent for meat, poultry, and eggs, to 25 per cent for edible oils. The total increase for all North America was 32 per cent; for South America, 16 per cent; for southern and eastern Asia, 3 per cent. The decrease for western Europe and North Africa was 9 per cent; for Oceania and South Africa, 14 per cent; for the Middle East, 1

per cent. The weather in 1943–1944, of course, affected these results somewhat. Total livestock production had fallen off 26 per cent in western Europe by this time, but dairy products only 10 per cent. Livestock production had also declined in Asia and the Middle East. But it had expanded in all the exporting regions markedly more than had crop production—it was cheaper to ship livestock products than feed and food crops. The last year of the war and the first postwar year saw somewhat of a recession in livestock production even in the exporting nations—the reserves of feed had all been used up, and the land and labor were needed to grow food crops.

VI. THE FIRST POSTWAR YEARS

THIS book is about food and agriculture as they will be after the next few years, when food supply and demand conditions have become about as near normal as they are likely to be in our time. However, it is needful in this chapter to outline very briefly the food and agricultural situation in the United States and in the world between 1947 and then, while the transition from war to peace is still under way. If we do not do this, we shall find ourselves constantly confusing these transition years with the real postwar years. Many in the United States did this in 1947. They were saying, for example, just as they did in 1944, that the United States and other exporting nations were going to have large food surpluses again after the war, although the war had been over for almost two years and acute shortages of foods still existed. At the same time, some persons in Europe, doubted that the world would ever again have food enough. One English businessman offered in 1946 to pay the senior author $500 if surpluses of any staple food appeared in the world within five years. In 1947, the Americans thought of the present too much in terms of the postwar; the Europeans, of the postwar too much in terms of the present.

The hard fact is that important groups in the United States have been much afraid, ever since the end of the war came in sight, that stocks of food would pile up somewhere and depress the prices of farm products. They are pretty much the same groups who were afraid to have the country engage in all-out food production in 1941 and 1942. Read this from a press statement announcing the departure of Lt. Col. Ralph Olmstead, deputy director of the Office of Distribution of the War Food Administration, on a mission to the United Kingdom and Russia in September, 1944:

> Outcome of the journey will be a precise knowledge of the quantity of American foods these nations will need after the ending of the war and to what extent their present stockpiles are adequate. The War Food Administration wants to know how future orders will be affected by termination of the European phase of the conflict in the near future. Probable cutback of these needs in that event will be ascertained. Assurance will also be sought that cutting back of this huge order will be gradual, and that Russia and Britain can be counted upon to help absorb vast American supplies of certain items like dried beans and peas, dried milk, etc. Plans for managing "blitz" stocks in Britain and for handling balance of vast supplies piled up for use by AMG must be known. Groundwork for decisions that will have a major bearing on our surplus disposal problem will be laid.

Accompanying this mission, the War Food Administration adopted its "bare-shelf program" and began moving these "vast American supplies of certain items" into consumption and slackening its food purchases. That the vast American supplies found ready users is strongly indicated by the facts brought out in the "World Food Situation" issued in February, 1946, by the Office of Foreign Agricultural Relations of the U. S. Department of Agriculture. The data were for the period from August, 1945, to August, 1946, the first 12 months after VJ Day. They took us up to the fall harvest of 1946. The over-all estimate for food production in that period was 12 per cent less than in the period 1935 to 1939; that estimated for Europe, outside of Russia, 25 per cent less. Severe droughts contributed importantly to this low production, but the devastations of war and shortages of labor, equipment, fertilizers, and other supplies were also major factors.

These and other data concerning the 1945–1946 period were summarized excellently in July, 1947, for the 21 countries of Europe by John M. Cassels of the U. S. Department of Commerce as follows:

Three countries, with a total of 103 million people, have been, for the year, below the *semistarvation level.* At this level, the energy provided will be insufficient to enable a population to continue even the minimum amount of work necessary to prevent further deterioration in its own economy. The psychological effects—apathy, depression and irritability—endanger the safety of political institutions.

Five other countries, with 49 million people, have been below the *emergency-subsistence level.* This level has been defined by the FAO committee as the minimum "needed to prevent the most serious undernutrition leading to disease and the danger of civil unrest." Its report states specifically that if food consumption "falls appreciably below the emergency-subsistence level for any length of time, serious consequences must be expected"; that, in these circumstances, "attention must be given to the institution of famine-relief measures," and that "the clinical treatment of severely malnourished people may become a problem of importance."

Six other countries, with 100 million people, have been below *the temporary-maintenance level.* This level has been defined by the FAO committee as "sufficiently high to maintain populations in fairly good health, but not for rapid and complete rehabilitation."

One country, with 26 million people, has been above the temporary maintenance level, but below the *rehabilitation level.* Three small countries, with 17 million people, have been slightly above the rehabilitation level. The rehabilitation level was considered by the *ad hoc* food committee of UNRRA to be the minimum on which a country could make effective progress, during the immediate postwar period, in repairing the damages of war and rebuilding its economy. The committee recommended that consumption of all the foregoing 15 countries should be raised as quickly as possible above this basic level.

Three other small countries, with 19 million people, have had sufficient food for

adequate nutrition. The adequate-nutrition level is computed from the Recommended Dietary Allowances established by the National Research Council of the United States. It corresponds roughly with the prewar consumption levels of most of the countries of Europe, but is distinctly lower than the levels were before the war in Denmark, Finland, Sweden, and Switzerland. It is lower than the current consumption levels in the principal supplying countries—more than 10 per cent below the 1945–1946 level in the United States.

Cassels then summarized the foregoing statements as follows:

If, in 1945–1946, the ex-allies had been provided with the food-consumption levels necessary for "temporary maintenance," while neutrals and ex-enemies were allowed only sufficient for "emergency subsistence," additional imports of between 6 and 9 million short tons would have been required. However, if consumption had been raised in the ex-allied countries to the "rehabilitation level" and in neutral and ex-enemy countries to the "temporary-maintenance" level, the additional imports needed would have been between 16 and 18 million short tons.

The "World Food Situation" summarized the situation in the Far East as follows:

Shortage of fertilizers and labor, and unfavorable weather for maturing of the rice crop have reduced food production in Japan to only slightly over three-fourths of prewar, and the seriousness of the food situation in that country has been further increased by the marked drop in the quantity of fish available for consumption. Many other areas of the Far East also have experienced large declines in food production, particularly the surplus rice-producing areas of southeastern Asia, where production during 1945–1946 is estimated to be little if any above domestic needs. This shortage of rice for export makes the food situation unusually critical in those areas normally depending upon imports for a part of their food supply. It is estimated that the quantity of rice moving into international trade from these areas will be less than one-fourth of the 8 million tons which was exported before the war.

Food production was also well below average, because of droughts, in both North Africa and South Africa and in sections of Latin America. Australian production had recovered only partly from its severe drought of 1944–1945.

Someone may point out that droughts figured importantly in the food situation in the period from 1944 to 1946 and that we cannot count upon them to prevent surpluses in the near future. The answer is that we must expect them to come any year—in 1948, and in 1949, and in every year—until the world is assured of food enough in spite of droughts and that we must produce each year as if drought were going to occur. In the treach-

erous situation in which the world finds itself, it cannot afford to take chances on running short of food. Far better policy is it to let stockpiles accumulate at the very first chance and then take account of these in planning the production of ensuing years.

Now let us see what actually did happen in 1946–1947. What was the 1946 harvest like in the Northern Hemisphere? And the following harvest in the Southern Hemisphere? And how ample were the supplies until the 1947 fall harvest became available? The third quarterly "World Food Appraisal" of FAO estimated the 1946–1947 continental European food production at 15 per cent below prewar, compared with 25 per cent below the year before. The deficits ranged from 7 or 8 per cent in the Scandinavian countries to 30 per cent in Austria and Germany. But stocks at the beginning of 1946 had been reduced to almost the lowest possible level in most countries. For example, stocks of wheat in the four major exporting countries were 450 million bushels less on July 1, 1946, than a year earlier. The United Kingdom reduced its wheat stocks a million tons during 1945–1946. The increases in exports of wheat from the United States and other countries were scarcely enough to offset this reduction in stocks, and wheat rations as a result had to be reduced in Italy and a few other countries. Although cereal production was at an all-time high in the United States, total supplies were not. World stocks of fats and oils and sugar declined even more.

The period of greatest deprivation in the Far East was before the 1946 crop began to come to market. United States shipments of wheat to India planned for the last critical month were blocked by the transportation strike in the United States. In many parts of India, the 1946–1947 food intake averaged less than 1,750 calories, more than 350 calories below the prewar level. The 1946 rice crop was better than the preceding, but not enough better. Famine conditions developed in two South China provinces. The Oriental countries did not receive more than a third of the rice imports that they asked the International Emergency Food Council (IEFC) to assign them and not more than half the wheat that they requested. As a result, the calorie level for the whole Orient averaged 12 to 15 per cent below the already low prewar level.

In most of the rest of the world, diets in 1947 were well up to prewar levels, and of course definitely higher in the United States. The Southern Hemisphere crop was definitely better than in the preceding years.

Taking the world as a whole, a situation had already developed by 1947 in which food supplies and needs were not well balanced—acute shortages in Asia and parts of Europe, and more than prewar production in other parts of the world. Freer movement of foods between countries would have remedied this situation. So far as stocks were concerned, the United

States could have exported 200 million bushels of grains in addition to 400 million that it had already promised.[1] Its 1947 carry-over of corn was around 450 million bushels. Dr. D. A. FitzGerald, secretary-general of IEFC, clearly stated that the importing countries were prepared to pay for 10 million tons more food and feed grains than would be available for export.

The fats-and-oils situation was more difficult. International trade in these commodities was not likely to exceed 3 million tons, compared with twice this in a normal prewar year. The United States had 90 per cent of its prewar supply, but some of its special-interest groups were urging that it go out and buy enough in the world's market to raise the supply to normal. This would have left Europe with little more than half its prewar supply. The sugar situation closely paralleled that for fats and oils. Even though the world supply in 1947 promised to be 10 per cent higher than in 1946, domestic United States consumption could be not more than about 90 per cent of prewar unless European countries were to consume much less than prewar. The record Cuban crop eased this situation.

Little has been said thus far specifically about livestock as distinguished from crop production. The "World Food Situation" for 1946 reported Continental European cattle herds at only 15 per cent below prewar but production of meat down 43 per cent, of milk down 37 per cent, and of eggs down 48 per cent. The over-all estimate for 1946–1947 livestock production was only 40 per cent below prewar. Meat exports from the United States could have been increased in 1945–1946 and after with the falling off in military requirements, but only if rationing had been continued and enforced. The two outstanding facts of the livestock situation were that the people of the deficit countries still needed the cereals for direct human consumption and the high consumer incomes in the exporting nations were absorbing a larger share of their livestock products than formerly. Before the war, the United States and Canada, for example, obtained 43 per cent of their calories from animal products and fats but in 1946–1947 46 per cent. In the same period the percentages for northern and western Europe dropped from 35 to 26, and in southern and eastern Europe from 21 to 18.

As one would expect, the supply of food from fish fell off to a very low level in Europe and Asia during the war. Recovery was rapid afterward, 1945–1946 export supplies of salt fish running 75 per cent above those of the last war years. The fisheries of the leading countries were almost back to prewar by the end of 1946. More canned fish will also be available to most consumers.

As for the year 1948 and the few years following, one can only conjecture

[1] It finally did export around 500 million bushels.

at the time this book is being written in 1947. With normal weather, the crop production of 1947 would average almost the same as prewar production except in Germany, Poland, and Austria, in spite of shortages of work stock and fertilizers. The severe winter of 1946–1947 and the late summer droughts of 1947 reduced greatly the acreage or yield of the wheat and potato crops. As a result of this setback, the 1948 crop does not, in October, 1947, promise to be much better than what had been expected for 1947, unless the summer weather of 1948 should prove to be unusually favorable. One cannot, therefore, look to a return of the prewar level of crop production before 1949 at the earliest.

But although crop production might be back to prewar levels in 1949, the crops would consist more largely of wheat, rye, potatoes, and other crops for direct human consumption than in the prewar years. This means that there would be less feed for livestock and that livestock production would still be well below prewar levels. The drought of 1947 reduced the feed supply so severely that large numbers of livestock were sure to be slaughtered in the winter of 1947–1948 and spring of 1948. Shortage of dollar and sterling exchange would make it impossible to import prewar supplies of oilcake and other feedstuffs. Much of the livestock production of prewar Europe was based on annual imports of 6 million tons of feed concentrates plus 8 million tons of corn. The prewar herds of western Europe were also fed to some extent on feeds from eastern Europe. The future of feeds from these sources is at least uncertain in 1947.

The simple fact is that the livestock producers of Western Europe do not in 1947 expect soon to see feeds so generally available as before the war. Some of them have even decided that it never will be so abundant again, that the Western Hemisphere is going to expand its livestock production and use its own feed, and that the farmers of Europe must adapt themselves to this situation partly by producing livestock with less grain and partly by growing their own grain. There can be little doubt that feed for European livestock will be relatively scarce for several years and that per capita livestock production may not reach prewar levels again for a decade.

It also seems probable that unless large feed surpluses are accumulated in the exporting countries the peoples of Europe will find themselves unable, during the next five years especially, to afford as expensive a diet, with as high a percentage of animal foods, as before the war. Recovery in its production and trade and the supply of foreign exchange will largely determine how soon Europe can return to its prewar diet.

Knowing that it was not safe to plan on the assumption that the weather would be even ordinarily good, and until such time as large enough carryovers had been built up to take care of at least one year of poor crops, the

production planners of the United States set their 1947 goals at near wartime levels. They set them especially high for the products that Europe and Asia would still need—up to the wartime levels (1942–1946) for oats and rice and almost to the wartime levels for corn; beyond the wartime levels for wheat, dry beans, soybeans for oil and protein feeds, flaxseed, sugar crops, hay and hayseeds, sweet potatoes, vegetables for the fresh market, and even cotton, potatoes, canning crops, and tobacco (except Burley).

The livestock goals called for an increased slaughter of beef cattle, both to supply more meat presently and to get cattle numbers better adjusted to ranges and pastures. A step-up of 13 per cent was asked in the spring pig crop, to supply both more meat and more lard. A halt was called for in the downward trend in sheep numbers, and a slowing down of the rate of culling of dairy cows. The milk goal of exactly equal to the wartime average was the best that could be hoped for, and even this called for heavier rates of feeding. The egg-production goal set was under the wartime average but still well above prewar; that for chickens raised, exactly at the prewar level.

These goals were for 1947 only. They will be out-of-date for anyone who happens upon this book thereafter. But they will stand as an example of an attempt by the agricultural leaders of a great food-exporting nation to secure an agricultural output that met the needs of the nations still short of food and fibers as well as its own needs, both as to total volume and to allocation between products. *Whether it assumed its responsibilities in getting the foods distributed as need be after they were produced is another question, and one still to be answered.*

The Canadian program for 1947 could be cited equally well. The Canadians, however, saw greater need for expanding milk production, to provide butter and especially cheese for export. They also called for a 10 per cent increase in egg production—Canadian egg production had not been overexpanded as had that of the United States. To obtain the greater output of these products and of hogs, the farmers of Canada were asked to shift about 2 million acres of wheat to the feed crops, oats and barley.

The farmers of the United States and Canada, however, and of other export nations with similar programs cannot reasonably be expected to undertake their part in such programs without some guarantees against the sizable price declines likely if the weather is extraordinarily favorable. Underwriting the risk that farmers are asked to assume is a responsibility of their governments, just as was underwriting their wartime production. Maintaining the world's food supplies at safe levels is as important a contribution to the future peace of the world and to the maintenance of or-

derly processes of government as was producing food to keep armies in the field and fighting ships at sea.

The guarantees in the United States of prices at 90 per cent of parity for 2 years from Jan. 1, 1947, were provided as underwriting for the food production of the war years. Much investment in agricultural production takes 2 or 3 years to recover—this is notably true of dairy production. The farmers in 1947 needed underwriting for the extra production they were then asked to undertake to ensure food supplies for the ensuing 2 or 3 years. Otherwise, they could safely expand only the annual crop production asked for and the hog production.

Moreover, as was made clear in Chap. III, one may rightly question whether the levels at which prices of farm products were guaranteed ensured farmers incomes comparable with those which nonagricultural entrepreneurs and workers were likely to obtain in the ensuing few years. This question will be analyzed in Chap. VIII.

PART II

PARTS OF THE PROBLEM

VII. FOOD AND POPULATION

WITH the major facts about the food and agricultural situation, in the United States and in the world at large, now clearly before us, we can go about the task of seeing what can be done about it. Before we undertake to lay out any definite lines of action, however, we need to analyze this task step by step in logical order. This is the objective of Part II. When we have finished with this portion of our assignment, we shall have the food and agricultural problem before us as an integrated whole and be ready to consider ways and means of dealing with it in Part III.

Except in the very short run, the most basic of all problems in food and agriculture is that of the ratio of the population to food-producing resources. The "final act" of the Hot Springs Conference on Food and Agriculture starts with a declaration that "the goal of freedom from want of food, suitable and adequate for the health and strength of all peoples, can be achieved." This declaration then proceeds to outline the means by which freedom from want of food is to be achieved, under two heads, increasing production and increasing the purchasing power for food.

> There has never been enough food for the health of all people. This is justified neither by ignorance nor by the harshness of nature. Production of food must be greatly expanded; we now have knowledge of the means by which this can be done. It requires imagination and firm will on the part of each government and people to make use of that knowledge.
>
> The first cause of hunger and malnutrition is poverty. It is useless to produce more food unless men and nations provide the markets to absorb it. There must be an expansion of the whole world economy to provide the purchasing power sufficient to maintain an adequate diet for all. With full employment in all countries, enlarged industrial production, the absence of exploitation, an increasing flow of trade within and between countries, an orderly management of domestic and international investment and currencies, and sustained internal and international economic equilibrium, the food which is produced can be made available to all people.

Not in these two statements, however, or elsewhere in the report is any direct or clear reference made to the dependence of freedom from want of food upon an adjustment of population to food-producing resources. Nevertheless, the food targets for 1960 set up in the FAO "World Food Survey" assume a 1960 world population 25 per cent above that of 1935. For the United Kingdom, an increase of 12 per cent is assumed; for south-

eastern Europe, 10 per cent; for the United States, 20 per cent; for China, 15 per cent; for India, 25 per cent; and for South America, 49 per cent. To feed this 25 per cent increase in population and at the same time to raise the food consumption of all the world's population to a 2,600-calorie level and improve some of the diets by including small additional amounts of beans and peas, fruits and vegetables, milk, eggs, fish, and meat, the survey estimates that there will be needed the following percentage increase in food output:

	Per Cent		Per Cent
Cereals	21	Pulses (beans and peas)	80
Roots and tubers	27	Fruits and vegetables	163
Sugar	12	Meat	46
Fats and oils	34	Milk	100

Can the world produce these additional amounts of food by 1960? Robert M. Salter, chief of the Bureau of Plant Industry, Soils and Agricultural Engineering of the U. S. Department of Agriculture, addressed himself to this question in a paper read at the 1946 annual meeting of the American Association for the Advancement of Science. He broke down his answer into two parts, the increase possible by applying the best known practices and intensifying production on the present acres of land in crop and pasture, and the increases possible from bringing more land under cultivation. These two estimates are given in the second and third columns of Table 7. His estimate of the first is based on observed results of applying these practices to land of the same classes in the United States. Enough could be produced in this way from present cultivated and pastured land to meet the FAO targets only for roots and tubers and sugar. The cereal production would be almost adequate. The deficits would be very large in the protein foods and in those providing the essential vitamins. There would be scarcely enough even of calories in the diets.

TABLE 7.

Commodity	Per cent increase required by FAO target	Per cent increase obtainable from present land	Per cent increase attainable from new land	Per cent increase attainable from all sources
Cereals	21	20	130	150
Roots and tubers	27	50	200	250
Sugar	12	15	485	500
Fats and oils	34	20	340	360
Pulses	80	20	35	55
Fruits and vegetables	163	35	165	200
Meat	46	20	25	45
Milk	100	20	95	115

Some have said that Salter's estimates do not allow enough increase from applying nitrogen to soils very low in that element because of continuous cropping. Perhaps so. But his estimates are far from conservative as to the gains from bringing new land into cultivation and grazing. The estimates in the third column envision bringing under cultivation 1 billion more acres of the Red soils of tropical Africa, South America, southeastern Asia, the East Indies, the Pacific Islands, and the southeastern United States and 300 million acres of the cold northern Podsols of Russia, Canada, and the United States. Much of this land is on slopes and would require careful strip cropping and terracing. Much of it is also stony. Some of it would have to be drained or irrigated. The major portion is covered with trees or brush. Food prices would have to rise greatly relative to other prices before anyone could afford to reduce much of such land to cultivation, in spite of recent engineering developments in clearing land.

Even with all this new land cleared and developed and farmed according to modern practices, the increased supply of meats and pulses would already all have been exhausted by 1960; and if the population increased at the same rate after 1960 as assumed for the years from 1935 to 1960, the increased milk supply would be exhausted by 1970 and the increased supply of fruits and vegetables by 1980. After that, any population growth would be possible only by reducing the per-capita intake of milk and meat and living more on cereals, roots and tubers, sugar, and vegetable oils. The animal fats increase no faster than the meats. Even with the diets shifted to cereals and roots and tubers, the food supply would reach its limit within 75 years.

If anyone wants to take exception to Salter's estimates and say that they are not liberal enough, let him double them. The result will be the same, except that it will be deferred.

It should now be clear that the two lines of action proposed in the Hot Springs "Final Act," increasing food production, and increasing the power to buy food, will not be enough—that adjustment of population to resources is also necessary. Indeed, this is by far the largest part of the problem.

The analysis of the food and population problem thus far has been in terms of world totals. It has in effect assumed that all the food-producing resources of the world are available to all people, either by shipping the food to where the people are or by moving the people to where the food is. Fortunately for the world, in its history thus far and for some time to come, this is a very unreal assumption. Instead, different peoples living in different parts of the earth, under their own governments, work out their own food-population adjustments. Some countries are crowded to the limit all the time, with no chance for any more people unless new land is irri-

gated or drained, or new agricultural practices are introduced, or perhaps new supplies of fertilizers become available. Others maintain a low ratio of population to land and high levels of living. Most are somewhere between these extremes. But each has established for itself—not deliberately, of course, but by its behavior—what its man-land ratio is and how well its people live.

Two general sets of population principles are involved in the problem that we are here discussing. The first set, as first propounded by T. R. Malthus in his first "Essay on the Principle of Population," assumed populations living at the point of subsistence. We still have much writing largely in terms of this first essay of Malthus, for example, the recent book "The World's Hunger" by Pearson and Harper, although Malthus himself later expanded his theory to provide for populations living above the subsistence level. The second set of principles centers around the concept of the *optimum* population, a population with every family living at the highest level of well-being possible at the time in the country concerned. It should be obvious that such a level would be the practical equivalent of the freedom from want that was talked about at Hot Springs. It would represent the closest possible approach to freedom from want under any given state of the arts. Only by improving the arts would any higher order of freedom from want be attained.

Let us now consider two peoples, one living at the extremely crowded level described above and the other at the other extreme at a very high level of living. We shall follow the prevailing practice and call the first of these levels the Malthusian, although this is an injustice to Malthus. The Malthusian regions of the earth, so conceived, are those in which the population multiplies all the time exactly up to the limit. This limit is set by social as well as by biological factors. One student of population in the Far East has observed that, given three tracts of land of equal inherent productivity, one in Japan, one in China, and one in India, and each farmed according to the state of the agricultural arts which is *average* for these countries, the Japanese tract will produce roughly twice as much as the Chinese tract, and the Chinese tract roughly twice as much as the Indian tract. These differences are far from being merely biological.

Given these three tracts, the population in them will be roughly proportional to the quality of their agriculture, that is, if they are all Malthusian areas. In all three, the number of children born and the life expectancy are determined largely by the amount produced of food and other absolute essentials of existence. The population of India, if the census figures are taken at their face value, increased 52 million, or 15 per cent, between 1931 and 1941. From 1921 to 1931, it increased only 10 per cent; from 1911 to 1921, only 1 per cent. The differences in the rates of

increase are largely explained by the rate of increase in the food supply,[1] much as the normal population of pine borer beetles in our northeastern forests is determined by the number of fallen pine trees. When the 1938 hurricane blew down large numbers of these trees, enough beetles were born so that no fallen tree was uninhabited. Thus the more fallen trees, almost without limit, the more beetles. No human populations are able to expand at the beetle rate; but they come near enough to it in the real Malthusian regions so that seldom does the food supply run ahead of the population for more than a few years.

Perhaps as good an indicator of the gains made in the face of population pressure is the expectancy of life *at birth*. Between 1881 and 1931, this figure changed for all females in India only from 25.6 to 26.6 years and for all males, from 23.7 to 26.9 years. These figures compare with around 65 in a few of the healthiest countries.

In such a society, everybody works who is in the least able, but most persons do not have strength enough, because of their low food intake, for more than a few hours of real work per day. A balance is reached between the amount of work done and the amount of food produced at the point that supports the *maximum number* of persons, *taking into account the additional food needed to bring children into the world and rear them to the point where they produce more than they eat.*

Of course, no whole population ever lives right down to this level. First of all, there is always a class that controls much of the wealth of the country, perhaps a landlord class—that lives without working and is supported by the rest. Even in the Orient, the families in the cultured classes tend to have small families. Second, the families have a wide range in capacities and efficiencies. The more competent are able to handle more and better land and other resources than their neighbors, feed and clothe themselves better, and rear better children. These, too, tend to have smaller families, at least in the second generation. Only the families with the lowest possible, or marginal, efficiency live at the bare Malthusian minimum described above. The more efficient families do, in fact, deprive the marginal families of the better land and other resources, and may, in fact, by so doing reduce the total population. But by so doing they give to these most crowded nations at least a small group of families with health and working efficiency well above the margin. In this class lies nearly all hope for progress in the Malthusian regions.

Now let us consider populations at the other extreme, with every family living at the optimum level of well-being. (There is no such people, but we can assume one.) With a whole population living at the optimum, any

[1] The 1918 influenza epidemic killed off 10 million or more because they were malnourished.

increase whatever would reduce the amount per capita of food, clothing, and all other things necessary for well-being, for there would be slightly less of land, capital, and other resources than would give maximum per-capita output. On the other hand, *fewer* people would also reduce per-capita output, for more workers would be needed to use resources with full effectiveness. Only in a newly settled country could such a condition exist.

Such an optimum society would also have its idle leisure class, probably a fairly large one. *But the existence of such a class would not change the location of the optimum population point. Rather, it would require only that the workers share their optima with the nonworkers.* Differences in productivity between families enter also into such a situation. They work out very simply as follows: Each family has its own optimum point, the point at which it gets its largest return for the effort which it is willing to put forth, this point varying with its efficiency and capacity. In a really optimum society, there must be enough land and other resources for *each family* to have enough so that having a little more would reduce its output per worker. In a situation such as prevails in the United States and similar countries, a small fraction of the families would fare better looking after fewer resources. Some farmers, for example, try to operate more land than is best for them. But the great bulk of the people are living under suboptimum conditions, suboptimum by a wide margin, even after allowing for the circumstance that those with low capacity and efficiency have low optima.

It follows from the foregoing that the optimum population for a country has to be an average of the optima for a wide range of different productivities, ranging, in fact, from almost zero to very high indeed. Actually, the only way in which a nation can ensure that all its families get enough to eat and wear to keep them well is to cause those with high optima and high outputs to share some of their incomes with the ineffective and indigent. Hence our systems of progressive income taxes based upon ability to pay.

Where do the countries of the earth lie with respect to the two extremes defined, of maximum population under Malthusian conditions and of optimum population? More than half the people of the earth fall into the first category or very close to it, if we allow for the two qualifications of the effects of the unequal distribution of resources and the differences in abilities of families. But in the countries with the highest ratio of resources to population a large fraction of the families are operating below their optima. The national average of well-being would be raised if such families had more land and other resources to use. This description certainly fits half the farm families in the United States and three-fourths of those in the South. In countries like those of western Europe—France, Belgium, etc. —the fraction of families living below their optima is larger than in the

United States, but not than in its southern regions. In Spain, Italy, and Greece, however, the fraction is larger than in the South.

It should now be entirely clear, that far more vital to the success of the FAO program than technological progress in agriculture or bringing new lands into farms is what happens to birth rates and death rates in the next half century. All hope of any progress toward freedom from want for food in the world could be buried in a population avalanche. But it should be equally clear that this need not happen to any country, and that in more than half the countries of the world there is no prospect of its happening. At least forty per cent of the people of the earth are living in countries that have already achieved a fairly good ratio of population to their resources. A more precise statement would be that *before the Second World War a majority of the people of such countries were moving toward an optimum population level rather than away from it, or that in such countries generally the arts were advancing more rapidly than the population.*

In fact, the foregoing has been true of all the industrial nations of the world ever since the industrial revolution got fully under way. In the first stage of the industralization of a country, the population increases rapidly. This is partly because better incomes provide better diets and health and reduce death rates, and partly because marriage rates and birth rates increase also for a while. Presently, however, a point is reached at which the birth rates decline along with the death rates and the population growth begins to level out, as it has in Japan in recent decades. Europe as a whole, excluding Russia, has advanced far enough along this route so that little population increase is expected after 1960, according to the Office of Population Research of Princeton University.[2] Russia, in the earlier stages of such a development at the outbreak of the Second World War, is expected to have a large population growth for several decades but to reach a peak of around 300 million in the year 2000.

The true picture of the population balance in the world is therefore, not that of all the world sinking toward a food-subsistence level, but instead that of one country after another reaching a point at which the arts advance faster than the population, output per worker increases, and the country definitely begins to move toward its population optimum. The 40 per cent mentioned above will become 50 per cent in a few decades, then 60 per cent, and so forth. In all such countries the Hot Springs twofold program of expanding agricultural production and of increasing purchasing power will accomplish its objective. In all of them, it is entirely reasonable to talk about acquiring more freedom from the want of food. The ways and means of doing this are clear enough.

[2] Notestein, *et al.*, "The Future Population of Europe and the Soviet Union."

1. Improving the arts and technologies, not only in agricultural production but in the distribution and use of farm products, not only in agriculture but in all lines of production and use. Industry has made much larger contributions in the last century to raising the levels of living for agriculture than agriculture has to raising the levels of living for industrial workers.
2. Increasing the productivity of the workers, by enabling them to feed themselves better and keep themselves in better health, and by educating and training them to increase their skills and efficiency.
3. Developing the productive resources of a country, by land improvements of all kinds, by utilization of water powers, by better conservation of resources.
4. Included in the foregoing, but probably needing special mention, is increasing the *amount* of capital goods used per worker, in the form of power in all its forms, of tools, machinery, and equipment, of buildings, of fertilizers, of livestock and feeds, etc.

One cannot say, however, that progress toward more freedom from want is proportional solely to progress along these four lines. Population could increase as fast as these and leave no net gain whatever. There can be gains only if the number of workers and bodies to be fed and clothed do not increase except where and when they need to in order to use resources more effectively. Progress toward better living depends upon how much the gains along these four lines exceed the population gains. *Checking the rate of population growth will therefore in many countries be a fifth way of making progress toward better living, and more important than all the first four together.*

How does the foregoing analysis apply to the Malthusian regions? How soon can we expect countries like China and India to start on their way toward their optima? They, as a matter of fact, probably have but one direction in which to go. They probably are already at their lowest possible limit, as that limit was defined earlier. They are likely to rise from this level rather slowly at the start—even if they make mighty strides in agricultural technology and in industrialization. The gains for a few decades will mainly take the form of less disease and misery and longer, healthier lives. Given rapid progress along these lines, levels of living will presently begin to rise, and in a few decades birth rates will begin to fall.

We fail to realize how inefficient and wasteful of resources and of human efforts is a Malthusian society. The ratio of the maintenance to production rations is unbelievably high in such a society—that is, nearly everything goes into the rearing and keeping of offspring and bodies alive, and little is left for productive effort. Consider, to illustrate this point, the great waste in feeding a hen a ration of 60 pounds of grain, of which 53 goes into maintaining her body and only 7 pounds into the 50 eggs that she lays in a year, as compared with feeding her 88 pounds of grain and getting 250 eggs—120 pounds of grain per 100 eggs in the first use and 35 pounds in the second. If we assume that the growing child in India at 12 years reaches the point where it produces more than it eats and allow as need be for those children who die between birth and 12 years, only a

short span of productive years is left, with an average expectancy at birth of 27 years and of 35 years at 1 year of age. To the maintenance ration must be added, of course, the food consumed in prenatal growth and in growth until death of those dying under 12 years of age. And a large fraction of those of working age have little left in their diets over and above maintenance rations to convert to useful work. There can be gains in such a situation only if the number of workers and bodies to be fed and clothed does not increase except when and where it needs to do so in order to use resources more effectively.

Of course, it may be pointed out that if all the workers in India had higher ratios of production over maintenance, there would not be enough land and other resources to employ their energies. These workers could, however, be employed first in developing India's resources to the full and building its industries. This would give larger resources per worker.

But among the peoples with low birth rates all is by no means smooth sailing. There seems to be a tendency in the world at present for Western democratic peoples to have too small families. After retreating for several generations from too high birth rates, they appear to swing too far in this direction. Not only do the populations come to a standstill, but they may actually decline. Measures now being adopted to combat these tendencies are mostly based on the theory that parents need to be assured that their children will have a chance for good health and a place in the world and that they themselves will be provided for in their old age. Family allowances, in some cases progressive with the number of children, are being paid in a growing number of countries. Canada has, in addition, recently stepped up its rates of old-age allowances. What is needed most is the appearance of a tendency for families with larger incomes to have more children. To the surprise of most persons, such a tendency is showing itself in some cities of Europe and the United States.

Several other aspects of the food-population problem need to be considered briefly. One of these is the industrialization process. First is the question of the time required for a country that industrializes vigorously to reach the stage of leveling out of its population. In Japan, this took about one hundred years. Many believe that the process can now be hastened somewhat. Of course, output per worker begins to run ahead of the population increase long before the leveling out occurs. Second, although the increases in output per worker are more rapid in industry than in agriculture, agricultural revolution seems to accompany industrial revolution. In a country like Russia with large agricultural resources, the agricultural revolution should be rapid enough so that more food need never be imported. On the other hand, in countries already very much overcrowded, like the Oriental ones generally, it may be necessary, at some

stages at least, to export industrial goods and buy food in order to raise food-consumption levels as need be. Export outlets for such goods may therefore become crucial. The principal market for the industrial goods, however, must always be in the home country. With increased output and buying power per worker, the people will spend an increasing share of their incomes on factory-made goods.

Some of the newer countries have visions of themselves as great industrial nations like the United Kingdom or Germany before the war. Few have the coal, iron, and other resources for this. If economic principles have any validity whatever, they posit for each country, as a necessary condition for a high degree of freedom from want, a reliance upon the production of those items with which nature has endowed it most abundantly and, if this gives it more cotton, or wheat, or beef, or olive oil, or raisins, or sugar, or rubber, or pulpwood, or tin, or steel than it can use at home to advantage, the exporting of these in exchange for goods for which it does not have adequate resources. It is true that some of these countries can have larger populations by subsidizing industries which use much cheap labor—but only by lowering the scale of living of their people, by accepting less rather than more freedom from want. What do they gain by such a course of action? In fact, a mere leveling out of the population increase is not going to be enough in Japan or in most other areas now highly overcrowded. Such countries must in most cases go also through a period of population decline if improvements in the arts are ever going to give them the levels of living of other countries.

In many countries, internal migration is needed as industrial or agricultural resources are developed. Most of the newer countries already have all the people they need to develop any remaining areas. Some of the Latin-American countries, it is true, may point to their vast undeveloped resources and say that they need more people. Actually, much of their present population may be living at relatively low levels—almost like that of Old Spain. What they really lack is capital and technology and skills rather than people. Internal migration out of their own already congested areas would provide all the people they need without any increase in birth rates. It is highly important that they take advantage of their remaining resources to relieve the population pressure in the older areas.

A few of the overpopulated countries envision emigration as a means of solving their problems, pointing to the way in which emigration from Europe to the Americas relieved population pressure in Europe. As long as any new country is so thinly populated as not to be able to utilize its resources to the optimum point, it may welcome immigration. But very few corners of the earth remain where this is true. Furthermore, accept-

ing emigrants from Malthusian regions does not really help these regions so long as they remain in a Malthusian condition—the only effect is to increase the numbers of people of their nationality origin in the world. It was only at the stage in the industrialization of Europe when output per worker was advancing faster than the population that emigration really helped. The Malthusian countries will need to make large headway in adjusting their population to their resources at a higher standard of living before their nationals can reasonably be accepted as immigrants in most parts of the world.

Third, for similar reasons any sound international measures for improving nutrition in malnourished countries must take account of their effect on the birth rates of these countries. If they promise in the end only to reduce the infant and other mortality rates, they will not be worth while.

Lastly comes the relation of the foregoing to the composition and quality of diets. The targets set up in the FAO "World Food Survey" provide for a general shifting of the diets away from cereals, roots and tubers, and sugar toward more dependence on protective foods. The shifts called for are very modest. But it is apparent from the foregoing analysis that even these will be difficult if not impossible to attain in some of the countries unless the rate of population increase can be checked. In all countries, however, in which the population is moving toward its optimum, with the arts advancing faster than the population, a rising level of food consumption is possible, and this rising level of food consumption will include a larger relative intake of milk, meat, fruits and vegetables, and other protective foods—such a rising level as Europe generally experienced in the nineteenth century and at least until the First World War. The gains in this direction will for a long time be very small in the Oriental countries now obtaining 90 per cent or more of their calories from cereals, roots and tubers. But, in the 40 per cent or more of the world in which population is already well adjusted to resources, diets will surely shift toward more milk and meat and fruits and vegetables. Their progress in this direction is not held back by the conditions in the Malthusian countries.

It is only accurate to conclude this chapter by reporting the views of a small minority of those who have kindly read this chapter in advance of its publication. One view expressed is that population adjustment is not a function of FAO or any other international agency. This is definitely true. The leaders of the Hot Springs Conference were fully aware of this. Surely they had population adjustments in mind, among other things, when they said, "The primary responsibility lies with each nation for seeing that its own people have the food needed for life and health; steps to this end are for national determination. But each nation can fully achieve its goal if all work together."

Surely these pronouncements do not mean that FAO should devote its energies to helping different nations to increase their food supplies without any regard to whether this help really improves the situation. If FAO and other international agencies are directed intelligently, they will apply their efforts where they will do the most good. So likewise will any nation like the United States that may be sharing some of its food with others. In arriving at decisions on such questions, they will examine the population program of each nation and see whether it will make the outside aid effective or relatively futile.

Another point of view is that of the pure unthinking sentimentalist who says that relieving hunger and disease is always good and that it is the moral obligation of other nations to do this just as it is of a doctor to help the sick. The answer is that, when whole populations are considered, prolonging a few lives this year is of no avail if this causes more misery and suffering in the years following. Occasional famines are almost always worth checking, for those saved from death or disability will ordinarily be able to contribute to the better feeding of their fellows in the years following. If the main result of a particular famine, however, is to eliminate the weak and infirm a few years before their time, the only argument for checking it is a sentimental one. Those who speak in this way are charged with being "hard-boiled" and nonhumanitarian, but they are the true humanitarians.

It is also important to recognize that the dominant attitude in the Malthusian countries themselves is not humanitarian. Human life, according to the prevailing thinking and attitudes of the real leaders of many of these countries, is profligate. The real end of their societies transcends human suffering. We cannot reasonably be asked to take a more humanitarian attitude toward the suffering in these countries than they themselves profess.

As indicated later, however, forms of aid can probably be developed in most of these countries that will save lives and suffering both now and in the future. School feeding programs, for example, probably can be organized and conducted so to fit such a description. Even a single country like the United States has a moral obligation to see that any food it helps to make available to a Malthusian country is distributed so as to be as constructively helpful as possible.

Comment has also been made to the effect that the discussion in this chapter does not allow sufficiently for improvements in the arts of food production. It is granted that Dr. Salter's allowances for this are conservative. The question is really whether in any country the improvements in the arts will advance faster than the population. As soon as any country joins the group of those in which the arts are definitely and finally

in the lead, its population problem is solved and it swells the ranks of the present 40 per cent. Unless new procedures are developed for adjusting population to resources, however, no improvements in the arts of food production that can reasonably be expected are likely to overcome the propensity to reproduction in most of the densely populated Malthusian areas discussed in this chapter or, if so, they will do this by only a very narrow margin. The gains will mostly result from occasional sudden improvements in some areas that manage to get translated into small rises in living standards before the population tide envelops them again. The authors are hopeful that in due time all these countries will attain a balance of population and resources. But the resources of many of them are highly limited even with all that the arts can contribute, and the population member of the equation is by far the most critical.

A few of the reviewers of this manuscript clearly have exaggerated ideas as to what industrialization can contribute. They see no good reason why the great masses of population in India, China, Java, Puerto Rico, etc., cannot be in due time employed in manufacturing and related trades as they are in Belgium and have been more recently in Japan. They have not stopped to ask themselves what manufactured goods they would produce and where they would sell them. There is, after all, a limit to the clothing that people will wear and, what is more important in the next fifty years, can afford to buy. As indicated in this chapter, the major outlet by far for the goods and services that go with industrialization is in the producing country. Much of whatever industrialization occurs in the Orient will take the form of rural handicrafts; and as long as the population is rural, its fertility persists. These same critics may also contend that the industrialization of the future will reduce birth rates more effectively than in the past because it will be accomplished by improvement of schools and popular education. This is a hope, but nothing more, until education has been adapted to the needs of such a situation. Bringing schools to Puerto Rico has had such an effect only in a small way.

VIII. AGRICULTURE IN THE GENERAL ECONOMY

ENOUGH has been said in preceding chapters to make evident the great interdependence of food and agriculture and the rest of the economy. The assignment in this chapter is to show the nature of this interdependence. It became clear in the last chapter that in a large part of the world all efforts to improve nutrition and achieve a prosperous agriculture may easily be defeated by population changes. It will become equally clear in this one and in the next that failure to keep agriculture and the rest of society in good balance may go far in the same direction and obviously a general breakdown in the economy can have the same effect.

Discussion of this subject needs to begin with a restatement of the second proposition of the Declaration in the "Final Act" of the Hot Springs Conference:

> It is useless to produce more food unless men and nations provide the markets to absorb it. There must be an expansion of the whole world economy to provide the purchasing power sufficient to maintain an adequate diet for all. With full employment in all countries, enlarged industrial production, the absence of exploitation, an increasing flow of trade within and between countries, an orderly management of domestic and international investment and currencies, and sustained internal and international economic equilibrium, the food which is produced can be made available to all people.

And Section XXIV of the "Final Act," bearing the title Achievement of an Economy of Abundance, elaborated this proposition in terms of the "promotion of full employment of human and material resources, based upon sound social and economic policies" and a "sound expansion of industry in undeveloped and other areas," both of these serving to "expand production and purchasing power," which are "indispensable to any comprehensive program for the advancement of agriculture."

The framers of this statement were not thinking of the balance between industry and agriculture that had developed during the war. They were harking back to the 1930's, when surpluses of farm products were pressing on the markets and proposals were made by the Mixed Committee to reduce these surpluses by moving them into consumption in malnourished areas. Apparently they were expecting these surpluses to reappear in a few years after the war and the long-run situation to be one of overexten-

sion of the supply of farm products relative to demand for them. Prof. T. W. Schultz in his "Agriculture in an Unstable Economy"[1] describes this long-run situation as one characterized by "a slowing down in the growth of demand for farm products" and "an acceleration of the supply." He finds the main forces responsible for this development to be "(*a*) a slackening in the increase of population, (*b*) the technical revolution in progress in agricultural production, and (*c*) the low income elasticity of farm products as people become richer."

By the second of these, Schultz has reference to the rapid progress being made in the use of power and machinery in growing crops and improving land, in the use of fertilizers, in control of diseases and pests, in plant breeding, and the like. By the third, he refers to the circumstance that, as their incomes rise, people spend a smaller fraction of them on food. The slackening in the increase of population to which he refers of course applies only to about half the earth's population. But the other half is too poor to buy the increasing food supplies produced by the first. Hence to all intents and purposes there has been, as Schultz states, an increase in supply relative to demand.

When did this period begin? The answer to this question depends upon how the agricultural history of the last few centuries is written. In Pearson and Harper's "The World's Hunger"[2] we are told:

> The current ideas of great world surpluses contradict the laws of nature, the history of mankind, and the realism of Malthus . . . . Although most of man's existence has been blighted with food shortages, there have been occasional periods when there was a relative abundance of food in some regions. Soon after the Western Hemisphere was opened up, immigrants flowed to North and South America and relieved somewhat the pressure of population on the European food supply. These immigrants produced increasing amounts of food and had a sharp rise in their standard of living even though the population expanded rapidly. For about a century, half the world had what might be called a relative abundance of food. Man ate well, ate white bread instead of black, and ate increasing amounts of animal products.

To this same period of relative abundance ending around 1900, E. Parmalee Prentice in his "Food, War, and the Future"[3] applies the term "a century of grace." We are told in his book that pressure of the population in Europe on the food supply is what caused both world wars and that the declines in the rate of population growth in Europe, and even in the United States, have been due to the growing scarcity of food. Pearson

[1] Schultz, T. W., "Agriculture in an Unstable Economy," New York, 1945.

[2] Pearson, F. A., and F. A. Harper, "The World's Hunger," Ithaca, N. Y., 1945.

[3] Prentice, E. Parmalee, "Food, War, and the Future," New York, 1944.

and Harper are equally sure that food shortages caused the two wars. They describe the years beginning around 1900 as follows:

> About 1900 this period of relative abundance began to draw to a close. The population was increasing faster than food supplies, and the consumption of the highly prized meats was decreasing. A world-wide campaign was initiated to make two blades of grass grow where one grew before. This period of scarcity was *temporarily* arrested by World War I, which reduced the number of European consumers with no diminution of food production.

Professor Schultz's interpretation of the period from 1895 to the First World War is that this was the temporary phase and that the surpluses since indicate the long-run trend. This temporary scarcity first became clearly noticeable around 1900, for industrialization in several important European countries was then at the stage when it is accompanied by rapid population growth. Careful analysis of the data shows that the turn came about 1885, but it was not noticed until later.

The import of the foregoing is that, whereas Schultz expects food supplies to increase faster than populations in the next few decades, and perhaps more or less indefinitely, Pearson and Harper expect populations to increase faster than the food supply, except in the very short run. As to the relative merits of these two positions, the analysis of population growth in the preceding chapter, if accepted by the reader, leaves little room for doubt.

Our concern here, however, is not so much with how the postwar situation is interpreted as it is with showing how agriculture and the rest of the economy are always in some sort of balance with each other, tipped in favor of agriculture part of the time, in favor of industry and trade part of the time, and even, or near to it, the rest of the time. In periods when agricultural output is growing faster than the population or at least than the purchasing power of the population, farm products are cheap and industrial goods and services high. It is common to say in such a period that the "terms of trade" are against agriculture. They were surely against agriculture, not only in the United States, but in all the food- and fiber-exporting nations, during all the 1930's, and only in lesser degree in the 1920's. They surely were in the United States from 1865 to 1880. But in the period from 1900 to 1920 the terms of trade clearly favored agriculture.

When the terms of trade are against agriculture, the obvious way of getting it into good balance with the rest of the economy is to expand the output of industrial goods and services, with an accompanying shift of a fraction of the population from the farm to the cities. If Schultz's interpretation of the postwar situation is correct, the United States will need a sizable measure of such adjustment in the years just ahead, even though

over 2 million male farm workers left the farms for the armed services and the cities from 1940 to 1945 and perhaps half of these did not go back.

Nor is this situation peculiar to the United States. The pattern is very similar in all the countries producing food and fiber for export. The basic situation in such countries is that the birth rates and net reproduction rates are higher on the farms than in the cities, and rarely do enough of the young people move to the cities to keep output per worker and earnings equal in farm and city. In consequence, farm people pay too many bushels of wheat or hundredweights of meat or milk for the machines, or household equipment, or clothes, or medical services that they buy from the cities.

The situation in the densely populated, largely agricultural countries of southeastern Europe, Asia, and the East Indies is different only in that the terms of trade in normal times may be even more against agriculture. One of the reasons why too many farm people stick to farming in such countries is that they are too poor to be able to move. Net reproduction rates may be no higher on the farms than in the cities, for the higher mortality rates offset the higher birth rates. But, all told, more urban than rural families in Malthusian regions live somewhat above the margin of subsistence.

It should now be clear how very much the agriculture of a country has to gain from industrialization. Most important of all, it provides jobs to which the surplus population of the farms can turn so that those remaining on the farms have more land to work and are able to produce more per worker and live better. But it also provides more and cheaper industrial goods and services to be received in exchange for the products of the farms. The total effect is a larger output per worker and more purchasing power for both farm and industrial products.

If the agricultural and urban parts of the economy of the United States are to be kept in good balance, Schultz concludes that during the first two decades after the war, nonagricultural output will need to expand between two and three times as fast as agricultural output.

However, even in a highly industralized economy such as that of the United States, the interdependence of agriculture and industry and trade does not run all one way. The larger the output per farm worker, the larger the net product to exchange for industrial products and the better the rural market for industrial products. The fewer workers required to produce the food supply for a nation, the more workers who can be spared for industrial production, and the larger the national product and national income. Improvements in the arts of agriculture mean more and better food for all classes of the people. No doubt the decline in Western countries in the past hundred years in the share of the consumers' dollar

that is spent for food has been due to the increasing efficiency of agricultural production as well as to rising incomes. And by no means least, the higher the level of farm living, the healthier, better equipped, and more productive the urban workers recruited from the farms.

These dependencies upon agriculture are even more important in the largely agricultural countries. In them, the general level of well-being of the whole nation is largely conditioned upon and measured by the productivity of the agriculture. If such countries have relatively favorable man-land ratios, with high outputs per worker, the sales of industrial goods are high per capita; and these can be supplied by domestic industry insofar as

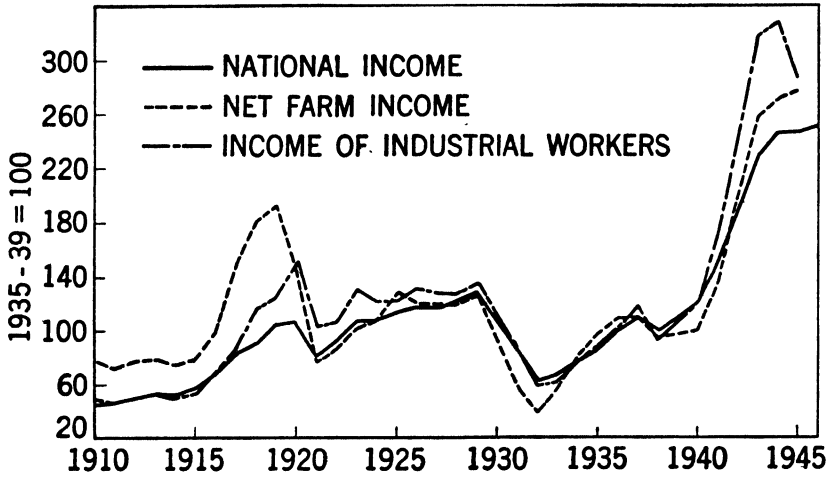


CHART V .—Index numbers of per-capita national income, of net farm income, and of industrial workers' income, 1910 to 1946 (1935–1939 = 100).

it has the basic raw materials for them. If the rural areas of such countries are densely populated, the domestic sales of industrial goods are low per capita. In some situations, however, the cheap labor of such countries may furnish a basis for export of manufactured goods requiring much hand labor.

These interdependencies appear, not only country by country, but also over time, especially in and out of wars and big depressions. Chart VI shows how, since 1910 in the United States, national incomes, industrial workers' incomes, and net farm incomes have moved closely together except at certain critical periods. (The common base period for these three index series is 1935 to 1939.) The most notable irregularities are as follows:

1. From 1916 to 1919, agricultural income rose much more sharply than national income. As stated above, prices of farm products had since 1880

been rising faster than other prices, because of the growing pressure of the population on the food supply, and food had become scarce even before we entered the First World War. Flour was rationed in the United States until 1919. The Second World War, in contrast, started with larger reserves of food and low farm prices, and agricultural income started low and did not run ahead of national income until 1942.

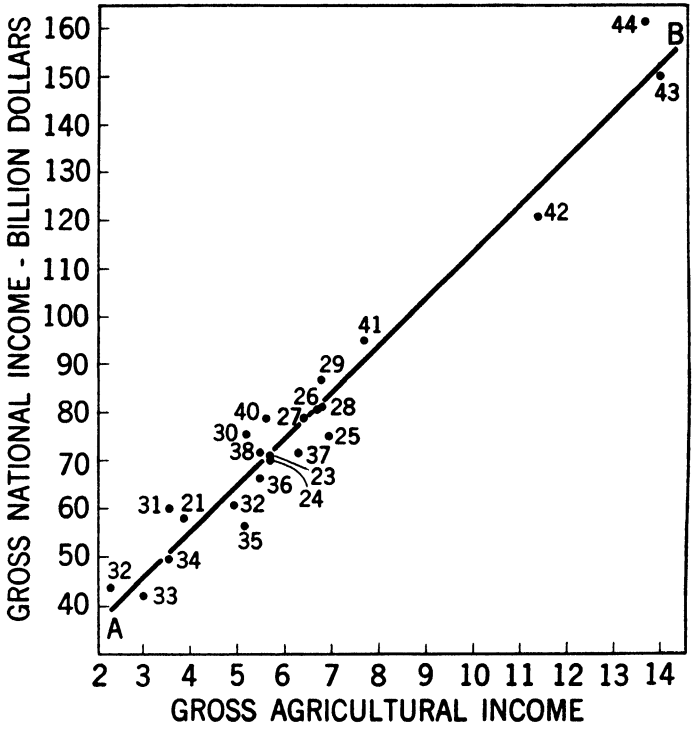


CHART VII.—The association of agricultural income and national income, United States, 1921 to 1944.

2. Agricultural income fell very much faster and further than national income after the First World War and also in the big depression of 1930 to 1933, although the difference was not so great. It seems to be characterisitic of farm prices and incomes to break more sharply than others in depressions and rise more sharply in the upswings.

3. Industrial workers' earnings rose much more in the Second World War than in the first, since labor was needed much more in the war industries and the armed forces drew off more men. The wide gap between industrial workers' earnings and national income from 1942 to 1944 indicates that other working groups in the nonfarm population did

not fare so well as the industrial workers. Nor did the earnings of capital rise spectacularly.

4. Industrial workers' earnings declined less than agricultural earnings in 1921 and again in 1929 to 1932.

Many agriculturally minded persons look at the series in Chart VI and conclude that, since national income and agricultural income rise and fall together, obviously high agricultural income is necessary for

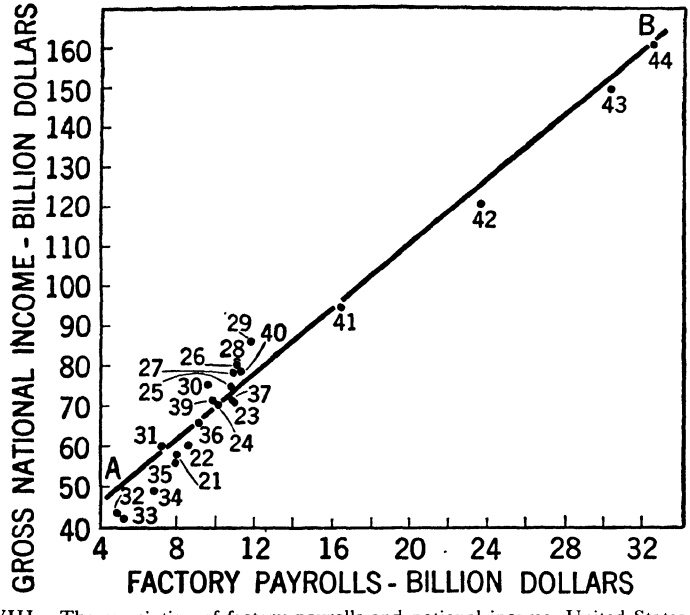


CHART VIII.—The association of factory payrolls and national income, United States, 1921 to 1944.

high national income. They may even attempt to prove such a contention by constructing a chart like Chart VII, which shows that as agricultural income rises so does national income. The line in the chart is an average line for the years 1921 to 1944, drawn so as to come as near as possible to all these years. The war years lie as closely along this line as the others.

But a labor-minded person can construct a chart like Chart VIII and find the years fitting even closer to an average line. He could argue equally validly that high labor incomes are necessary for high national incomes.

The truth is that, in the main, neither high agricultural nor high labor incomes are the *cause* of high national incomes; all three are high or low together because wars come and go, and so do cycles of prosperity and

depression, and the reasons for this reach far beyond either agriculture or labor. Only the divergencies in the three series are significant as evidence of interdependency.

The argument is sometimes used that the movements that start first indicate the causes. It may be argued, for example, that farm incomes led the way upward in 1919, and again in 1933, and downward in 1920, and 1929, and 1938. But what made them start upward or downward on these occasions? Was it not always something in the general economic situation that was reaching forward and reflecting itself in agricultural markets?

One obvious and important conclusion to be drawn from this chapter is that the best course of action for a nation is to combine measures for raising urban and rural incomes and well-being. More progress will be made with each if it is supplemented by the other. The two reinforce each other. They form, not a vicious circle, but a beneficent one. Increasing the well-being of urban peoples by increasing their buying power for food is of benefit to both farm and city. The better the diet, the more efficient the worker and the larger his income; the larger his income, the better his nutrition tends to be.

This book will not, however, undertake to outline measures for raising industrial incomes. Such measures are outside its scope. It is important that a food and agricultural program contribute to better urban incomes in all possible ways. But it is not its responsibility to provide for such incomes.

IX. INSTABILITY IN AGRICULTURE

THE closing section of Chap. VIII brought to the fore another of the major problems of food and agriculture, namely, that of the violent fluctuations in agricultural income. Economic fluctuations as such are not peculiar to agriculture—it is only their extreme violence that is peculiar. The fluctuations shown in Chart VI, moreover, are only those appearing in national totals. Added to these, for any area or any region, are the fluctuations arising from good and bad crops and from the tendency for particular lines of production, such as sugar, or cotton, or wheat, to become overexpanded relative to other lines and to remain so over long periods. This chapter will consider all three of these types of fluctuations. Combined, they make agriculture highly unstable. Most of the analysis will be in terms of the United States; it would be little different in principle if it were based on almost any other country. As in Chap. VIII, the discussion will be confined mainly to analysis of the problem. Procedures will be reserved for Part III.

First we need to get our thinking straight as to the manner in which fluctuations in national income affect agriculture. That they do not much affect the amount of food consumed is evident in Chart IX. National income in this chart is expressed in terms of "gross national product" (GNP) per capita and in dollars of constant purchasing power as measured by the Bureau of Labor Statistics cost-of-living index. Gross national product is the best measure of the goods and services actually produced in any year. At the very lowest point in the big depression of 1930–1933, with per-capita GNP down to 38 per cent below the 1935–1939 average, food consumption per capita dropped to only 3 per cent under its 1935–1939 average; with per-capita GNP at its peak in 1944 at 87 per cent above the 1935–1939 average, food consumption per capita rose only to 11 per cent above its 1935–1939 average. If food had not been rationed, consumption might have risen to 15 per cent. Thus a range of 125 per cent in national income was accompanied by a range of only 18 per cent in food consumption; in effect, only $1 in $7 of additional income in this period was spent in buying more food. And as we learned in our earlier chapter, this was spent in buying, not more calories, but, instead, a larger proportion of meats, dairy products, eggs and fruit, and other more expensive foods.

The broken line in the same chart shows that consumption of cotton in textile mills, in contrast with food consumption, fluctuates over a very wide range, even more than GNP. A large part of this use is industrial, of course, and does not enter into direct consumer purchases, which are much more stable. It is mill demand for cotton that is reflected in farm prices, and also for wool and flaxseed.

Consumption of all farm products, as contrasted with food products alone, is therefore somewhat more responsive to GNP than the consumption of food alone.

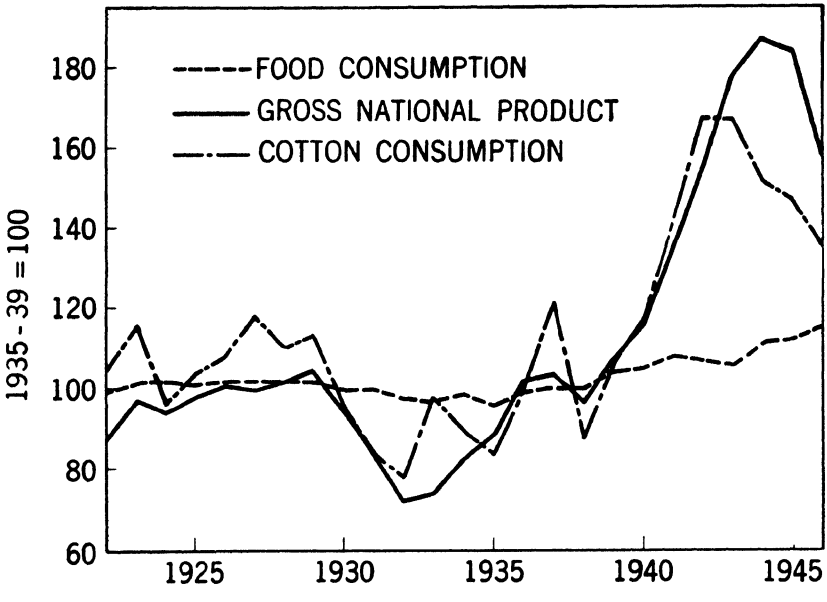


CHART IX.—Relation of food consumption to national income in the United States, measured in gross national product, 1922 to 1946.

If a high level of national income does not cause a large increase in the demand for farm products, how then does it help agriculture? The answer is, of course, that the demand for all farm products combined is so inelastic, especially in the high-price brackets, that a small increase in demand brings a large rise in prices and income. We customarily do our thinking about elasticity of demand for food too much in terms of single products taken one at a time, with large possibilities of substitution in some cases. As the elasticity of the demand for all meats is less than that for beef, or pork, or lamb taken separately, so is it that the elasticity of the demand for meats, eggs, and dairy products combined is less than that for any one of these separately; and least elastic of all is the demand

for all farm products combined. So far as the authors know, the only published analysis of the elasticity of demand for aggregate farm products is that of Willard Cochrane[1] in the *Journal of Farm Economics*, and this does not include nonfood farm products. Chart X is adapted from Cochrane's Fig. 5. It shows, in curve *DD*, the quantities that the buyers

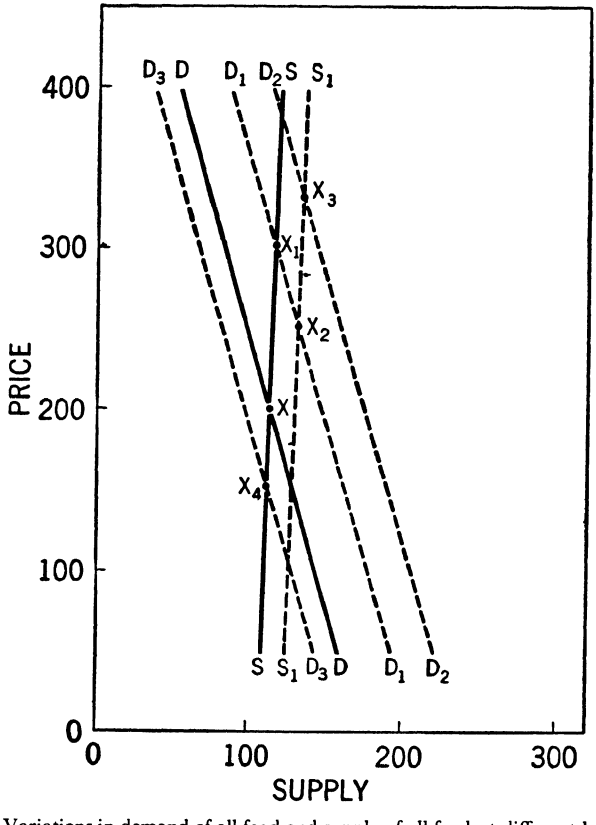


CHART X.—Variations in demand of all food and supply of all food at different levels of wholesale price, the United States, 1922 to 1940. (*Adapted from Fig. 5 in Cochrane's article in Journal of Farm Economics, June, 1947.*)

of the United States foods, in the period before the war, were in the practice of buying at different levels of wholesale prices of farm products The quantities and the prices are expressed as percentages of the averages. Thus at price 200 they took amount 113; at price 100, amount 140. At the upper end of the scale, they took only 83 at price 300. This is what an inelastic-demand curve is like—a small change in the amount bought

[1] Cochrane, Willard, Farm Price Gyrations—An Aggregative Hypothesis, *Jour. Farm Economics*, June, 1947.

accompanying a large change in price. In Chart X, the ratio of price changes to changes in amount taken is roughly 3 to 1.

Given such a demand curve, what happens if war comes and shifts demand to the right—all the way to D_1D_1, let us say? The amounts that the buyers stand ready to take at different prices are all increased sharply. If the supply indicated by curve *SS* remains the same, prices will rise from X to X^1. It may be, however, that the farmers have unused capacity to produce, as they did in 1941, and will step up their production quickly to S^1S^1. Then the price will tend to settle down around X^2. If the war demand then rises still more to D_2D_2 and the farmers have no more land, man power and equipment, as happened in 1944 and 1945, prices will start upward again to X^3.

The location of the points X, X^1, X^2, X^3, and X^4 also depends upon the slope of the supply curve *SS*. As drawn, it is highly inelastic and really represents the way in which the total supply of farm products behaves when average farm prices go down and in the short run.[2] It is a well-known fact that the total agriculture of the United States and of most other countries contracts very little with declining prices. Thus, when a business recession sets in and demand for farm products falls off, as to D_3D_3 in the chart, prices have no place to go except down to X^4.

The sharp rises in prices of farm products have mostly occurred with the onset of wars. A war brings a sizable new demand for food; for soldiers and sailors consume or waste a third more food than civilians, and reserves must be accumulated and pipe lines filled during the first part of a war. If the war lasts long, production may also dwindle in some of the warring countries. In peacetime, no new demands of this sort arise, and one can count only on as much of a change in consumption and price as comes with changing employment and incomes. Coming out of the big depression of 1930 to 1933, food consumption rose perhaps 5 points. When the wars end and the economies must convert to a peacetime basis, the extra wartime demands disappear, although part of them may continue while the agriculture of the warring countries is getting back to normal. The domestic economies may remain in high gear after the war, at least for a few years, while making up the deficits in production of buildings and equipment. But the high national incomes resulting are not enough, by a sizable margin, to absorb the wartime production of food and fiber, and prices of farm products presently fall off to a peacetime basis. If a depression also follows, the index of domestic consumption of food may contract a few points more.

[2] It represents the response to prices upward only on the assumption of an agricultural plant already operating close to existing capacity.

Our concern at this point, of course, is more with effects on prices and income than with effects on consumption. The 5 per cent decline and recovery in per-capita food consumption in and out of the big depression of 1930 to 1933 was accompanied by a drop of 83 index-number points in prices received and a recovery by 1937 of 54 points. But the general price level was changing at the same time. If the index of prices paid by farmers is used to convert the prices received to purchasing-power terms, the drop was 35 points and the recovery 37 points. Parallel figures in terms of incomes are 39 points down and 44 points up. These changes accompanied a 5 per cent change in per-capita food consumption. If all these changes are expressed as percentages of 1935 to 1939, a change of 1 per cent in consumption was accompanied by a change of about 9 per cent in prices and 10 per cent in incomes. In the steep rise from 1939 to 1945, a 1 per cent rise in food consumption was accompanied by an increase in purchasing-power prices of only around 5 per cent and of purchasing-power income of 8 per cent. If the changes in these two periods are combined, they average about the 1-to-7 ratio for incomes and per-capita food consumption shown in Chart IX for the whole period from 1922 to 1946. If cotton and other nonfood farm products are included, the 7 in the ratio may be as low as 5.

The situation facing agriculture, therefore, is one of small changes in the consumption of its products and large changes in its income, in and out of wars as they have been managed in the past, and in lesser measure in and out of business depressions. The bigger the depression, the larger these swings. In minor depressions, often called "recessions," as in 1938 the swings may be much milder.[3]

Two circumstances connected with these swings need brief comment. The first is that the ratios swing as much as they do partly because the prices of industrial goods and services, and also of middleman services, are not, in general, freely competitive and hence are less flexible than farm prices. They tend to hold up in depressions. The index numbers of retail food prices dropped only from 132 to 84 in the 1929–1933 period, and from 105 to 95 in 1937–1939; and other retail prices dropped even less. The cost-of-living index dropped only from 122 to 92 and from 103 to 99 in these two periods.

The other circumstance is that, if the rate of food consumption in the United States is to be increased at any time, the increase will mainly have to take the form of including more meat, milk, eggs, and fruit in the diets of the lower income groups in the population. In countries with average calorie intakes below 2,500 at the retail level, part of the increase

[3] In the recession of 1938, for example, the ratio of prices received to prices paid dropped only from 92 in 1937 to 77 in 1938–1939.

can take the form of larger consumption of cereals, roots and tubers, and sugar.

That agriculture suffers severely from the instabilities caused by wars and business cycles needs no exposition. It can be saved from such suffering only be preventing wars and cycles or by so managing them that they have no serious impact. Action toward such ends must be mainly outside of agriculture, though there are some forms in which it has a part. So far as business cycles as such are concerned, one line of action is to prevent the overexpansion of credit in some periods and increase its use in others. This is the modern form of regulating the quantity of money. If the private economy does not borrow as freely as need be at times to maintain a high level of employment, it will be necessary to make public credit available as the pace of economic activity slackens, and perhaps even to engage in public works. Agriculture can take a part in such action by choosing such times to use credit or public works in all forms of rural construction, both on farms and off, and in all forms of land and forest improvements. A line of action that is particularly important for agriculture whenever a recession impends is to undertake to keep up and even expand the volume of private consumption. If these measures fail, a good argument can be advanced for supplementing farm incomes temporarily. If overexpansion of credit is developing, agriculture's heaviest responsibility is to prevent the inflation of farm real-estate values.

The approach to the instabilities caused by wars needs to be somewhat different. There is no way of checking the great expansion of military demand that comes with wars or the contractions afterward. But the rise and fall of civilian demand can be checked by drawing heavily upon expanded incomes to finance the war and by increasing public borrowing. If these measures do not suffice, and they never have sufficed, perhaps because not carried far enough, prices and wages will need to be held in line. Agriculture's role in such an effort is to produce food and fiber to the limit to meet enlarged needs, to obtain its increase in income from larger output rather than higher prices, and to devote its increased earnings to paying off mortgages, buying war bonds, and the like. The increased earnings will then come largely from fuller employment of man power, plant, and resources. Several nations managed their economies pretty successfully in this way during the Second World War. Even the United States demonstrated that it could have done so with adequate Congressional support.

If a nation allows its wartime economy to develop the price and wage inflations and other dislocations that wars have commonly caused in the past, various types of readjustments are necessary in the postwar period.

They need not, however, return the economy to its prewar status. For example, the industrial wage levels twice as high as prewar that resulted from the First World War were fully sustained in the decade following. Even in the matter of prices, a postwar level part way between the war

TABLE 8.—COMPARISON OF FARM AND FACTORY EARNINGS

Date	Prices received by farmers 1939 = 100		Hourly factory wages 1939 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	157	116	88	70
1939	100	100	100	100
1945	213	152	162	126
1946	245	157	171	122
1947	293	158	(July) 195	123
	Net farm income 1939 = 100		Factory pay rolls 1939 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	128	134	113	91
1939	100	100	100	100
1945	290	154	288	224
1946	332	176	261	186
1947	404	212	(July) 314	198
	Net farm income per worker 1939 = 100		Factory pay roll per worker 1939 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	124	93	109	87
1939	100	100	100	100
1945	306	199	194	150
1946	336	191	187	134
1947	400	189	(June) 213	135

and prewar levels may prove better even for bondholders and other fixed-income receivers, within a space of ten years, than returning entirely to the prewar level. In the present situation, the prewar had so much of urban unemployment and so much of underemployment and low prices in agriculture that few rational persons will want to return to it exactly as it was.

The seriousness of the instability caused by wars may be judged by

considering for a moment what returning to prewar conditions would mean for American agriculture.[4] The first column in each section of Table 8 shows the percentage changes, with 1939 = 100, in terms of actual prices and wages. But these changes were all greatly affected by the general rise in prices. If adjusted for this, the agricultural prices in terms of prices paid by farmers, the net farm incomes in terms of prices paid for goods used in farm-family living, and the factory figures in terms of the cost of living, the changes are as in the second column, called "adjusted" under each of the heads.

For agriculture to go back to 1939 would mean, in actual dollars, a falling off from 1945 levels of more than one-half in prices received and more than two-thirds in net income per farm and per farm worker. For factory workers it would mean a decline from 1945 of one-third in hourly wages, nearly two-thirds in factory pay rolls, and somewhat less than one-half in factory pay roll per worker. In the more realistic terms of the adjusted figures, the reductions called for would still be very important, nearly one-third in agricultural prices and over one-half in net returns per farm and per farm worker. The parallel cuts for factory workers would be somewhat less, only about one-fifth in hourly rates, but 55 per cent in pay rolls and one-third in pay roll per worker.

But, as already indicated, agriculture, considered from any reasonable standard, was unusually depressed in 1939. If the more reasonable base period of 1925 to 1929 were taken and agricultural and factory labor earnings were returned to their relative positions in those years, the reductions would be the greater for factory labor earnings measured in hourly rates and pay rolls, but not when incomes and pay rolls are expressed per worker. The comparison in these terms is shown in Table 9.

The 90 per cent of parity scheduled for 1947 and 1948 in existing legislation for all crops except cotton (92½ per cent for cotton) calls for reduction of farm prices from 1945 of 22 per cent, or to an index number of 165 on the 1939 base. If hourly wages were cut to the same extent, they would stand 125 on the 1939 base. This would be around 80 cents per hour. If farm prices and hourly wages were brought into line with each other on the 1925–1929 base, either the 80 cents per hour for factory work would need to be lowered considerably or the farm prices raised. But, on a per worker basis, the adjustment called for, using the 1925–1929 base, would be either down from 1945 by 27 per cent for agriculture, or up 27 per cent for factory workers, to bring them into line with each other. If a reduction of 27 per cent for agriculture had to come out of prices received, the parity ratio would be reduced to 83. This means that 90

[4] Other data and analysis on this subject are presented in Chap. III.

per cent of parity would leave agriculture fully in line with factory labor on a per worker income basis.

Should the national income decline seriously in the near future, as was being freely predicted in 1947, what effect would this have on farm prices and incomes? If the period 1929 to 1933 is taken as a guide, a

TABLE 9.—COMPARISON OF FARM AND FACTORY EARNINGS

Date	Prices received by farmers 1925–1929 = 100		Hourly factory wage 1925–1929 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	100	100	100	100
1939	64	86	114	142
1945	136	131	184	179
1946	156	136	195	174
1947	180	135	(July) 223	140
	Net farm income 1925–1929 = 100		Factory pay rolls 1925–1929 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	100	100	100	100
1939	78	104	88	110
1945	226	196	255	248
1946	259	198	230	205
1947	308	195	(July) 277	174
	Net farm income per worker 1925–1929 = 100		Factory pay roll per worker 1925–1929 = 100	
	Actual	Adjusted	Actual	Adjusted
1925–1929	100	100	100	100
1939	81	108	92	115
1945	247	215	178	173
1946	271	207	172	154
1947	323	204	(June) 195	154

decline of two-fifths in GNP would double the foregoing declines in prices and incomes. If, however, the experience of 1920 to 1922 is taken as a guide and to the decline in civilian consumption is added the falling off of overseas shipments after that war, the decline in farm prices might be definitely more than this. Chart VI shows that net farm income declined three times as much as the national income in 1919 to 1921.

The instability caused by variable weather is far simpler to analyze

than that due to wars and business cycles. For the stapel crops that move freely in international trade, the fluctuations in yields of different producing areas or regions often cancel each other largely, so that the prices do not move over a wide range. The Northern and Southern Hemispheres do not commonly have short wheat crops in the same year, nor Europe and North America. Only the crops which are produced in large volume in one region, like cotton in the American Cotton Belt, or those which are costly to transport, like potatoes, or which cannot be carried over from one season to the next have wide price swings because of weather.

What is more important, the price and quantity changes tend to offset each other over a good part of the price range for many farm products, so that the total value of the crop does not vary greatly. Thus, in the years before the war, a United States corn crop of 2 billion bushels commonly sold for around 1.8 billion dollars and a crop of 3 billion bushels for about the same total, the prices being 90 cents and 60 cents, respectively. The demand for corn has close to "unit elasticity," that is, prices and quantities vary about in proportion to each other. Large income fluctuations arise from the size of only those crops for which the demand is highly inelastic, like potatoes. A United States potato crop of 325 million bushels was likely to sell at around $1.25 per bushel before the war, or close to a total of 400 million dollars, whereas a crop of 450 million bushels sold for 60 cents per bushel, or a total of 270 million dollars.

More important income fluctuations arise in years when crops are poor in some areas and moderate to large elsewhere, so that the producers in some of them sell their small crops at moderate prices and the producers in others their large crops at these prices. Thus the wheat growers of the United States fared unusually well from a good crop in 1924 when crops elsewhere were somewhat short, and the Maine potato grower fared badly in 1937 from a moderate crop when the crop was large in other late-crop regions.

Under the foregoing circumstances, to stabilize prices by setting them at a fixed point, or by allowing them to move within only a narrow range, as was frequently proposed in 1947, might unstabilize incomes. The small crop that would have sold at a high price must under set-price schemes sell at the average price, and likewise the big crop that would have sold at a low price. In place of the incomes of $1,800,000,000 for each of the two corn crops cited above, we should have had $1,500,000,000 and $2,250,000,000, with both selling at 75 cents per bushel, or $1,650,000,000 and $1,925,000,000 with the two crops selling, respectively, at 10 per cent above and 10 per cent below 75 cents.

The situations in which incomes would be stabilized by setting prices

are mainly those in which producers in a minor fraction of the producing area have a large crop when crops in the rest of it are small, or conversely. They will, under set-price schemes, in the first case get only an average in place of a high price for their large crop and, in the opposite situation, get at least an average price for their small crop. Situations of this kind are more likely to arise if prices are stabilized internationally instead of only nationally; a relatively small country may be largely dependent on one crop, as several small countries are on sugar or coffee, and such national price pegging may save it from the extremes indicated. The effect, however, of a straight one-price system in a country like Brazil that produces a large share of one crop will be to raise incomes greatly in years of large crops and depress them severely in years of small crops. Setting a price only within a 10 per cent range either way will remove these bad effects in considerable part.

The most serious need for measures to deal with weather surpluses arises in connection with the perishable and mostly minor products—like fresh fruits and vegetables. The problem with these is not so much one of stabilizing incomes as of saving the crop from wastage. The prices must be raised enough in years of large crops, however, to make their harvesting and preserving remunerative; or some public agency must manage the processing, storage, and distribution of the excess supplies of particular years.

The problems of weather surpluses must not be confused with those of seasonal surpluses. Products that are ready for market mainly at certain seasons and need storage until they are consumed may suffer from clogging of the channels of trade in years of large output. In such cases, prices to enable producers to hold them off the market may be helpful. The "ever-normal-granary" loans served such a purpose in the United States when first offered. Later, however, they came to be used to finance larger than normal carry-overs, apparently on the assumption that the trade did not go far enough in this direction, and still later to put bottoms under prices and thus hold still larger stocks off the market.

No doubt the best way to handle instability arising from crop failures is by means of insurance. In sections of this country where yields may run seriously low over a run of years, the payments out of the insurance fund may exceed collections over wide areas during all this time. The insurance fund needs to build up enough in prosperous runs of years to cover the outpayments in series of poor years. A major difficulty is that in prosperous years the producers may not feel the need of insurance. Systems of compulsory insurance may prove to be necessary in the end.

The final type of instability that we are considering arises from a tendency for production of some crop to overexpand in whole regions

and then not contract as necessary in spite of continuing low prices. This is the problem of the so-called "chronic surpluses." It lies midway between the problem of over-all overexpansion of agriculture discussed in Chap. VIII and the problem we have been discussing in this chapter. It is a more important and difficult problem than that of weather surpluses. The problem of Chap. VIII arises because of the difficulty that agriculture as a whole has in contracting once it is out of line with population and industrial growth. In the situations discussed here, regions or areas largely dependent on one farm product get out of line in this way and do not contract as they should, but instead languish perhaps for a decade or two, until population growth catches up with the supply. A loss of market may produce such a situation as well as overexpansion of output. The market lost may be a foreign instead of a domestic one, and trade barriers may be a factor in it.

In the United States, the crop and region suffering most in this way have been cotton and the South. In this case, competition from new areas in other countries and from substitute fibers has been an important contributing factor. The second major example is wheat and the Great Plains. The overexpansion in this case was induced to some extent by the high prices of wheat in the First World War but to a greater extent by mechanization and new techniques that made it possible to grow wheat with less rainfall than before. An example of a minor crop thus afflicted was cigar-leaf tobacco in the interwar period; the decline of cigar consumption was the causal factor in this case.

The Agricultural Adjustment Act of 1933 was passed more to deal with the chronic surpluses of cotton, wheat, and tobacco than for any other reason. The producers of these crops were assigned acreage quotas well below the acreages in the prior years used as "historical bases." The corn, the rice, and the other types of tobacco included in this program were overexpanded only about as much as agriculture as a whole was overexpanded.

The highly practical question is why these lines of agricultural production do not contract as needed. As explained earlier, the acreage of individual crops and numbers of head of livestock are in general highly responsive downward as well as upward to price changes; it is only agriculture as a whole that does not respond downward. Why is there little or no response downward in the case of the crops affected by chronic surpluses? There may be any one or more of several reasons for this. Other crops can be substituted for cotton or tobacco in the South, but none that will provide employment for the large mass of cheap labor available there. Some of the substituted crops, like truck crops or fruit, employ much labor, but their market is quickly oversupplied. The

only large alternative to wheat in the Great Plains is ranching, and the returns per acre from ranching are small compared with those from wheat even at a rather low price.

Crops in other countries in danger of being afflicted with chronic surpluses are sugar, coffee, rubber, and sisal. These are all plantation crops. A large investment is involved in establishing them and in obtaining the necessary processing equipment. Once the capital is invested, the only way to get it out is to keep on producing and processing. With most of these plantation crops, the large profits made earlier from exploiting abundant national resources with cheap labor were what led to overexpansion.

The seriousness of the chronic surpluses of these plantation crops is that a number of countries are dependent upon them in large measure. Even Brazil depends upon its coffee crop mainly for the foreign exchange it needs for its imports. Some of the Central American and East and West Indies countries are even more dependent on one or two crops.

X. THE CONSERVATION OF AGRICULTURAL RESOURCES

VERY clearly if the lands of the earth are to continue feeding its present population, to say nothing of the impending increases, they must be used in such a way that they will be productive in the future as well as now. This presents the problem of conserving our soils. Related to this is the problem of conserving the rain that falls, so as to obtain as full use of it as possible from year to year. We shall deal with this conservation problem in terms of broad general facts and principles. We could introduce statistics as to the damage already done by erosion in the United States and elsewhere, but they would probably be more misleading than helpful.

First, we need to get very clear in our minds what we mean by *conserve*. According to some popular usage, if land is conserved, it cannot depreciate at all. A more rational use of the term admits depreciation provided that it is offset by appreciation within a short space of time. But even this use of the term does not cover the essential idea. Land, after all, is not conserved for its own sake. Instead, if some present use of it is restricted, it is in order to get future uses out of it. The essential idea in conservation is the *balancing of present uses and income from land against future uses and income so as to get the most out of it over the whole period.* There is, of course, still room for argument as to how far ahead one should figure. Some are more willing than others to let the not too distant future look after itself.

The first application of this definition which we need to make is to the conservation of the once virgin soils of the United States and other new countries. Some have compared the present condition of the Corn Belt, prairie, and other blackland soils of the United States with their virgin condition and arrived at alarming conclusions as to the extent to which we have already used up these soils. Highly pertinent in this connection are the remarks of Gen. Francis A. Walker, the leading American economist of his time, who became the director of the Census of 1880 and wrote as follows in his introduction to Volume III of the Agriculture Census:

> Down to this time our apparently wasteful culture has, as I have sought to show, been the true economy of the national strength; our apparent abuse of the capital

fund of the country has, in fact, effected the highest possible improvement of the public patrimony. Forty-eight noble states, in an indissoluble union, are the ample justification of this policy. Their schoolhouses and churches, their shops and factories, their roads and bridges, their railways and warehouses, are the fruits of the characteristic American agriculture of the past.

But from a time not far distant, if indeed it has not already arrived, a continuance in this policy will be, not the improvement of our patrimony, but the impoverishment of our posterity. There will be all the difference between the past and the future, in this respect, morally, economically, and patriotically considered, which there is between the act of the strong, courageous, hopeful young man who puts a mortgage on his new farm that he may stock it and equip it for a higher productiveness, and the act of the self-indulgent man of middle life who encumbers his estate for the purpose of personal consumption.

If General Walker had been writing a preface to the Census of 1940, he might have written in precisely the same vein, again saying that the exploitation of the past had been sound national economic policy but that the point has now been reached, and so forth. Conceivably some commentator another sixty years from now will be moved to write in the same way.

The basic principles involved are simply these, that land can be maintained at different levels of productivity—some cotton lands of the South, for example, at levels giving yields all the way from 150 to 500 pounds per acre—and that at any given time, in a given state of a country's demand for food and other products of the soil, it pays to maintain the soil at a given level of productivity. If all the cotton land in the United States were maintained at the maximum level, the supply of cotton would depress world cotton prices to 6 or 8 cents a pound. There is a similar most advantageous maintenance level for Corn Belt lands. To exploit or mine them in their virgin state until well down to such a maintenance level has commonly been good national economy.

No doubt, however, much land in the United States has been exploited below a sound maintenance level, and in much of the United States the land can advantageously be maintained at a higher level of fertility than prevails at present. During the long stretch of years while the virgin fertility of our soils was being exploited, our farmers established traditions and habit patterns which they are now continuing over into a period to which these are no longer suited. In many parts of the East, when they had reduced the fertility of their first fields to a point where it no longer paid to grow crops on them, they cleared additional fields and let the first fields either recuperate or revert to timber. When they had thus exploited all the land on their farms, they pulled up stakes

and moved to the frontier. This process set in all over again in many parts of the Midwest and West.

Of equal importance is it that new technologies make it possible to maintain relatively higher levels of productivity at greatly reduced cost, though the farmers of this country are just now adopting them. Such techniques as cover cropping, green manuring, and contour cultivation are certainly not yet a part of the skill and knowledge of a majority of our farmers. If our farmers knew how to use these techniques, they could afford to maintain their land at a higher productivity and their cost curves would not rise so sharply with increased output. They could produce and sell more than now at lower prices. One of the great advantages of keeping land at a high productivity level is that it then has a wider range of alternative uses.

Another set of relevant principles depends on the fact that land may appreciate as well as depreciate. As a matter of fact, much land in the East and Southeast and other formerly timbered areas is at a higher level of productivity now than when first cleared. Such a description fits most of the agricultural lands of Europe, which are now generally maintained at a high level of productivity.

But what is more important for our purposes is that land can usually depreciate a good deal and then be restored to a high productivity level. For example, moderately sloping lands can lose virtually all their topsoils and then acquire new ones, ordinarily in not more than 10 to 15 years, if a cropping system is adopted that includes green-manure crops supplemented by liming and fertilization and that keeps the land always under cover. Moreover, this process of restoring such lands is frequently not very costly. The new cropping system often begins to yield net returns within 3 to 5 years.

But the depreciation process can easily continue long enough so that no one can afford to restore the land to full productivity. This is most likely to happen in areas that are on the verge of submarginality for any kind of agricultural use, such as the areas that have been abandoned for farming in the Northeastern states or in the piedmont parts of the South. The boll weevil was a contributing factor in the piedmont areas and the competition of the Midwest in the Northeastern states.

In practice, much of the farm land of the United States goes through much successive depreciating and appreciating, over a short span within rotation periods, over a longer span as the lands pass under owner operation for a period and then back into tenant operation, or from owner operators who have grown old on their farms to younger owner operators, or in and out of wars and severe depressions. How wasteful these processes are

cannot be determined by any methods now generally in use. Estimating the amount of topsoil that is carried away or that is washed into the Gulf of Mexico each year does not furnish an answer. Other aspects are the costs of replacing the topsoil and whether farming in such a way as not to lose the topsoil would not be better economy than losing it and then replacing it. Really serious damage, however, has been done in areas where the subsoils are thin or where extreme gullying has been permitted; and the total extent of these areas in the United States is large. There are areas, for example, with only two or three feet of subsoil left.

In most of the older countries, the pattern of soil conservation is pretty firmly established. If it had not been, centuries ago, there would be no agriculture in these countries now. Civilizations that went to pieces usually let their lands go to pieces at about the same time. It would be useless to argue which was cause and which effect, The classic examples of this are the lost civilizations of Babylonia and Assyria. The story of North Africa seems to be complicated by climatic changes. There is some evidence that erosion has got out of hand as a result of continuous cereal production in northwestern China. It would be strange if there were not some evidence of erosion in parts of India. For the most part, however, erosion enters into the modern food problem of the world and its separate parts, *not as a hunger threat because of vanishing topsoil, but as one of the factors to be contended with in agriculture, like soil depletion, uncertain rainfall, early frosts, weeds, diseases, and pests. Like these, it needs to be managed in such a way as to keep the costs of contending with it at as low a figure as possible.*

Presenting the conservation problem in this more accurate and less theoretical way does not make it less important, however. Of the problems discussed in Part II, it is the one that requires the closest attention, for it is easier to neglect than some because the losses from such neglect do not appear so promptly.

Looking at the world as a whole, one is likely to conclude that erosion control is most poorly managed in the newer countries, for the reasons indicated earlier. Even those who have given most attention to it in the United States in the last quarter century have much to learn about its technology and economics. And the practice of farmers is further behind the knowledge of scientists in this phase of agriculture than in most others.

The newer countries have most to learn about soil conservation from studying the methods followed in parts of Europe where at some time or another much of the land has gone through periods of exploitation and proximate exhaustion but today is mostly in a higher state of productivity than in the eighteenth century. The major factor contributing to this was the rise in incomes and levels of living, made possible by industrial-

ization and the shifting of land from producing cereals for direct human consumption to producing forage and grasses for livestock. This has kept the land under cover much more of the time.

Of vital interest in this connection is the effect of the more intensive cropping of the war years on the soils of the New World. Charles E. Kellogg, chief of the soil survey of the U.S. Department of Agriculture, made a canvass of the judgments of 100 United States soil scientists on this point early in 1944. The consensus at which he arrived was that up to that time the decline in the United States had been inconsiderable. The losses had been greatest on sloping lands growing soybeans in the Midwest and on sandy soils growing peanuts in Oklahoma and Texas. The losses in these sections and in local areas elsewhere, however, had been largely offset by the use of more lime and fertilizer in other areas and sometimes on the same farms. There had been an appreciable building up of soils in many sections from 1935 to 1940 under the encouragement of public programs—enough to contribute importantly to the high yields of the war years—and these practices were in part carried over into the war years.[1] No doubt, with the years of intensive cropping since 1944, there has been a further net loss. But if the same 100 soil scientists were canvassed again at this time, they would not support the extreme statements now being made by some ultraconservationists.

The parts of the Old World in which erosion is now most serious are those where population pressure forces every halfway level piece of land into growing cereals and root crops for direct human use. In many of them, virtually all the devices for keeping water from running off exposed fields are already in use, and little further progress in erosion control is possible until levels of consumption can be raised and the more sloping fields are put under vegetative cover.

The conservation of rainfall by preventing runoff is of major importance in all the Great Plains states and of more importance than commonly realized even in the semihumid regions. It is directly connected with soil erosion. If the water is kept on the land, so also are the soil particles. If the surplus rainfall of heavy storms is carried off the land properly, it does not damage the land and growing crops. But of equal importance in many areas is the fact that keeping as much as possible of the water on the land makes it that much more available for growing crops. Methods now coming into use in the Great Plains may make it possible to grow wheat with several inches less rainfall than formerly and at the same time reduce wind erosion considerably. Experiments conducted on the heavy soils of the wheat-growing parts of the Southern Great Plains show that only one-fifth of the rainfall becomes actual soil moisture avail-

[1] *Country Gentleman*, March, 1944.

able for plants, that light summer rains are two-thirds evaporated shortly after precipitation, and that rainfall of more than 1 inch becomes runoff unless held in the land by contour tillage or level terraces.

The Midwest also loses considerable moisture badly needed in dry periods in the summer. For the 6 years 1939 to 1944, the Illinois Experiment Station reports corn yields 7 bushels higher under contour cultivation than under uphill and downhill cultivation, oats, 7 bushels higher, and wheat and soybeans 3 bushels higher. Probably more of these increases were due to moisture than to soil conservation.

Anywhere east of the 100th meridian, one of the largest needs for water conservation is on the rolling permanent pastures characteristic of much of this terrain. Little movement of the soil occurs on these pastures except where the vegetation becomes thin and the sod is broken. But the water of heavy storms often runs away in the drains and collects in the low places. It is true that the ground temperatures are in large measure responsible for the drying up of the pastures in July and August; but if more moisture were available, sods would be established that would better withstand the summer heat.

Three methods have been developed for dealing with this problem. The first is simply to lime and fertilize the pastures so that they become covered with a dense sod that holds the water better. The second is to establish better grass mixtures, often with more clovers in them. The third is to contour-ridge the slopes. The furrow seeders that have been developed are useful for all three purposes. Few or no data are available upon which to estimate the costs and returns from these practices, but a farmer can easily try them out on a small scale and find out for himself.

It follows from the foregoing that, in countries with rising food standards, the improving of diets and better conservation of soils and water go hand in hand because both gain from getting more of the land in pasture and in forage crops. Both also gain from an increase in the acreage of legumes, especially of the legume crops not intertilled. Much land is in cultivated crops in the United States that the leaders in the Soil Conservation Service would like to see put in grass and forage crops. It will not be possible to move in this direction as fast as they would like, but important gains are easily possible. Supplementary food-distribution measures which will increase the consumption of dairy products and beef will help much more to this end, whereas those which increase consumption of meat from largely grain-consuming animals like hogs and poultry will not.

For the same reasons, soil conservation is difficult in densely populated countries that must grow crops for direct human consumption or see their peoples starve. Measures that help somewhat are a freer use of

lime and commercial fertilizer in crop rotations including winter cover crops or legumes or grasses, more use of strip cropping and terracing, and more fertilization of pastures. Also, when standards of living begin to rise, the steeper slopes can be converted to pasture. The use of commercial fertilizers on food crops will raise yields and release more of the slopes for forage and pasture use. No large headway can be made in these countries, however, until the rate of population growth perceptibly declines.

XI. THE LOW-INCOME FAMILIES IN AGRICULTURE

THE nations may largely solve their problems of keeping agriculture in balance with industry and of stabilizing farm prices and incomes, but most of them will still have with them large numbers of families on farms who have incomes so small that they cannot even feed themselves properly, to say nothing of obtaining needed clothing, shelter, medical care, and education. These families are the subject of this chapter. Why do they exist and persist? What is the nature of the problem that they present?

Let us begin by asking how numerous this group is in a supposedly prosperous country like the United States. Even the state averages reveal wide differences—at the bottom, in 1939, a net income per farm, including value at the farm of farm products used by the farm family, of $337 for Alabama, and $364 for Tennessee, which is in the heart of the Tennessee Valley Authority (TVA) area, after 5 years of its beneficent influence; at the top, net incomes like $1107 for Iowa and $1362 for California. Nine other Southern states had net farm incomes averaging under $500 per year. Of course, 1939 was a depressed year, like all the other years in the 1930 decade. The comparable average net incomes for a more normal year, 1929, were $674 for Alabama, $662 for Tennessee, $1,802 for Iowa, and $1,976 for California. At the peak of the war years, the Alabama and Tennessee net incomes rose only to $1,251 and $1,280, respectively, compared with $3,856 for Iowa and $7,097 for California.

It is not possible, from the existing data, to show the proportion of farm families with low net farm incomes, but net farm incomes are generally about half the gross values of farm products given in the accompanying table. The data are for 1929 because this is the latest nearly normal year. It appears that 9 per cent of the farms of Tennessee in 1929 yielded products worth less than $250, including what was consumed by the family, and another 13 per cent products worth somewhere between $250 and $400. The three lowest groups include 41 per cent of Tennessee's farms, 22 per cent of Ohio's, 8 per cent of Iowa's and 19 per cent of California's. Very many of the farms in these lowest groups are on a part-time basis, especially in California. In the lowest-income

groups, a major fraction of the gross values consisted in farm-produced foods consumed by the farm families.

The nearest that we can come to a separate grouping for the farms with inadequate incomes is to take the 500,000 farms classified as "self-sufficient" in the 1929 census enumeration. These are farms with such limited resources that half or more of their products were used by the family. Their average gross value of product was $425 in 1929. None of these farmers worked off his farm more than 150 days during the preceding year. If any had, they would have been put in the class of part-time farmers. One-fourth of the half million farms yielded less than $250 worth of farm products.

TABLE 10.—GROSS VALUES OF FARM PRODUCTS, FOUR STATES, 1929

Gross values of farm products	Percentage of farms in 1929			
	Tennessee	Ohio	Iowa	California
$250 and under	9	6	2	8
250–400	13	7	2	5
400–600	19	9	4	6
600–1,000	26	16	7	10
1,000–1,500	14	16	10	10
1,500 and over	19	46	75	61

One way of looking at part-time farms is to say that their operators had to find jobs off the farms because their farms were too small. But many of the farms, in the eastern part of the United States especially, are better described as supplements to nonfarm jobs that did not provide an adequate living. Be that as it may, of the 340,000 farms classified as part-time in 1929, over a third had products valued under $400.

Another considerable low-income group in agriculture is found among farm laborers. Some of these are migrant laborers who in normal times are not employed long enough to earn sufficient incomes. Others are casual laborers not fully employed in their home communities. In 1929, regular farm hands employed by the month were earning around $300 a year in addition to board and lodging in the South; around $500, in the North Central states.

The patent reason why such farm families have so little income is that they have so little to work with—so little land, so little equipment and livestock, etc. As tenants or croppers, they may have more to work with than as owners, but then they have to share the proceeds of their farming with their landlords. The average value of all land and other producer goods per worker in agriculture averaged under $2,000 in 1929

in the group of Southern states mentioned, compared with nearly $10,000 in the North Central states.

But to say that such farm families have low incomes because they have little to work with does not get us very far. Why do they have so little? And would they be more productive if they had more?

A sizable fraction of the low-income farmers now on the land would benefit very little from more and better land and equipment, or they would benefit so little that it would be a wasteful use of resources to supply them with more. They are already advanced in years or too infirm to make enough of the necessary changes. The reformation of many should have begun back in their childhood or when they were first starting out as heads of households. And almost any biologist will insist that many should have been reformed before they were born.

Another large fraction could improve their conditions considerably simply by making better use of present resources. They have land enough if they will use it effectively. They have plowland that can be made much more productive by proper liming and fertilizing, plus following rotation systems with cover crops or legumes in them, and plus strip cropping or terracing to control erosion in many cases. They have pastures that would carry more cows if seeded to the right grasses and clovers, and contour-ridged to keep the water from running off the slopes. Some pastures need also to be mowed to keep weeds down or to be cleared of brush and shrubs. Many of these farmers have woodland that if properly handled would provide all the fuel and fence posts that the farm needs and frequently in addition some sawlogs for lumber or for sale. Finally, if the productivity of their land were increased in these ways, most of them would need more livestock and equipment and even in some cases more farm buildings.

Why do not these families take advantage of their own opportunities? In the first place, most of them do not have the know-how for it. If they do, they do not have the necessary access to credit. Some are tenants or croppers needing leasing arrangements under which they can afford to make the needed changes. Some of them even are families needing medical care or better diets. Some would be helped by credit in buying a cow or two and a sow to provide food for their families. Chapters in Part III will discuss the measures required to increase the productivity of these farms.

A third large group consists of farmers who do not have enough land of the necessary quality to provide the needed income even if it were fully developed. This is the reason why many farm incomes are so low in Alabama and Tennessee. In some situations, there is more land

within reach that can be purchased and added to the present farm. In others, the land can be rented, which is much better than not having it at all. The land nearby that can be purchased may not be of the type that the farmer would prefer or that is needed most to supplement his present farm. For example, it may be rough woodland or lowland meadow. Still, this land should be used by someone, and the best use may easily be to combine it with existing farms.

In communities where there is not enough land to enlarge farms as needed, the only way out for some of the farmers now there is to move out altogether. But they should sell their farms to their neighbors who are short of land. Only in this way will farms be enlarged as needed in large sections of the Southern states.

If it is tenant or cropper farms that are too small, of course the only solution is for many of the cropper families to shift to other occupations in the same or other areas or regions.

What of the fraction of low-income farmers that will benefit little from a larger command of agricultural resources? The important point is that their children should not be deprived of such resources even though they themselves cannot profit by them. Society has a strong interest in seeing to it that the new generations do not have to start life with stunted, malformed, and diseased bodies, ignorant and untrained, with no opportunity to get a start in the world. Even with the low-income farmers already discussed who can use more resources effectively, the benefits that the children will receive in better diets, education, medical care, and, more than all else, outlook on life will be far more important than any other effects. Larger incomes for these farmers will not alone ensure that their children have all these advantages. Government, by one means or other, must take a hand in the provision of education, health, and probably good diets to some extent. While it is doing so, it should make additional provision of these advantages for the children of families whose resources are irremediably low. There is absolutely no escape from this if large numbers in the new generations in low-income areas are not to be irretrievably lost to the nation so far as any real contribution to society is concerned.

Provision of the foregoing will not, to be sure, guarantee that all the children of the coming generations will develop into useful citizens. Even with the best prenatal care, some are born with poor bodies and minds. Some inherit other traits that disqualify them for success in the roles that human beings must play in modern life. Some will become indigent, and a few will even become criminals. In due time, the children of such families, some still with low incomes, others with incomes and living

conditions much improved, will leave the schools and begin to take their places in the world. Not many will long find enough to do on the home farms, for these will still be relatively small in most cases. Probably a majority of them should seek occupations other than farming, many of them in other areas or even regions.

If the farms of the United States are to continue to supply the human materials for the growth of industry and trade, the schools and families in rural districts must plan with this in view. Many of the children eventually migrating to industry and trade will become hired workers for a few years on the larger farms and in the larger homes in the neighborhood. Some of the boys will plan to remain farm laborers until they can start as tenants or croppers. At this stage particularly, there will be a rigorous sifting out. Those who take the art of farming seriously and learn its skills and responsibilities and accumulate savings will in five or ten years be in condition to become tenants. The others will drift from place to place and in many cases wander off to the cities. The decision to become a tenant is an important one. The first farm need not be very large, but it should be large enough so that the young man can make more progress than by continuing as a farm hand. Much more important is it in buying a farm not to buy one with inedaquate resources—leave these for the pensioners and part-time farmers.

How large a fraction of the low-income families of an area commonly fall in the fractions that can advantageously increase their resources by developing their present farms or buying additional land or larger farms? This is not a very important question. There will be enough families in nearly all communities to use to the full all the guidance and help that will be provided. Few communities will ever get anywhere near the end of their waiting lists—until such time as the work done with the new generations of children has reduced greatly the numbers needing such help.

Everything said thus far in this chapter has been mainly in terms of conditions in the United States. The nature of the low-income problem in agriculture differs much between countries. The authors have no intention of trying to analyze it under all its varying circumstances. They may be permitted, however, to make a few large generalizations. First, the problem is more or less the same in several of the newer countries. Canadian agriculture, for example has about as wide a range of income differences as prevails in the United States. Australia and New Zealand have smaller differences by areas. Some of the countries of northwestern Europe have already gone a long way toward solving the problem of low-income farm families. The problem varies greatly

in the different Latin-American countries, from Argentina at one extreme, to some of the plantation republics of Central America at the other. In the countries subsisting under a Malthusian economy, it is scarcely possible to single out any low-income agricultural group, for only a limited number of the more successful families are not in this class. Some of the countries of southern and southeastern Europe are in an intermediate position with respect to this problem.

XII. THE MALNOURISHED GROUPS

THE reader may think it strange to find at this point a special chapter devoted to the problems of the malnourished groups, since malnourishment is one of the main themes of the book. As he reads, however, he will discover that clarification on a number of points is much needed. The purpose of this chapter is to classify the malnourished populations of the earth, as they exist in normal times, in five groups and then to see what the dietary problem is for each. Wars and postwars change the numbers in these groups; but the groups persist. The best efforts of all the leaders of the human race will not altogether dispense with any one of them.

Group A.—This group includes those who eat everything they can lay their hands on and still do not get enough calories. Two effects follow: they are underweight, and/or they are underactive, unable to do full work. The more they do, the more underweight they are. Those in this group show surprisingly few other signs of malnutrition. Dr. Russell M. Wilder of the Mayo Clinic of Rochester, Minn., has said: "It would appear from study of such groups that starvation is a way to cure nutrition-deficiency diseases; both in rats and in men, deficiency of calories may leave nutritional lesions of its own making, but it prevents or retards development of the kind of lesions that result from lack of vitamins."

How large is this group? In a country like the United States, the average calorie consumption at the retail level does not give much of an answer to this question, because of the vast amount of overeating by large numbers of people and the large waste of food. The area surveys do discover many persons who are underweight, but by no means all of them need to be—they are persons who are not eating enough because of poor appetites arising from illness or from deficiencies of vitamins in their diets that weaken their appetites. The fraction of persons who in normal times in the United States do not get calories enough because they cannot buy them, or grow them, or forage for them is small indeed. This is equally true in Canada, Argentina, Australia, New Zealand, and northwestern Europe. The fraction rises a little in parts of central and southeastern Europe and a little more in Spain, Italy and Greece. It may be as high as 15 or 20 per cent in some of these countries in some

years and possibly somewhat higher in Puerto Rico and Mexico. It may be as high as a half or more in parts of the Orient.

The remedy for such undernourishment is simple enough to state—get higher incomes for these people. If this is not possible, in any case get them more calories. If they are fed better, many of them will work more and earn more calories. Perhaps in some places there is no more work for them to do because all the land and other resources are completely utilized and all the jobs are being taken by others. In this case, only a reduction in population numbers will help, unless the nation wants to feed its surplus people indefinitely.

Group B.—This includes those who have just about enough calories, but with too few coming from protective foods. Many in this group show definite external symptoms of nutrition deficiencies. Many more show evidence of them in blood examinations and other clinical tests. As a group, they have low working efficiency, but not as low as the first group. They are likely to foment more revolutions than the Group A persons—they are not so much hungry as they are miserable, unhappy, and irascible.

Why do those in Group B have unbalanced diets? Mainly for the same reasons as those in Group A. The protective foods cost more, and the income is lacking with which to buy them. In the case of farm people, the needed protective foods require much more land per 1,000 calories than do cereals and roots, and so little land is available that none can be spared for such use—all of it must grow calories or crops that can be exchanged for calories.

How large is this Group B fraction? Much larger than the first in the United States. In this group one finds the population groups in the South whose diet is too largely made up of corn, pork fat, and molasses; other rural groups whose diet is too largely comprised of potatoes and salt pork; and the low-income urban families whose diets are largely composed of cereals, potatoes, and sugar. One must be careful, however, not to include in this group many families that belong in the next higher group, consisting of those who could have enough protective foods in their diets if they used their incomes and resources wisely. Possibly as much as 10 per cent of the population of the United States belongs in Group B and Group A combined. This same estimate ought to fit Canada, northeastern Europe, and Argentina. It will be too high for Australia and New Zealand. It includes a considerable group in the cereal-eating and potato-eating countries of central and southeastern Europe and most of the remainder of the malnourished in the Orient. It surely includes the large masses of the population of Puerto Rico, whose earnings as laborers afford nothing better than a diet of rice,

beans, and lard supplemented by a very little salt fish, practically all of which are imported; and similar groups of plantation workers elsewhere in Latin America and in the East Indies.

The program for this group is not so simple as securing them more income or more food. The *right* food must be secured. Never having had any real experience in choosing what foods to buy, most of the families in this group need considerable guidance in spending any additional earnings. This policy of guidance may advisedly go so far, when the undernourished groups are large, as to see that only the right foods are available for them to buy until they have formed the right new food habits. Farm families who obtain more land on which to grow food will need guidance in planning their production. An effective procedure in some countries is to reduce the prices of the protective foods by introducing methods of growing or importing or distributing them at lower cost. Finally, some governments could subsidize the distribution of the needed foods, at least temporarily, to see whether the increased productivity resulting does not enable such families to buy their own protective foods.

Group C.—This group, as indicated above, has income or resources about sufficient to buy or produce balanced diets, at the minimum adequate level or somewhat above, but it does not use its income and resources in this way and as a result is more or less malnourished. Families in this group may even buy too few calories because of buying them in too expensive a form. They are more likely, however, to buy enough calories but to buy them in the wrong forms—for example, to buy too much polished rice, or unfortified white flour or bread, or sugars and sweets or to spend any excess that their incomes afford over mere calorie requirements on the wrong combination of protective foods. Farm families in this group do not produce the protective foods that will contribute most to improving their diets.

This group is smaller than Groups A and B in most of the overpopulated parts of the world. The fact of mere survival has forced the people of such regions to choose the most efficient sources of calories and to spend anything left over on the most economical sources of vitamins, minerals and the essential proteins. The exceptions to this statement are those groups who are eating too much refined rice, flour, and sugar, but who could as well afford to use them in their more natural state or even in fortified form. Large groups of rice-eating peoples in India, however, parboil their rice before they mill it, which has the effect of driving the vitamins to the interior of the rice kernels.

Group C is even less important than Group A or B in much of Europe. When the people of western and northern Europe improved their diets along with industrialization, they diverted their land generally to pro-

ducing the protective foods that would give them the best combination of calories and protective foods. This has tended to be true even as industrialization pushed eastward, Russia in a certain period being the principal exception. The major qualifications to such a statement for Europe as a whole are that probably too much effort has gone into producing meat and not enough into milk and into green, leafy, and yellow vegetables and that too much income may be spent on beverages of all descriptions, especially alcoholic.

The countries in which Group C is the most important are those like the United States. A relatively large number of families in the United States could have minimum adequate diets or somewhat better if they used their incomes and resources rationally.

This raises the question as to what is a minimum adequate diet. Stiebeling and Ward have defined "an adequate diet at minimum cost" as one supplying 35 per cent of its calories in bread, flour, and cereals, and also liberal amounts of dried peas and beans; and, as compared with the "adequate diet at moderate cost" and "liberal diet," relatively small amounts of tomatoes and citrus fruits, green vegetables, and fruits and only 8 per cent of its calories in lean meat, fish, and eggs. The amounts of milk, fats, and potatoes are about the same in all three diets. But this is not a minimum diet in the strict physiological sense. George Stigler demonstrated that in 1939 in the United States a diet consisting of the following would supply all the calories, proteins, minerals, and vitamins in the Recommended Daily Allowances and would cost only $40 per year at prices then prevailing.[1] It is questionable whether this really is a minimum diet for a working population, for it is too bulky and does not contain enough fat. But it could be made into one by the addition of fat in the form of cheap vegetable oils and a very small amount of a few other items. Also, more species of vegetables could have been included at no increase in cost and a greater variety of cereals and fewer beans at very little increase in cost.[2] Further, the diet would need to be adapted somewhat to different localities according to the foods available there. Another $10 or $15 per year would make it into a true minimum-cost diet.

Wheat flour	370 lb.
Evaporated milk	57 cans
Cabbage	111 lb.
Spinach	23 lb.
Dried beans	285 lb.

[1] *Jour. Farm Economics*, May, 1945.

[2] The mathematics would have been much more involved if a longer list had been included.

The Stiebeling-Ward diet would have cost about $85 in 1939. The extra $25 or $30 is paid, not for more nutrients of any kind which the body really needs, but for more expensive foods which the people of the United States are accustomed to having and of which they feel much deprived if they do not have them.

It will be said that the Stigler diet even as modified would not be very palatable. But palatability is very largely a matter of habit—we like what we learned to like as we grew up. It will also be said that the modified Stigler diet would be monotonous. It would be to those who are accustomed to variety in their diets, but not to a half billion of the earth's population who ask for nothing more, and need nothing more, than enough of the foods on a list no more extended than the modified Stigler diet. But it must be admitted that, if a population group in the habit of eating a larger assortment of foods and with taste preferences for certain staple foods were suddenly forced to live on six or eight foods, it probably would not for some time eat enough of needed foods. However, a very little added money spent judiciously on foods designed to give variety and needed nutrients at the same time would make the modified Stigler diet acceptable in time to large masses of the population of the United States.

Clearly, the modified Stigler diet comes much nearer to being a scientific minimum-cost adequate diet than the Stiebeling-Ward diet. The latter is largely a summary description of the diets of the people of the United States who manage to get enough calories and other nutrients in reasonably good balance out of what they buy and produce in spite of wasteful or somwehat costly food habits. It is an adequate diet at minimum cost only if one accepts these wasteful and costly food habits as largely not subject to change—only if we say, for example, that families are going to buy the potatoes, meats, eggs, and sugar in the Stiebeling-Ward diet and not in the Stigler diet even if their incomes are reduced, and that is all there is to it, and therefore to eliminate any of these items or to lower the amounts allowed will produce diets below the minimum of adequacy. When the Stiebeling-Ward diet is called "an adequate diet at minimum cost," the qualifying phrase should be added, "assuming present food habits."

These two descriptions of minimum adequate diets fit our present needs excellently. The families living in the United States on diets between the Stigler diet, liberalized as indicated, and the Stiebeling-Ward diet, who are at the same time malnourished because of the wrong choice of foods or for related reasons, are in Group C. They make, indeed, a sizable group—probably more than half of all the malnourished

families in the United States. The group is probably equally important in Canada and some other parts of the world settled within the last two centuries. And yet great masses of the peoples of Europe were spending on food in 1939 little more than the Stigler level of $40 per year—that is, $200 for a family of five—and were not malnourished. The rank and file of the people in the United States have never had to learn how to live so economically.

What can be done for this group? More income and resources will, of course, give them more nearly adequate diets though their present wasteful and costly habits are retained. But strong emphasis surely should be put on establishing better food habits by education of the children and guidance of the homemakers and by helping farm families to produce better diets for themselves. Also, much can be done by improving the processing of the staple foods in their diets, developing new and better types of foods, and getting these established in the habit patterns.

Considerable light is cast on the nature of the problem of Group C families by the fact that in the Consumer Purchases Study it was found that *one-sixth* of the families in the lowest income third had *good* diets and *two-fifths* had *fair* diets. These low-income families with good and fair diets achieved this in some cases by spending more than the usual fraction of their incomes on food but in more cases by buying the right foods and making appetizing meals of them.

Group D.—This group of middle-class and well-paid artisan families are still more or less malnourished though they have income and resources enough and spend enough on food to buy the diet designated by Stiebeling and Ward as an adequate diet at moderate cost or even the liberal diet and though in general they do have diets roughly like these. They consume liberally meats, eggs, butter and other fats, sugar and pastries, certain fruits and vegetables, and beverages; but they underemphasize in their diets such foods as whole-grain cereals, beans and peas, milk, tomatoes, fruits, and green, leafy, and yellow vegetables.

This group obviously is important only in countries having a large middle class of relatively well paid artisans. Increasing their incomes will clearly be of no help in improving their diets. To do this, reliance must be placed mainly on the spread of a knowledge of nutrition through the schools and the press. This new knowledge must be applied, not only by homemakers, but by food processors, by restaurant and hotel keepers, and by "eaters out" of all descriptions. The medical and dental professions have a part to play in it, too.

How important this group is in a country like the United States may

be judged by the simple facts brought out in the Consumer Purchases Study that a fifth of the nonfarm families in the three highest income classes in the United States had *poor* diets and a half had only *fair* diets.

Group E.—This group includes the well-to-do persons who are malnourished because they overeat or overdrink and in general consume rich foods in such quantities that there is no room left in their diets for the essential vitamins and minerals. They are found in all lands, but especially in the more prosperous ones. They are the particular responsibility of the doctors and the undertakers.

XIII. THE FOOD NEEDS OF THE UNITED STATES

In earlier chapters we have reported on the state of the nutrition of the people of the United States and other countries, and also the state of the agriculture in these countries, and have analyzed some of the problems involved in achieving better nutrition and at the same time a larger measure of well-being for agricultural people. Before we begin in Part III to analyze and outline measures for achieving these ends, we must examine more carefully than we have thus far the needs for food in different parts of the world, and to some extent country by country, and then follow this with a parallel examination of capacities to produce the needed foods. We shall do this rather thoroughly for the United States in the succeeding chapters and then more generally for the rest of the world in Chap. XV.

Our analysis of food needs will be carried through on two assumptions. The first in order will be that consumers are going to buy their own food and hence that what is consumed will depend upon the income they have with which to buy it, influenced, to be sure, by the sort of education, promotion, and advertising that was practiced before the war. We shall then analyze needs on the assumption that a definite program is set up to raise nutrition to certain desired levels and that supplementary distribution measures will be employed as necessary.

Under the first assumption, the need for food in the United States will be determined by population and income. The Bureau of the Census forecast of growth of population for the United States indicates a declining rate of growth up to 160 million in 1970 and very little growth after that—a maximum of 164 million in 1990. The 160 million by 1970 would be an increase of 23 per cent over 1935 to 1939.

Forecasting income and the effect of income on food consumption is by no means so simple a matter as forecasting population.[1] We shall have to be content with making several alternative assumptions with respect to both. Let us first assume that income will flatten out around the level of 1946, that is, around $1,000 per capita in 1935–1939 dollars, which is equal to $1,300 in 1945 dollars, and then ask what we can expect food consumption to be with such an income. If we are to judge the

[1] The discussion in this section benefits greatly from work done by Willard W. Cochrane, especially his "High Level Food Consumption in the United States," *U.S. Dept. Agr. Misc. Pub.* 581.

future by the past, the answer is given in the solid line in Chart XI. This is an average line showing how the index of food consumption increased with national income, measured in terms of GNP in the years 1922–1940. The increase in this chart is about at the rate of the $1 more for food for every $7 more income that we noted in Chap. IX.

If food consumption increases with income beyond the $735 per capita for 1940 as it did for the lower range of incomes of 1922 to 1940, it will be in accordance with the broken-line extension of the solid line. Con-

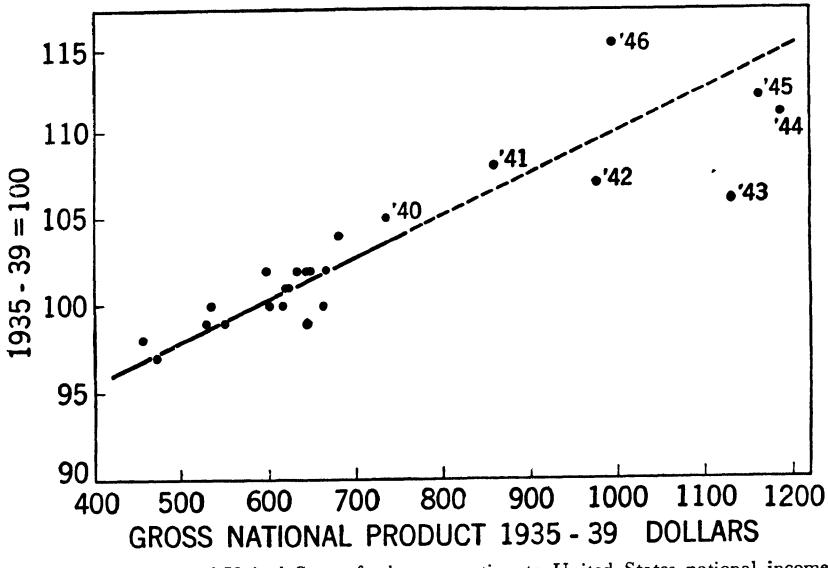


CHART XI.—Relation of United States food consumption to United States national income, measured in gross national product, 1922 to 1940, with projection for later years.

sumption for the 1941 income of $860 was a little above this line; but that for the incomes of $980, $1,130, $1,190, and $1,160 for the years 1942 to 1945 was all below the line. Food shortages and rationing no doubt reduced consumption in some of these years. The consumption of 1946, it will be noted, is well above the line. Its index ought to have been 110, and actually it is 118.

Does this mean that food consumption from now on is going to be consistently above the line? An argument to this effect can be made on the ground that the wartime income increases have brought large masses of the population up to the $2,000 level and that the increases in consumption of meats, eggs, milk, and fruits and vegetables with rising income are very rapid below this level (see Chart V). On the other hand, as more of other things, such as household furnishings and conveniences, automobiles, and the like, become available, consumers may have less

left with which to buy food. Presently, moreover, they may have to spend more of their earnings on rent. The rapidly mounting prices of food in the last year have no doubt already reduced their food-buying abilities. If the dotted line, with its index of 100 for $1,000 of income per capita, is a good forecast of future consumption, the increases it suggests, combined with a 23 per cent increase in the population, will cause a total increase of 35 per cent in food consumption by 1970. If the 118 is a better forecast, the total increase will be 45 per cent by 1970.

It is not reasonable to assume, however, that income per capita will stop at $1,000 very long. Output per worker has been increasing consistently in the past, with nothing more than an occasional slackening, to be offset by spurts such as in manufacturing in the 1920's, and there is no reason to expect these increases to come to an end. In fact, the slowing down of the population growth will give the arts of production at least a chance to gain a stronger lead on the population. In the whole period from 1870 to 1940, the output per worker measured in goods gained at the average rate of about 1 per cent per year. Manufacturing gained at four times this rate and agriculture at twice this rate. But of course these two lines of production represent less than half of the present economy. The gains in goods handled per worker in trade appear to have been almost nil, although the services furnished with the goods sold have increased. As for personal services, including not only housekeeping, but education, medical care, music, recreation and travel, and all forms of public services that mostly do not appear in totals of commodity production, one cannot even guess whether or not they have increased per capita at a faster rate than 1 per cent a year.

Estimating gains in real income that combine all forms of goods and services is a hazardous undertaking. One such calculation gives a gain of 1.3 per cent per year from 1910 to 1940, but unemployment was still widespread in the latter half of the 1930's and continuing to 1940. If the 1930 decade had been a normal one, the per capita gain in income might have averaged 2 per cent per year. Such an increase from 1910 forward would have given an income by 1946 just about equal to the $1,000 that actually occurred. This rate projected forward to 1970 would give an income of $1,500 per capita. On the basis of the 110 index of food consumption for 1946, this would mean an index of food consumption of 147 for 1970; on the 118 basis for 1946, it would mean 157 for 1970.

Of course, one large group of social thinkers in this country is not satisfied to assume that our country will make no more rapid progress in the period ahead than was made from 1910 to 1940. They envision the possibility of holding national income in the next five years, except for a possible temporary recession at some point, well up to the 1946 level and

of making even more rapid progress from that level in the decades following than was made from 1910 to 1940. They assume that our country will be able to keep employed a labor force such as appeared during the war, plus all the gains in numbers of workers from population growth, with no more than 3 million unemployed except for short occasional lapses.

If these incomes at higher levels are reached, however, the question becomes highly pertinent as to whether they will be divided between food and other expenditures in the same way as were the lower incomes. If they are, consumers will have to shift their diets to higher and higher proportions of the more expensive foods. The gains in income and consumption will have to come mainly among the working classes and lower income groups. These, it is true, still have a long way to go before they eat all the fruits, vegetables, meat, and milk that they would like to eat. But they may prefer to spend more of their increased income on housing and automobiles than upon food.

About as optimistic a forecast as one can rationally make for per-capita incomes in 1970 is not much more than $1,500 in 1935–1939 dollars; for per-capita food consumption, an index of 122. This, combined with the 23 per cent gain in population, will make a total gain in food consumption of 50 over 1935–1939.

If we assume the foregoing optimistic forecast and use Chart V as a guide, the percentage increases and decreases in food consumption per capita from 1935–39 to 1970 for the 11 classes of foods represented in the chart will be as in the first column of Table 11. With a 23 per cent increase in the population counted in, the changes will be as in the second column.[2]

Insofar as the data in the chart and the assumptions are valid, these estimates show that the people of the United States, by 1970, if their incomes increase as optimistically assumed, individually will be eating less of cereals, pulses, and fats and oils than they were before the war but will be making up for this by large percentage increases in consumption of fruits and vegetables and foods of animal origin. The growth of population will offset all the decreases except in cereal consumption. Least of all do those who have assembled and analyzed the data used to construct the chart want them to be taken as altogether accurate. They may easily be too high or too low by as much as a third for some items. But they show truthfully enough the nature of the changes likely to occur. The index of per-capita food consumption for such a diet is 122, compared

[2] There is involved in such estimating the assumption that families adopt the consumption behavior of the higher income groups as their incomes rise. They may do this only very approximately, especially in the short run.

with the prewar 100, and 118 for 1946. The index of consumption at the average level of the Stiebeling-Ward "liberal diet" is 117.

Let us now consider some assumptions as to income increases that are less optimistic than the foregoing. Certainly another large fraction of our population believes that employment and national income will level out around 1950 with a labor force equivalent to 5 to 6 million fewer than what are now counted in the labor force and that no more than this number can be counted upon in the future except for population growth.

TABLE 11.—1970: PERCENTAGE CHANGES FROM 1935 TO 1939 (+ OR −)

Food groups	Per-capita changes	Per-capita changes combined with population increase of 23 per cent
Cereals	−24	− 4
Potatoes	+18	+ 49
Sugar	+13	+ 42
Fats and oils	− 1	+ 25
Pulses	− 3	+ 22
Tomatoes and citrus fruits	+96	+147
Vegetables—green, leafy, and yellow	+15	+ 45
Other vegetables and fruits	+28	+ 61
Eggs	+33	+ 68
Meat, poultry, and fish	+48	+ 86
Milk	+17	+ 47
Consumption index	122	

In the first section of Table 12, such a level of employment and national income is called "high-level employment," and per-capita food consumption and total food consumption are estimated for 1950. The population increase allowed for is 12 per cent over 1935–1939. The second half of the table assumes that employment and per-capita income will fall halfway back to 1935–1939 levels by 1950. Not many are this much discouraged about 1950, but we may as well get a good look at the effects of such a setback.

These last two sets of figures indicate roughly the domestic food consumption that the agriculture of the United States can look forward to in the next decades if consumers depend upon their own buying power and food habits to determine their food purchases. Both these sets, but especially the high-level-employment figures, call for much larger increases in per-capita fruit and vegetable consumption than the 5 per cent in fruit consumption and 11 per cent in vegetable consumption that have already occurred since 1935 to 1939 but for less increase in eggs,

meat, and milk consumption than the 21, 23, and 18 per cent increases, respectively, in these that have already occurred since 1935 to 1939. The indexes of consumption are 113 and 109, respectively. Sugar and fats and oils consumption in 1947 are expected to be 12 and 10 per cent, respectively, below prewar, but consumption of cereals and roots and tubers is expected to be almost the same. The shifts when the shortages are over will mostly be in the direction indicated in the table. The final consumption adjustments will call for production changes in line with those outlined in Chap. III.

TABLE 12.—1950: PERCENTAGE CHANGES FROM 1935 TO 1939 (+ OR —)

Food groups	High-level employment		Moderate unemployment	
	Per capita	Total	Per capita	Total
Cereals	−13	− 3	− 7	+ 4
Potatoes	+13	+26	+ 8	+21
Sugar	+ 7	+20	+16	+16
Fats and oils	− 1	+11	0	+12
Pulses	+ 2	+14	+ 1	+13
Tomatoes and citrus fruits	+48	+66	+32	+48
Vegetables—green, leafy, and yellow	+ 6	+19	+ 5	+18
Other vegetables and fruits	+11	+24	+ 7	+20
Eggs	+19	+33	+13	+26
Meat, poultry, and fish	+23	+38	+14	+28
Milk	+10	+23	+ 7	+20
Consumption index	113	. . .	109	

The analysis made by the U.S. Department of Agriculture that is most comparable with the foregoing was published in 1945 in "What Peace Can Mean to American Farmers."[3] It assumes a national income of 150 billion dollars in 1943 dollars, which is equivalent to 141 billion dollars of GNP in 1935–1939 dollars, with only 2 million unemployed. Its forecasts of 1950 per-capita food consumption differ from those in the first column in the table above principally as follows: (1) A sizable decline in potato consumption compared with an increase in the table, this difference being offset by a smaller decline in cereal consumption; the total changes for the two groups of inexpensive starchy foods combined is a somewhat smaller decline in the Department of Agriculture analysis. (2) Larger increases in the consumption of meats, fats and oils, sugar, and pulses and slightly larger for milk. (3) Somewhat smaller increases in the consumption of fruits and vegetables. The general patterns of the

[3] *Misc. Pub.* 562.

changes are about the same, with the Department forecasts totaling a clearly higher level of consumption with an index number of 118. For moderate unemployment in 1950, however, its index is 110, close to the 109 in the table; for severe unemployment, 100.

A very common opinion is that this country will experience a high level of employment and income for the next decade, except for a possible minor recession at some point, but that at some time later on, perhaps around 1960, a major depression of the sort experienced in 1930 to 1933 will descend upon the nation. Accordingly, in Table 13, the year 1960

TABLE 13.—1960: PERCENTAGE CHANGES FROM 1935 TO 1939 IN TOTAL FOOD CONSUMPTION, WITH AN 18 PER CENT INCREASE IN POPULATION (+ OR −)

Food groups	High-level employment	Moderate unemployment	Major depression
Cereals	− 6	+ 3	+16
Potatoes	+38	+33	+20
Sugar	+31	+26	+17
Fats and oils	+16	+17	+18
Pulses	+22	+20	+18
Tomatoes and citrus fruits	+99	+75	+37
Vegetables—green, leafy, and yellow	+27	+25	+20
Other vegetables and fruits	+38	+31	+20
Eggs	+30	+40	+25
Meat, poultry, and fish	+59	+45	+23
Milk	+33	+30	+20
Percentage of 1935–39	139	133	121

is taken for a cutoff point, and three assumptions are made as to employment at that time. A population increase of 18 per cent is assumed in all three cases.

To realize the importance of the differences between the consumption in the three conditions of employment covered in this table, one needs to bear in mind that cereals before the war were supplying 28 per cent of the calories in the diet of the United States and meats, eggs, and milk another 28 per cent. The lowest point reached by the food-consumption index in the 1930–1933 depression was 97. The 121 for a major depression in 1960 takes account of the higher level of food consumption from which the depression will start.

Now let us consider the question of the food needs of the United States from the standpoint of foods required to meet certain standards. These standards can be set up in terms of nutrition, or diets, or income. The most important one from the nutritional standpoint is that of the targets

set up in the FAO "World Food Survey." The target for the United States allows food enough for an *average* "moderate-cost" diet with a 12 per cent increase in population over prewar by 1950. The per-capita changes that it calls for are given in the first column of Table 14, for the eight food groups used in the "World Food Survey" tables. The three remaining columns give the estimated increases with population increases figured in for 1950 (12 per cent), 1960 (18 per cent), and 1970 (23 per cent). The consumption index for this target is 113. It shifts more strongly toward the protective foods, especially fruits and vegetables and milk, and more markedly away from roots and tubers, sugar, and fats

TABLE 14.—CONSUMPTION CHANGES TO MEET "WORLD FOOD SURVEY" TARGETS (+ OR −)

Food groups	Per-capita changes	(112) 1950	(118) 1960	(123) 1970
Cereals	− 7	4	10	15
Roots and tubers	− 3	9	15	19
Sugar	−22	−13	− 2	1
Fats and oils	−10	0.4	7	12
Pulses	− 5	7	12	17
Fruits and vegetables	33	49	57	64
Meat, fish, and eggs	5	18	24	29
Milk	39	56	64	71

and oils than do the diets presented in the last section of this chapter based upon income and employment changes only.

In evaluating this diet, it is important to keep firmly in mind that it provides only an "average" diet at the moderate-cost level. This means that roughly half the population will be living below this moderate-cost level. An improvement in the diets already above this level does not help those below it unless they improve equally at the same time. A more realistic kind of target would provide for raising all the poor diets up to some level of adequacy. Rainer Schickele made an estimate of the level of such a diet by adding to the total 1941 consumer food bill of the United States the amount more that its low-income families would have to spend to buy themselves adequate diets at moderate cost at 1941 prices.[4] (The retail cost of such a diet in 1941 was $145 per capita.) The required increase in the food total bill was 17 per cent. This added to the consumption index of 109 of that year would make an index of 126, which is well above the 117 for the Stiebeling-Ward "liberal" diet. That diet, of course, is only an average diet. Willard Cochrane takes

[4] *Jour. Farm Economics*, May, 1946.

the diets of 1941 as a basis for "high-level consumption" but raises to "a good adequate minimum" the consumption of all the income groups below this level and extends his results forward to 1950.[5] He gets as a result a diet with 72 per cent more milk, 38 per cent more meat, poultry, and fish, 34 per cent more butter and other fats, 30 per cent more fruits and vegetables, and less only of cereals and pulses, with an index number of 134.[6] O. V. Wells, chief of the Bureau of Agricultural Economics, has developed, instead, a "best adapted diet," which provides a nutritionally adequate diet for all income groups but chooses its foods for low-income families from the minimum-cost diet of Stiebeling and Ward, for middle-income families from their moderate-cost diet, and for high-income families from their liberal diet, and adds 10 per cent to each to allow for the above-average consumption of roughly half the families in each of these groups. The index for his best adapted diet as he set it up in 1942 is 116. The best adapted diet is clearly the most rational of these three. All of the last three diets are designed to do what the "World Food Survey" targets fail to do, provide for some kind of adequacy for those whose consumption is below average.

[5] "High-level Food Consumption in the United States," *U.S. Dept. Agr. Misc. Pub.* 581 (1945).

[6] A more recent analysis by the Department of Agriculture, presented in the hearings on new agricultural legislation on October, 1947, assumes that the food consumption of all low-income families is raised to that of prewar families with incomes of $2,000 and over. This should give an index of 137.

XIV. FOOD THE UNITED STATES COULD PRODUCE

THE next question is how readily, if at all, the United States can produce, for a population of 160 million in 1970 and 165 million by 1990, the diets at various levels of employment and income defined in the first part of the last chapter; and also the moderate-cost 1960-target diet and other diets defined in the latter part of the last chapter.

The usual statements on this type of question run in very conservative terms. It is pointed out that in fact the agricultural output of the United States has expanded only at the rate of 1 per cent a year in recent decades and has scarcely been keeping up with the growth of consumption and that imports of farm products have been increasing while exports have been decreasing. Agriculture is frequently described as having highly limited resources and possibilities of expansion. Attention is called to the fact that, while agricultural production was expanding 25 per cent from 1939 to 1945, industrial production was expanding 86 per cent.

These conservative statements need much qualifying. How much would the agriculture of the United States really have expanded if large increases in food and fiber had been needed and the government had diverted to agriculture all available capital, labor, and scientific knowledge and had agreed to repay the producers for all unexhausted investments in the new production as it did the producers of war materials? In spite of the time it takes to get some lines of production going, it is not improbable that the 25 per cent by 1945 might have been twice the 25 per cent and even more. Much liming and fertilizing of fields and pastures and improving of pastures would have been needed, much cropland converted to more intensive crops, and much land never cropped, or once cropped and since abandoned to pasture, brush, or woods, hurriedly developed and brought into crop use. With the same favorable weather, a 50 per cent increase and more might well have been achieved.

The reason why the agriculture of the United States has not expanded faster than 1 per cent a year has been the lack of sufficient demand for farm products. As stated in Chap. VII, during the four decades culminating in 1919, demand was pressing on supply. The turn might have come as early as 1915 if war had not broken loose in the world. The expansion of 1 per cent a year from 1920 to 1940 was in the face of a lag-

ging demand. If prices of farm products could be kept on even terms with industrial wages in the next two decades and all the farm products consumed that would be produced at such a level of prices, the agricultural output of the United States might well expand 2 or 3 per cent per year.

A little concreteness will be illuminating at this point. Let us consider briefly a sample of farms scattered widely over the United States. The first two farms are in the state of Missouri, almost in the geographical center of the country. The first is near St. Joseph in Buchanan County. It contains 267 acres, of which 168 are in cropland and 65 in permanent pasture. Its topography is rolling, with many long slopes, which are exposed to the ravages of erosion. This farm during the past 20 years has been handled in about the usual way of farms in this part of the United States. The county agent of Buchanan County, Webb Embrey, and Darryl Francis of the research staff of the Federal Reserve Bank of St. Louis have worked out a plan for increasing the productivity of this farm that in 7 years would increase its net income around $2,000. The total expenditures for these improvements on a hired-labor basis would be $9,700, including interest. The improvements include 14 miles of terraces, 1.3 miles of grassed waterways, and fencing, lime, and fertilizers. The plan calls for spreading these improvements over 7 years so that in practice much of the improvement work could be done by the farm labor force. The crop acreage will be increased somewhat, and especially the yields, and the additional feed produced will enable the farm to keep 10 dairy cows and 15 sows to farrow 2 litters each year and to buy and fatten 40 to 60 feeder calves. The additional income will yield a handsome return on the additional investment.

The second farm analyzed by Francis is in the foothills of the Missouri Ozarks. It has 390 acres of land of which over 200 were in timber too dense for pasture. Under the improvement plan outlined, one-half of this timber has been converted into pasture, and the farm now has 190 acres suitable for open pasture and small grain and hay crops. Terraces and waterways have been constructed on sloping fields, and rotation systems have been introduced that maintain the land at a much higher level of productivity. In the 4 years between 1937 and 1941, the net cash income of this farm was increased from $795 to $2,375.

The Southern states have a very large area of piedmont land where much cotton has been grown in the past and much of the land has been badly eroded in spite of heroic efforts at building and maintaining bench terraces. Heard County, Georgia, is a typical county in the piedmont. The Bureau of Agricultural Economics and the Farm Security Administration, with the assistance of the Forest Service and other agencies,

selected 10 farms in this county and replanned them with a view to providing as good an income and living as possible for their present operators. One plan calls for shifting a 153-acre cotton farm completely to beef cattle and establishing 40 acres of kudzu beans for hay and pasture. This is a system of farming that will check erosion almost completely and restore much of the lost fertility of the land. At the same time it will raise the net farm income from $120 to $700 per year. Another plan calls for converting a 93-acre one-mule cotton farm to one substituting sweet potatoes for some of the cotton and building up a small dairy herd on the basis of kudzu plantings. This plan is expected to raise the income of this farm from $250 to $1,800. The plans for some of the other farms add poultry as well as dairy cows and beef cows. Plans were made for improving the woodland on all these farms. If the plans for these 10 farms are carried out, the net income will on the average be increased four times.

A plan for a Bankhead-Jones tenant purchase farm worked out with the operator in the Farm Ownership Branch of the Farm Security Administration provides for improving a 107-acre farm in Titus County in northeastern Texas to the point where it will keep 10 milk cows and 16 head of young stock in place of the three cows now being kept. Lespedeza and bermuda grass pastures have been established on 12 acres; phosphate has been applied to much of the pasture, and grazing has been controlled to ensure survival of the young pasture plants. The yields of most of the crops had doubled by 1945.

The Soil Conservation Service is working out with the operator a program for converting a 93-acre farm in the South Carolina piedmont from a badly gullied cotton farm with 6 head of cattle and 2 sows to one with 18 head of dairy cattle, 5 head of beef cattle, and 3 sows. The acreage in cotton and corn has been reduced, but the yields have been enough larger to offset the lower acreage. Pastures have been improved, and also the yield and quality of the hay. Sloping fields have been terraced and farmed in a strip rotation.

The TVA has 30,000 test demonstration farms for which plans have been made and on which improvement programs of one sort or another are under way. The plan for an 80-acre farm in Hancock County at the northern end of the Eastern Valleys of Tennessee consists in blocking off a large 35-acre field of the least sloping of the land, strip cropping this completely, and improving all the pastures on the farm. This farm is now carrying 8 milk cows instead of 4. The replanning of a badly gullied farm in Buncombe County in western North Carolina has increased the feed and forage production to the point where 36 head of beef cattle are being carried in place of 16 in 1939. The pastures have been limed

and fertilized and seeded to a mixture of orchard grass and lespedeza mainly. The cropping system includes corn, oats, and 2 years of clover and grass hay in strips laid out on the contour.

In the historical literature on the agriculture of the United States, one finds many references to the abandoned farms of New England. They are farms that have disappeared as such, and their land has been allowed to grow up to brush and trees. On the farms still operated, many fields have gone through this process or are in the midst of it. The possibilities of restoring such land to full productivity are illustrated by a farm plan for a 217-acre farm in Worcester County in the center of Massachusetts. This farm now has 40 acres of land in crops, 19 acres of open pasture, and the rest all in brush or woodland. Of the hay, 13 acres is of poor quality. None of the pasture is really good, and two-thirds is rated as third class. This means that much of it has a thin cover of grass, grown over largely with shrubs like sweet fern, blueberries, or haircap moss. Much of what was once open pasture has grown up to birch sprouts, wild cherry, and aspen. Much of the land was kept in open pasture for many years, but the stones were not removed from the part that was never plowed.

Any number of reorganizations of this farm are possible, ranging from a limited amount of pasture improvement to removing the brush and surface stones from all the deteriorated pasture land, removing the stones from an additional 100 acres of land so that it can be farmed in crop rotations, and removing about all the stone fences so that the cropland can be farmed in fields of 20 acres or more. No doubt, to carry improvements to this extreme will not be warranted by the prices of farm products likely to prevail in the next 50 years. However, a more modest program of improvement will increase the cropland by about 40 acres and improve 50 acres of pasture, lime and fertilizer being freely used on all this and good woodland practices applied to the remaining timberland. This will increase the carrying power of the farm from less than 20 cows to more than 50 cows and the net income from around $1,300 to around $5,000. To handle this number of cows, a large investment in additional barn room will need to be provided. The land improvements will call for a cash outlay of less than $4,000. The additional income will cover in 7 years all annual operating costs and redeem the investment, including the new barn.

This book does not concern itself except incidentally with the problem of meeting the needs of the nation for timber and other woodland products, but food production and timber production are closely associated in a large fraction of the farms in the United States. Planning procedures such as are described above applied to the woodland on the farms of the

United States reveal equally striking opportunities for increasing output. For example, 150 acres of woodland on a farm in Worcester County, Massachusetts, if managed according to methods already well understood but unfortunately little practiced by farmers, would yield enough returns on the average to pay for 160 days of labor yearly from sales of fuel wood, fence posts and some saw logs for the first 50 years and would begin to return much more than this after that.

Similar analysis for 60 acres of woodland on a Heard County farm shows that it would yield a net annual income within 20 years of more than $200; for 25 acres of poor woodland on a Tennessee test-demonstration farm, more than $75 a year.

The reader may get the impression that the farms that have been selected for analysis are in the poorer farming sections of the United States. They are representative of all the farming land of this country except the ranching country of the West, except the Great Plains Region west of Minnesota, Iowa, and Missouri, except a considerable fraction of the Corn Belt (but a smaller fraction than is commonly realized), and except scattered farming areas in other parts of the country like the Black Prairie of Texas and the Central Valley of California.

Areas such as these just named offer fewer chances for improvement. Nature has already improved them. But it is becoming increasingly apparent that applications of particular fertilizers such as potash are needed in many sections of the Corn Belt and that pasture improvement will contribute importantly to productivity even in these sections. Developments in the last decade or two in breeding are yielding types of corn and other crops that show much promise for the future. New varieties of oats are now yielding one-fifth more than old varieties in large sections of the Midwest. It has been estimated that the hybrid corn now used has increased the yield on half the farms in the Corn Belt by nearly one-fifth. Yields of potatoes on experimental plots to which the new types of insecticides have been applied have been increased as much as one-third in recent years. It is true that the larger yields make heavier drafts on the plant nutrients in the soil, but these are mostly of types that can be readily replenished.

Much progress has already been made in the efficiency with which feed is used in feeding dairy cows, hogs, and poultry. The increase in efficiency arises in large measure from reducing the proportion of feed that goes into the maintenance of the animal and increasing the growth and production fractions of the rations. Improvements in breeding have been an important aid in these developments.

It will be obvious that improvements can be made to land that add much more to costs than they return in production. The revised plans

discussed above were nearly all considered carefully from this point of view, and no improvements or new practices were introduced that did not promise to pay for themselves at levels of prices such as are commonly assumed in making farm-management plans. Nearly every item of the plans promised to increase the output per unit of input of labor and other factors of production, with the result that it reduced costs per unit of product along with the increase in output. The remainder increased costs somewhat but increased output by enough more so that they added to profits. The heavier applications of fertilizer sometimes come under this latter description, and likewise the heavier rates of feeding.

Also, at this point in the history of the agriculture of the United States, one must anticipate a very great reduction in costs from increasing mechanization. Important new developments are under way in the use of power and machinery in growing cotton and sugar crops and in the handling of hay and forage. The mechanization of cotton production reduces the labor in planting and caring for the crop as well as in harvesting it. The same is true for sugar cane and sugar beets. These machines reduce the quantity of labor required very much more than they reduce costs. In large part, power and machine costs are substituted for labor costs, but only when they are lower does mechanization make any headway. The developments in prospect all promise to reduce costs importantly in the near future.

Improvements in the distribution of farm products so as to get them from the primary producer to the consumer at less effort and expense are fully as important as the developments in production. The research energies of students of agriculture are now being turned markedly in the direction of more efficient distribution, and one has the right to expect some important gains in this field also.

The skeptic may raise his voice at this point and say that the possibilities of fuller utilization of land and other resources of the country have been with us for a long time but have not been utilized and ask why we may expect them to be more fully utilized in the future. The principal answer is as follows: If farms had been improved and practices applied as with the sample of replanned farms described earlier in this chapter, the volume of farm products resulting would have depressed their prices beyond all reason. The simple fact is that the number of farms already operated in the United States has been so large that since 1920 any further improvement would have swamped the market for farm products. There has been, therefore, little room for the application of improved methods on a wide scale. Individual farmers here and there have been able to do very well for themselves by applying the new techniques of management. Always enough of them

have done so to keep prices so low as to discourage the progress of those remaining. About all that is needed is an outlet for the products of present farms, at levels of return comparable with those in urban enterprise and employments, and farm management will at once proceed to realize upon the opportunities described.

The improvements here outlined will in general reduce costs and make it possible for the farmer to sell at lower prices, but not lower than those that prevailed during most of the 1930's. At those levels, all but a few of the farmers were forced to restrict themselves to cashing in on investments already made. But it is easy to make improvements that will require higher prices to cover their cost. These may be needed if pressure of the world's population on food supply resumes as it did in the four decades at the turn of the century. In such a situation, the United States will need to begin to export foods. It will not have population enough at home to consume the production of its farms when they are developed to such a stage.

What is the relation of the foregoing to the conservation discussed in Chap. X? Can the increase of 2 to 3 per cent per year in agricultural output predicted as possible be attained without deterioration of our soils from erosion? The Soil Conservation Service is accustomed to saying that half the land now in crops can be kept in crops safely only by wider adoption of soil-conservation practices than is general now. No doubt some of the land now in cultivated crops should be kept in grass most of the time. More of it should be in rotations that include more grass and close-grown crops. On the other hand, as the foregoing illustrations of actual farms indicate, much land now not in crops can be so used if improved in such a way as to protect it against erosion. Surely we have the land base for a much larger output of farm products if we utilize it properly.

An important phase of matching food production to food needs is the relative efficiency of different crops in converting land and other resources into food. Some crops use much labor, power, and supplies per acre of land and yield a large output in calories of food energy. Others are relatively most efficient in producing the proteins needed for growth. Others are relatively most efficient in the production of minerals or vitamins. In Table 15 are presented the data showing the output per acre of food energy, protein, minerals, and vitamins for the average acre of land in the United States in the period before the war. The unit of measurement for minerals and vitamins is in the form of number of a day's intake of these products. This is the best unit for comparing the yields per acre of the three leading minerals, calcium, iron, and phosphorus and the five important vitamins, A, thiamine, ascorbic acid, ribo-

flavin, and niacin. These data are based upon a very valuable report prepared by Raymond C. Christensen of the Bureau of Agricultural Economics, published under the title, "Using Resources to Meet Food Needs." It cannot be too strongly emphasized that they are average figures for the whole United States and that they apply to the United States only. With different systems and different relative yields, the comparison would be different.

TABLE 15.—FOOD VALUES FROM AN AVERAGE ACRE OF LAND IN THE UNITED STATES, PREWAR

Foods	Energy, 1,000 cal.	Proteins, lb.	Minerals, day's supply	Vitamins, day's supply
Wheat, flour	1,130	90	2,117	434
Corn, meal	1,880	96	292	234
Rice, white	2,135	102	694	128
Potatoes, white	2,285	118	2,701	1,624
Sugar beets, sugar	6,250	...	....	....
Beans, dry	1,080	150	3,906	394
Sorghums, whole	1,545	340	5,548	923
Peanuts, whole	1,175	116	876	281
Milk, whole	350	39	325	175
Dairy products	290	25	212	110
Eggs	145	26	22	102
Hogs	500	18	58	193
Beef cattle	45	7	18	26
Carrots	2,685	166	2,628	21,499
Cabbage	870	96	1,168	5,804
Tomatoes	408	41	474	2,701
Lettuce	332	48	511	1,314
Oranges	1,909	68	985	5,804
Apples	1,073	13	219	511

It will be noted that a sugar-beet crop yields the largest number of calories per acre but yields absolutely nothing of any of the other food elements. The soybean crop, in contrast, gives the highest output of protein per acre. The pulses and peanuts come next. These products are also rich in minerals and vitamins. The largest yields of the vitamins, however, are obtained from some of the vegetables and citrus fruits. The livestock products all yield relatively low outputs of food energy per acre. Growing corn and other cereals and other grains and feeding them to hogs provide more calories per acre than any other form of livestock products. The calories, however, are mostly in the form of fat, which can be produced much more cheaply in vegetable oils. Milk provides more than twice as much protein per acre as pork. If, however, a large

part of dairy production goes into butter and the skim milk is fed to livestock, the dairy enterprise is not very efficient. Taking livestock products as a whole, seven times as many acres are needed to provide a given quantity of calories as from the cereals taken as a whole.

Where land is not the scarce factor, as is true in the United States and in many of the newer areas, output per day of human labor may be more important than output per acre. The cereal crops are twice as efficient in the use of labor as the sugar-beet crop; so also is the soybean crop. The cereal crops yield more than ten times as many calories per day as the most efficient of the livestock products and thirty times as much as beef cattle.

It should be very clear from these data that the most important single factor in adjusting food production and food consumption is the proportoin of the food production sources devoted to cereal production and the other foods which are most efficient in the use of land and labor. A conversion to cereals, potatoes, and pulses of a large acreage of land now in pasture and forage crops could completely bury the market for farm products in this country.

At one time during the war when shortages of food at the fighting front and behind the lines in Europe began to appear threatening, some of the food planners of this country figured out a diet with a large dependence on cereals as a source of calories and protein, on tomatoes, carrots, and cabbage and a few other efficient sources of vitamins, and on milk as an efficient source of calcium and protein that would have enabled this country to export half its food production at no sacrifice of essential food elements, although, of course, at a great lowering of the dietary level according to ordinary food standards. Fortunately, it was not necessary to make this sacrifice. The United Kingdom did need to move considerably in this direction; and the German military governments in France, Belgium, and Holland were forced to make large shifts in this direction. As agriculture becomes restored in western and central Europe, production will shift back toward the former large reliance upon meats, dairy products, and the other protective foods. If surpluses reappear in this country, they can be soon reduced by a large shift from cereals and the other high-calorie products to the livestock products.

It is safe to conclude from the foregoing discussion that the United States does not suffer from a lack of ability to produce enough food for thoroughly adequate diets for its people. The major problem confronting it is one of *keeping production and consumption of food in good balance at all times,* so as to avoid periods of overexpansion of the agricultural output as during the interwar years and of too low production as in the first two decades of the century. *This balancing needs to be done for each product.* It is not

enough that the general level of production is well adjusted to consumption. The second problem in importance is *developing methods of producing and distributing food that will lower the costs to consumers* so that their incomes will go farther in providing them with adequate diets. This is especially important for the protective foods.

Part of the total food supply of the United States will, of course, always come from imports. This is as it should be. Many items in the diets of the people of the United States are more economically produced in lands other than in our own, and many of these foods contribute importantly to the nutritive value as well as the variety of our diets. Our food policy should permit the freest possible use of any foods that can be produced abroad and fitted into the national dietary in such a way as to improve it. These imports may be balanced in full by exports of agricultural products that this country can produce more economically than others.

Whether or not imports and exports are in balance, however, is a matter of no concern so far as the national diet is involved. If any interference with the normal movement of trade between countries that may restrict imports or exports is undertaken, the basis for it must be other than diets as such. This will not be true for many other countries, especially the smaller ones. Some of these may need to import essential foods so as to make up deficiencies in their national diets. A country as large and with as diverse resources as United States has no problems of this sort. It may very well, however, be cheaper to import some foods from other countries than to produce them anywhere within the United States or to grow them at one boundary and ship them all the way across to another.

Will the United States, in this situation, manage to keep its food production and food consumption in good balance? If no better procedures and mechanisms are developed for this in the future than have prevailed in the past, it will not. If farmers are left to themselves, they will do a poor job of adjusting their production to consumption needs. They will even do a poor job of fitting their production to the market in such a way as to obtain the largest returns for themselves. They will generally overexpand their production of hogs following years of good prices, and conversely in years of low prices, thus perpetuating a continuous waxing and waning of production, with prices in reverse. They will overexpand their production of cotton, wheat, and tobacco at times and keep these in chronic surplus for long periods until consumption catches up. It is possible that supplying the farmers of United States with the fullest possible information as to market and production outlooks, and a vigorous program of training farmers in adjusting their production

to market situations will be sufficient to keep production and consumption in good balance or at least accomplish as much in this direction as can reasonably be expected. At any rate this approach to the problem should be followed intensively and thoroughly. Some form of production control of a more definite and direct sort may prove to be necessary with some products, but the procedures of control must be very different from those practiced in the 1930's if they are to be really helpful. Discussion of this point is reserved for Part III.

Some will not be satisfied to leave the discussion of capacity to produce in such general terms. It has been the vogue in the U.S. Department of Agriculture in recent years to translate food needs into acres of land required to produce them. Thus the report "What Peace Can Mean to American Farmers" concludes, after allowing for the agricultural exports and imports reasonably to be expected with full employment in 1950, that 23 million more acres of cropland would be needed than the 345.5 million acres used from 1935 to 1939, assuming "average" technology. It then adds, however, that, with only moderate improvements in technology, 327 million acres only would be needed and hence that agricultural production might outrun demand, even with full employment.

A more recent analysis, referred to in the last chapter, that runs in terms of a minimum per capita income of $2,000, and a food-consumption index of 137, and hence of large increases in the consumption of meat and dairy products, would use 370 million acres of land, not counting in 20 million in summer fallow, and 50 million in pasture but cropped in rotation.

Analysis of this kind, it should be apparent from what has gone before, gets us nowhere. The simple fact is that the cropland of the United States can range, without any difficulties whatever except the painful one of readjustment, from 300 to 400 million; and no great obstacles stand in the way of expanding it to 500 million acres or even more. If the land of the United States were in Europe, probably 700 million acres would be cropped in some sort of rotation.

XV. FOOD FOR THE WORLD

OBVIOUSLY, space cannot be provided in this little book for analyzing, in the manner of Chaps. XIII and XIV, the food needs and the food-producing capacity of all the countries of the earth. Nor, if they tried, could the authors perform such a task on the basis of information about the different countries that they could assemble in the United States or in many of those countries at this point. Nevertheless, exactly this kind of analysis needs to be made for and by each country. Upon such analysis must be based the food and agricultural programs of each country.

What this chapter will do, instead, is to present some information and analysis on food needs and food-producing possibilities in other countries that show the general nature of the problem in other parts of the world.

As in Chap. XIII, we shall consider the problem of food needs from two standpoints, first, from the standpoint of the amount of food that the people will buy in the regular markets out of their incomes without any special measures to assist them in obtaining foods required for adequate diets and, second, from the standpoint of the foods required to supply them with diets of various types of adequacy.

As in the United States, food needs under the first head will be determined by population changes and income changes. For the first, we at least have as a basis for our analysis the forecasts made by the population scholars, uncertain as these may be. Past experience with these forecasts indicates that some of them have been too high and some too low. The forecasts have sometimes been proved wrong because of developments that were not anticipated, such as wars and epidemics on the one hand, and positive programs to increase the population, which had some effect at least in their early years, on the other. But seldom are they far wrong.

Let us look at Europe first. The forecasts in Notestein's "The Future of Population in Europe and the Soviet Union" indicate an increase between 1940 and 1960 of only 6 per cent for Europe excluding Russia and 14 per cent including Russia.[1] The forecast for Russia is 31 per cent. For eastern Europe, the forecast is 15 per cent; for southern Europe, 10 per cent; for northwestern and central Europe, no increase whatever. The countries with actual decreases forecast are Sweden,

[1] Notestein, F. W., *et al.*, "The Future Population of Europe and the Soviet Union," Geneva, 1944.

Belgium, and Switzerland, each with 2 per cent. The only increases forecast for that part of Europe are the Netherlands 13 per cent, Denmark 6 per cent, Finland 4 per cent, and Germany 3 per cent. The European countries with the largest predicted increases are Greece, Romania, Yugoslavia, Bulgaria, and Portugal.

The forecast for England and Wales is a decline of 3 per cent but for Ireland an increase of 7 per cent, for North Ireland of 6 per cent, and for Scotland of 3 per cent. The largest decrease in western Europe is 5 per cent for France.

The only forecast which the authors have available for Japan is for 1970, an increase in 30 years of 20 per cent.

The "World Food Survey" bases its 1960 targets on the following population increases: China 15 per cent, India 25 per cent, southeast Europe 10.4 per cent, South America 48.6 per cent. Comparable figures for some individual countries are as follows: Canada 24 per cent, Argentina and Peru 35 per cent, Mexico and Puerto Rico 45 per cent. The forecasts for China and India and the Malthusian countries, as explained in Chap. VII, are in the main only forecasts of the rate at which the food supply can be increased. Those in the Latin-American countries essentially assume that levels of food consumption will be very little improved.

Income changes could make equally large differences in the amounts of different types of food consumed in the different countries. If they were large enough, they could over the centuries shift the diets of some of the countries from 80 per cent cereals and roots and tubers to less than one-half from such sources. They could raise the indexes of food consumption of under 65 shown in Table 6 in Chap. V for countries like Hungary, Yugoslavia, and Turkey to levels of 80 or higher like those of Austria and Germany. But to attain shifts like this in the space of a century would require some mighty strides in industrialization and transfer of populations from farms to industry and trade, such changes as occurred in Europe from 1775 to 1900. If such indexes had been computed for northwestern Europe before the industrial revolution, they would have been much like those for Italy, Greece, and even Egypt. Only in the very long run can we expect such changes to develop in the Orient. Conceivably, a century of vigorous development of industrial and agricultural resources would raise the consumption index numbers of such countries as China and the Philippines from 35 and 44 to around 50 and 55 in the next fifty years, provided that the population did not increase at the rate common in the past in the first stages of industrialization. If past history is a guide, it will not be until the second fifty years that the large gains will come. So far as these countries are concerned, little or no increase in income is possible as long as birth rates

remain as high as now. *Only if improvements in the arts are rapid enough to outstrip population increases will the income support any shift away from cereals to the protective foods.* These improvements in the arts can take three forms, industrialization, increasing agricultural output from the same land, and development of lands not now in use.

The other countries of the world mainly lie at some position intermediate between the United States and the Orient. In many of them the arts are gaining on the population at present, and all that is needed is an acceleration of these gains to make possible a considerable rise in the standard of living and better diets. In others, however, as pointed out earlier, large masses of the populations in congested areas have low incomes and poor diets. Only industrialization and agricultural developments that will decentralize the populations and a general movement toward equalization of income between population groups will make possible any notable gains.

For a few of the newer countries, it is as reasonable to assume per capita income changes as rapid as 2 per cent per year as it is to assume it for the United States. For more of these, a rate nearer 1 per cent is more reasonable. A few of the countries of western Europe could very properly set goals for themselves of 1 per cent a year. If the food-consumption index rises 1 point for every 7 in income, as indicated for the United States, a gain in income of 25 per cent in the next twenty-five years in France would mean a rise from 84 to 88 in its index of food consumption.

Of interest at this time is the effect of the war on incomes in Europe. No doubt, real incomes were somewhat reduced in 1946–1947 and will continue so for several years in many parts of Europe because of destruction of plants and the difficulties of reconversion. Shortages of equipment, livestock, fertilizer, and the like, are reducing the output per worker in many lines. But these difficulties will be overcome in the course of time, and incomes not only can return to their prewar levels but can easily exceed them. If we may judge by the experience following the last war, within five or ten years incomes and consumption will be on a higher level than ever before. These higher standards of living will make it possible to include more of the higher priced foods in the diets. At least, all this is entirely possible in almost any part of Europe if the peoples set about realizing their opportunities and the nations collaborate with each other to such ends.

Let us now consider the needs for food if specified nutritional goals or targets are to be attained, as we did for the United States, in Chap. XIII (pages 125 to 127). The "World Food Survey" presents the increases for the eight food groups listed in Chapter XIII for the United Kingdom,

South America, southeastern Europe, China, and India. In Table 16 are presented the increases required merely to realize the targets for the 1935–1939 populations of these countries.

It will be noted that the changes for the United Kingdom are much like those for the United States. No increase in calories is needed, but cereals need to be replaced with large percentage increases in milk and fruits and vegetables. The percentages of these are as high as they are because present consumption was so low. Only a small percentage decrease in cereal consumption is required to allow room for the increases in milk and fruits and vegetables. The South American countries in the aggregate need an increase in calories—increases are shown for all items but

TABLE 16.—PERCENTAGE CHANGES IN FOOD CONSUMPTION PER CAPITA TO ATTAIN FAO TARGETS WITH 1935–1939 POPULATIONS (+ OR −)

Food groups	United Kingdom	South America	Southeastern Europe	China	India
Cereals	− 8	+14	−12	0	+ 11
Roots and tubers	0	−18	+14	+ 44	+ 62
Sugar	− 8	0	0	0	0
Fats and oils	− 6	+11	+19	+ 37	+ 70
Pulses	−10	+14	+75	+ 38	+ 47
Fruits and vegetables	+61	+16	+61	+ 270	+244
Meat, fish, and eggs	+ 0.1	+ 7	0	+ 26	+224
Milk	+68	+91	+60	+4,900	+ 28

roots and tubers. (This classification is interpreted to include bananas and cassava and the other starchy roots that grow in the tropics.) The diets of many of these countries need increases in proteins to be derived from pulses, milk, and meat, fish, and eggs.

In much of southeastern Europe, roots and tubers can advantageously be substituted for part of the cereals consumed. The types of proteins available in pulses need to be substituted for the cereal proteins, and fruit and vegetable consumption needs to be expanded as in the United Kingdom

For China, the increase in starchy foods to provide more calories had best come from roots and tubers rather than from cereals, as in southeastern Europe. The Chinese consume very little milk at present, and one of the mysteries of nutritional science is where the people of China obtain enough calcium to support the growth of the bodies of their children. The consumption of meat, fish, and eggs is very low, but offsetting this is not as important as offsetting the deficiency in milk.

The Indian diet contains much more milk, but still not enough. It is extremely low in animal proteins other than those obtained from milk and needs large increases even in the basic cereals, roots and tubers, and pulses.

To attain these targets would raise the indexes of food consumption of the countries listed in the table, and of several others, as in Table 17. It will be noted that the FAO targets were left as they were so far as calories are concerned, provided that they were already up to the level

TABLE 17.—INDEX NUMBERS OF PREWAR AND FAO TARGET CONSUMPTION

Country	Prewar			FAO targets		
	Food consumption	Calories	Composition of the diet	Food consumption	Calories	Composition of the diet
United States	100	100	100	113	100	110
Canada	87	96	91	99[b]	96	103[b]
Argentina	104	97	107	110[b]	97	113[b]
Mexico	48	59	81	68[b]	80	85[b]
Puerto Rico	47	68	69	60[b]	80	75[b]
Peru	39	64	61	63[b]	80	79[b]
United Kingdom	88	92	96	103	92	112
Belgium	71	86	82	91[b]	86	106[b]
Italy	56	76	74	80[b]	80	100[b]
India	33	62	53	55	80	69
China	35	68	51	55	80	69
South America[a]	70	74	94	80	80	100
Southeastern Europe	64	86	74	76	80	95

[a] Excluding Argentina.

[b] These are estimates made by the authors.

of 80, and those below 80 were raised uniformly to the 80 level. The reason for this was that the FAO committee working on this considered that, once the diet reaches the 80 level of 2,550 to 2,650 calories per year, to get more protective foods in the diet is more important than getting more calories, particularly in view of the fact that so many of the calories above this level are wasted in various ways.

The reader will understand that these targets are goals for the year 1960. They represent the amount of improvement in diets that the committee considered it wise to set as goals to be attained by 1960. Even these, it appears from our analysis, are considerably inflated with optimism, especially on the score of composition of the diet in some of the more fully developed countries.

If with these increases to attain the targets of the prewar populations

are combined the increases in population allowed of 8 per cent for the United Kingdom to 1960, 15 per cent for China, and 25 per cent for India, the total increases called for are those shown in Table 18. The data in this table are taken directly from the "World Food Survey" except that the target for the United Kingdom has been advanced from 1950 to 1960. The increase in food production to attain even these moderate goals is very large even in terms of cereals and roots and tubers in South America and China, fruits and vegetables in China and India, meat in India, and, above all, milk in China.

TABLE 18.—PERCENTAGE INCREASES IN FOOD CONSUMPTION TO SUPPLY 1960 POPULATION AT FAO TARGET LEVELS (+ OR −)

Food groups	United Kingdom	South America	South-eastern Europe	China	India
Cereals	− 1	+ 70	− 3	+ 15	+ 39
Roots and tubers	+ 8	+ 22	+26	+ 66	+103
Sugar	−11	+ 49	+10	+ 15	+ 25
Fats and oils	+ 2	+ 65	+31	+ 58	+113
Pulses	− 3	+ 70	+93	+ 59	+ 84
Fruits and vegetables	+15	+ 73	+78	+ 327	+330
Meat, fish, and eggs	+ 8	+ 59	+11	+ 45	+305
Milk	+60	+184	+77	+5,650	+ 60

Again it is highly important to keep firmly in mind that these FAO targets assume raising only *average* consumption to the moderate-cost levels. If they had raised to the average level the diets of the half the population living below this level in each country, the indexes would have been raised very greatly—proportionately more in most of the countries than the difference between 109 and 126 that Schickele figured out for the United States, or between the 109 and 133 that Cochrane figured out in terms of high-level consumption, or between 109 and the 116 that Wells figured out in terms of the best adapted diet.

Now let us consider the ability of the world to produce the foods needed under the two foregoing assumptions, the first based upon growth of income and ability to buy and expected population growth, the second, upon foods needed to meet certain targets, or goals, and expected population growth.

It will be remembered that the analysis in terms of the world as a whole in Chap. VII indicated that the 1960 targets could be met from the present farm lands only in the case of cereals and roots and tubers. The yield increases upon which this conclusion was based are exemplified

by the following: For the United States, an increase in wheat yields from 12.4 to 14.6 was estimated. Parallel increases for Russia were from 10.0 to 12.0, for India from 10.7 to 20.0, and for China from 14.9 to 18.0. The large increases allowed for India and China recognize the deficiencies in nitrogen in these soils that have been cropped for centuries in rotations providing inadequate green-manure crops and livestock manures. The lower yields and smaller increases for the United States and Russia recognize the limiting factor of rainfall on the semiarid wheatlands of these countries. The increases in corn yields forecast for the United States were from 28 to 37 bushels, for Russia from 16 to 20 bushels, and for India from 13 to 20 bushels. The increase in potato yields allowed for the United States was from 124 to 150 bushels, for China from 100 to 150, and for Russia from 121 to 180. Striking differences appear in the present yields and assumed increases for the rice crop. For India, the increase allowed is from 26 to 40 bushels; for China, from 52 to 70 bushels. Two crops a year are grown on much of these ricelands.

These yield increases are recognized as conservative even though they do allow for large increases in the applications of nitrogen. Further developments in planting, breeding, and pest control may increase yields much more over the centuries. The potato yields allowed seem very conservative if measured against the 300 bushels commonly obtained in Aroostook County, Maine, in the United States (403 bushels in 1946) and still larger yields in many areas in Europe. Much of the potato-growing land of the earth, however, does not have the soils or rainfall required for very high potato yields. The character of the Maine soils that makes the high yields possible is best described as high capacity for the use of fertilizer. From 1 to 1½ tons per acre is now commonly applied. The lighter soils in Michigan and Wisconsin with less certain rainfall during the maturing period do not warrant the use of more than one-fourth as much fertilizer.

The possibilities of increasing food production by bringing new land into use needs to be considered very carefully from the standpoint of where these lands are located. It will be remembered that 1 billion acres of the possible new lands were Red soils of the tropics and subtropics. These soils occupy an estimated 28 per cent of the world land area. Probably less than 1 per cent of them are under cultivation, but probably less than 20 per cent of them are suitable for cultivation. Where are these located? In the northern half of South America, in the great tropical center of Africa, and in the great islands of Sumatra, Borneo, New Guinea, and Madagascar. Similarly, the 300 million acres of Podsols are located almost wholly in the northern part of North America

and of Asiatic Russia. Probably not over 10 per cent of the Podsols of the world are now under cultivation, but no large fraction of them is suitable for agriculture because of rough topography and stoniness. It thus appears that the new lands are not favorably situated with respect to present population masses. Hence a large amount of frontier development will be needed to bring them into use, which will call for large migrations of population and investments of new capital. Then, if these lands are brought into full production, a large volume of international trade will be needed to make their products available to the industrial populations of other regions.

A corollary of the foregoing is that, if the older countries of the earth are taken one at a time and analyzed from the point of view of potential new farm lands, only in a few of them will any large opportunities for expansion appear. The opportunities are larger by far in the United States than in the countries of Europe. Few of the European countries have the large areas of cutover and abandoned farming land that can be brought into more productive use by the methods described in the preceding chapter. Small acreages of timberland can be brought into crop use in the northern sectors of Russia, in Finland, and in other parts of Europe, but only with careful cropping to prevent erosion.

As for the Red soils of the tropics and subtropics, much more is involved than simply converting them to crop use. Many difficult problems of sanitation and disease and pest control must be solved.

It may be of interest to consider the fertilizer needs of a food-production program such as is involved in the foregoing. The projected new lands are all of types that require the very liberal use of fertilizers, and the increases in yields in the past 50 years on lands already farmed have been in large measure based upon freer use of fertilizers. The programs described in Chap. XIII that would meet the 1960 targets for cereals, roots, and tubers but scarcely that for other products call for about *eight* times the present consumption of phosphate and nearly *eight* times the present consumption of potash. The known world reserves of phosphate would last more than 5,000 years at this rate, but the known reserves of potash only 500 years. The earth's surface has not been thoroughly explored for these minerals, and doubtless the actual reserves exceed the known reserves by a large margin. As far as nitrogen is concerned, it can be produced almost without limit, except for requirements of power and heavy investments of capital in converting water power to such needs.

It follows from the foregoing that, except in the newer countries and in those with possibly expanding frontiers, the foods needed for a continuously expanding population cannot be produced. In some of them,

the foods needed for adequate diets for their present populations cannot be produced within their own boundaries. Many countries are therefore forced into a set of such alternatives as the following:

1. Expanding their industries and exchanging the products of their industries with other countries for food.
2. Checking the rate of growth of their population.
3. Subsisting on inadequate diets.

As made clear in Chap. VII, the first or second of these alternatives, or some combination of the two, is within the reach of all nations.

XVI. FOOD DISTRIBUTION

To the groups at the League of Nations that set up the Mixed Committee on Nutrition, the problem of getting food for the malnourished seemed to be largely one of distribution. What appeared to be lacking was an ability to get the foods distributed and consumed after they were produced. The Hot Springs Conference took a longer and larger view of the problem. Many of its participants came from countries in which food-producing resources are highly limited, and the surpluses that had worried the Mixed Committee came to be considered by them as more or less temporary. Increasing the volume of production therefore came in the end to receive priority in the resolutions. The resolutions in the "Final Act" did, however, cover two phases of distribution, one the unequal sharing of the food supply among different economic classes of the population and the inability of some classes to obtain foods that they need and the other the inadequacies of marketing facilities and inefficiencies of marketing processes.

Under the first of these heads, Resolution XXVI entitled Special National Measures for Wider Food Distribution calls attention to the large numbers of families even in the most prosperous countries who cannot afford to buy enough good food even in periods "when agricultural prices have been low and when large supplies of food have piled up in warehouses or rotted in the fields." It therefore recommends "some form of direct action to make protective foods available free, or at low prices, to groups with inadequate diets" and "special attention to assisting such groups as pregnant women, nursing mothers, infants, children, aged persons, invalids, and low-paid persons."

Resolution XXVII then calls for similar measures on an international scale to take care not only of famines following catastrophes but also of persistent inadequacies of food supply in some countries. "Relatively little attention has been given in the past to the possibilities of developing special measures for wider food distribution in the international field. It is generally agreed that it would be desirable if arrangements could be made whereby a part of current world food supplies could be used to supplement the national food-distribution programs of certain countries." And another resolution calls specifically for studies of the possibilities of the use of international commodity arrangements for the purpose of

supplying consumption needs from the most efficient sources of production when these sources happen to be in other countries and thus taking advantage of the economics of international division of labor in food production.

The resolution having to do with marketing facilities calls for restoring those destroyed by the war and hastening technological developments in food preservation, processing, and transport. That having to do with marketing processes calls for expansion of the government services provided in most countries, such as grading and standardization and market news, and for providing these on an international basis so that foods can move more freely in the channels of international trade. Resolution XXX then calls attention to the large fraction of the total cost of food that is absorbed in assembly, grading, inland and ocean transport, storage, wholesale and retail distribution, processing costs, the rewards of enterprise, and, in some countries, the provision of "nonessential services" that increase the margin between the producer and the consumer and asks for a reduction in marketing costs or margins, which will "benefit both producer and consumer alike."

Finally, Appendix 3 is devoted entirely to the Facilitation and Improvement of Distribution. Conviction is expressed in this appendix that

> . . . the automatic equilibrium among economic forces that is supposed to assure the full and most advantageous utilization of the world's human and material resources is not based on fact. Among the forces that interfere with the maintenance of equilibria are the natural differences between the conditions of production in agriculture and industry. The farmer is at the direct mercy of the elements and the seasons.
>
> Sudden fluctuations in the conditions of supply, or in demand, frequently lead to situations in which there is either too little or too much of his product.

A final section of this appendix develops further the thinking with respect to measures for wider food distribution. It speaks of the substantial progress along this line made in some countries in providing food either free or at low prices to such groups as "expectant and nursing mothers, invalids, children, infants, aged and low-paid persons" and refers to the need, during the period when steps are being taken to develop the industry and agriculture of a country, for providing food for large numbers of people who may suffer from chronic malnutrition or who may have difficulty in getting enough foods of the proper kind. It then suggests the use of such outlets as school lunches, factory canteens, low-priced restaurants, milk stations, and stamp plans. The final paragraphs, however, revert to the need of improving the marketing, processing, and distribution of farm products and describes them as being "less spec-

tacular than some other measures designed to raise nutritional levels" but nevertheless highly important in realizing the objectives of the conference.

The generalizations in the Hot Springs report will be more meaningful if they are supported by pertinent facts and analysis. For example, it will be helpful to consider the simple facts as to magnitude of food distribution as compared with food production. In the United States around 1913 to 1915, the statistics show that 46 per cent of the consumer food dollar went to the farmer. The rest went to transportation, storage, buying and selling, and the other middleman activities. This percentage declined in the early years of the First World War because farm prices rose faster than transportation rates and middleman margins, but it fell off to 40 per cent in the postwar depression of 1921 to 1923. After some recovery, it then fell off to 32 per cent with the very low farm prices of 1932. In the immediate prewar years it had returned to a level of around 39 cents. With the subsequent rise in prices, the percentage rose to 55 at the peak. No doubt the Office of Price Administration (OPA) program of putting ceilings on prices had much to do with the attainment of this high level—these held retail prices down while farm prices were rising. One might assume that the marketing agencies lost money as a result, but the evidence runs to the contrary. They handled a larger volume with less labor and other inputs and furnished less services with the goods. Whether this 55 per cent of the war years and postwar years to date will return to 39 per cent depends in considerable part upon the level to which prices of farm products fall. If such prices are kept above 90 per cent of parity, as under present legislation, around 45 per cent is likely to be the lower limit of the farmers' share of the consumer dollar.

The drop from 46 to 39 cents in the farmers' share of the consumer dollar in the 25 years between 1913–1915 and 1938–1940 is highly significant. It means that the farmers were getting 7 cents less and the marketing agencies 7 cents more out of each dollar paid by the consumer for food. Or, stated more exactly, the 7 cents added to the 54 cents that the middlemen were getting before was a 13 per cent increase, and the 7 cents less that the farmers were getting was a 15 per cent decrease.

This trend is in keeping with trends for other commodities bought by consumers. Stewart and Dewhurst in their excellent study, "Does Distribution Cost Too Much?" (1939), found that between 1900 and 1940 the number of gainful workers employed in distribution in the United States increased 160 per cent and the number employed in production only 40 per cent.[1] From 1920 to 1940 the number of gainful workers in

[1] The Twentieth Century Fund, New York, 1939.

distribution rose nearly 50 per cent, while the number in production was not rising at all. The volume of goods handled per worker in distribution actually declined from 1900 to 1940, while the volume of goods produced per worker was rising 90 per cent. Stewart and Dewhurst estimated that 59 per cent of each dollar spent by final consumers in 1929 for all goods and services went to transportation, storage, buying and selling, and the other middleman activities. Their method of figuring included a little double counting, however; if this is removed, the fraction would be 51 per cent. Of this 51 per cent, only 13 per cent was paid for transportation, by railroads and other public carriers, leaving 38 per cent as going to marketing agencies as such.

The spread between producer and consumer prices is much higher for some commodities than for farm products, for example, for such goods as household furniture and jewelry. Department stores put a markup of around 60 per cent on women's dresses offered for sale in the regular season—they have to take less at postseason clearance sales. However, the margins are definitely lower for some other nonfood commodities. The average for all commodities combined seems to be about the same as for food.

Of course, the range is very wide among foods. In 1945, the farmers were receiving 75 per cent or more of the consumer dollar spent for butter, beef, and eggs as compared with 61 per cent for milk, 50 per cent for apples, 41 per cent for oranges, 31 per cent for canned peas, 30 per cent for cabbage, and 19 per cent for white bread. Of course considerable processing cost and costs of some other materials entered into the margin on bread. The factors determining the spread of the different farm products are mainly volume of the product handled, the size and frequency of individual consumer purchases, the processing and packaging costs, and the wastes and losses; but differences in efficiency of the distribution system may also be an important factor.

Why have spreads between primary products and consumers' products been increasing since 1913? A number of valid economic reasons can readily be named, such as the longer haul for some farm products when production settles down in more distant areas having comparative advantage in production. Thus the shifting of fruit and vegetable production to California, Florida, and the other Southern states and of potato production to the western irrigated valleys has raised distribution costs. Similarly, the growth of cities makes it necessary to haul large volumes of products longer distances and distribute them over wider urban areas. Other such factors are the increasing amount of processing, with more use of bakery products and of canned, frozen, and dehydrated fruits and vegetables; the increasing amount of packaging as distinguished

from bulk handling; the smaller size of the individual purchase with smaller families and more apartment living; and the large increase in services furnished with the goods that has accompanied the rising standard of living in the United States.

But these factors by no means furnish the whole explanation. The essential operations in commodity distribution are the actual selling and buying, the getting together of the buyer and the seller and negotiating the transfer. These can be done very efficiently, as happens, for example, when a satisfied purchaser of a commodity under an annual contract simply renews the contract each year. Thus the members of a large mutual insurance company are able to obtain renewals of their contracts each year by nothing more than filling in a short form. The highly inefficient types of selling are illustrated by the selling of durable consumers' goods sold by house-to-house salesmen, and the like. Stewart and Dewhurst make some very pertinent observations on this point.

> For decades the inventive genius of American business has been chiefly dedicated to the lowering of production costs through mechanization and scientific management and to the elimination of inefficiencies in making goods. The results have astonished the world. It is equally true that the same inventive genius has hardly begun to be applied to the reduction of distribution costs. Originality and inventiveness have not been lacking in distribution, but in this field they have been used all too often to persuade people to buy more goods rather than to reduce their price.

Competition also works out in such a way as to provide a large volume of what are called nonessential services in the Hot Springs report. Even though these may not be essential, they may be worth all they cost to families with comfortable incomes. The point is that a great number of families with inadequate incomes find themselves paying for them merely because a minority of the well to do prefer to do so. Competition in this field works out in such a way that minorities rule. Thus a milk-distribution company in order to take customers away from its competitors may offer the service of extra deliveries of milk and cream for those families who find they need additional supplies after the regular morning delivery. This is a convenience for housewives and may save them a trip to the nearest store, or an extra delivery by the local merchant. No doubt, such service will appeal to a small fraction of the consumers, and they will begin to shift to the distributor offering it. The final result is likely to be that the competing firms offer the same service in order to keep their customers, and presently milk wagons will be seen on the streets at all hours of the day. This is no hypothetical case; it actually happened in one of the large cities of the United States. As a result, all the milk

consumers except those who shifted to store purchases found themselves paying an extra cent or more per quart for this service. In much the same way, many of the services now furnished with goods by retail merchants have now been loaded upon the American consumers.

Thus the most important single truth about consumer markets nearly everywhere is that minorities rule. If a small fraction of the buying public wants a new service, first one merchant offers it, and then another, and presently the majority of consumers are all paying for it. But this majority would not have voted for it if it could have had a choice between the extra service and the lower retail price. The minority fraction that wants this extra service and gets it is, of course, the well-to-do minority. The big majority that does not want it but has to pay for it includes all the lower income families. We have heard a great deal about "consumer sovereignty" in recent years. In the consumer market, this sovereignty is used to vote more and more services for the select well to do. This is, of course, the very reverse of the situation in our medical system, according to which the well to do pay extra and by so doing commonly make possible some medical care for the poor and indigent.

By such a process, there has been added to the task of the independent retail grocer an increasing amount of delivery and credit service, selling and delivering in smaller and smaller amounts, more and smaller packaging, fuller lines of fancy groceries, more and more year-round fresh vegetables, and more and more brands. (Of course, many of us like all these. We should not like our grocery stores without them. But *we* can afford them—although no doubt some of us also would do without part of them if we had to pay the retailer markups really required to cover what it cost the grocer to provide them. As it is, the rank and file of lower income customers are paying additional markups on the goods which they must have so that some of us can have the extras which we want.)

The most expensive part of the retailing service rendered takes the form of providing the public with the convenience, not only of a grocery store only a few blocks away, but perhaps a half dozen to choose among. How do we get such a multiplication of retailing outlets? First of all, almost any location for a new grocery store is handier for some buyers than the store locations already occupied. Second, most of us are always trying out something new, even if it is nothing more than a new grocery store with a new front or window display. This is enough to give the new store an initial start. The number of stores that never get much beyond this stage is pretty large. But enough get beyond it so that another store is added at most trading corners every few years. Of course, the business that the store gets is largely taken away from the older stores,

and this may force the weakest one to quit. But often it does not. Instead, margins are stepped up little by little so that the older stores and the new ones manage to hold on, and the final result is that the community is supporting one more store. A roughly similar situation prevails in the wholesaling and jobbing field. These operators find themselves furnishing more and more services to the retailers, and also new ones manage to crowd in among the old ones and gradually raise margins.

One may ask why competition does not eliminate some of these nonessential services. Often it does have this effect for a while. The major example of this is the emergence of the chain-store system, with delivery and sales on credit eliminated. These systems expanded rapidly for a decade or two until they had reached most of the families that were willing to save as much as could be saved by doing without credit and delivery service. The chain-store system was in a position to introduce some large economies in buying, warehousing, and the like, and these in part they passed on to the consumers. But part of the savings went into large profits, and these induced a number of rival chain systems to start in business. When the point was reached at which the competing chain-store systems were unable to expand further on a limited-service basis, many began to try to attract more customers by rendering some of the services of independent stores, with the result that chain-store costs and margins began to rise. This provided an opportunity for another competing system to arise, namely, the supermarkets, which were able to reduce costs by getting the customers to buy more at each visit to the market. However, these competing systems replaced the old systems only in part. In fact, the first effect of the appearance of both these new systems has been to increase the number of retail outlets. The new chain stores set up in the 1920's were in large part simply added to the numbers of independent stores already in existence, and only gradually did they replace part of them. The supermarkets have replaced chain stores more than they have independent stores. In similar manner, the selling of milk through stores does not take very many of the milk wagons off the streets. It tends instead to increase the mileage traveled by a milk wagon in selling a given number of quarts of milk.

Cooperative buying and selling offers promise of reducing distributive margins in some situations. The cooperatives have tended to acquire a larger volume of business than their independent competitors and to force some of these to operate on an equally efficient basis or go out of business. In cooperative buying, one of the important contributions has been getting the consumers exactly the kinds and qualities of goods that have fitted their needs best. This has been particularly important as an aid to farmers buying their supplies of feed and fertilizer. But coop-

eration does not always work in this manner; it may do little more than add one more competing firm.

A few observations concerning the commodity distribution of other countries will be interesting at this point. McNair, Teele, and Mulhearn of the Harvard Graduate School of Business Administration undertook to assemble data on margins and operating expenses of retail and wholesale marketing enterprises in Europe and compare them with similar margins in the United States.[2] A basic figure in such an international comparison of total expenses of retail groceries in 1936 is 15.8 per cent of sales for stores scattered over the whole United States. Comparable figures for retail food stores in 1934 in Germany were 10 to 11 per cent and in Denmark 12.6 per cent and in 1928 in Sweden 11.8 per cent. The total expenses of food wholesalers in Germany in 1925–1926 averaged 10.5 per cent of total sales. The comparable figures for wholesale grocers in the United States in 1922–1923 ranged around 11 per cent. For a small group of general department stores in different countries, the percentage margins ran as follows: United States 33.3; Germany 32.1; Sweden 25.1; England 23.7. It thus appears that, in general, distribution expenses are definitely lower in Europe than in the United States. The most probable reasons for this are the lower levels of wages paid employees and the lower wages reflected in lower rents and building costs. Also, it may be true that some of the more costly services are not provided.

The cooperative-store systems that have been developing in the United Kingdom, Sweden, and other countries operate in many respects like the chain-store systems in the United States. They are set up so as to realize the advantages of buying in larger volume, of standardizing methods of operation, and of restricting the brands of goods that they handle to a limited number of proven worth. Attempts to establish the cooperative systems of this sort in the United States have met with the competition of the chain-store systems, which had already capitalized on these advantages.

Bringing food within the reach of lower income and vulnerable groups in the population is a problem to which distribution must make a major contribution. The American Red Cross follows the plan of supplying families meeting disaster from floods, droughts, and other catastrophes with orders on local merchants. No doubt this method is well suited to the Red Cross type of operation. The Red Cross could scarcely afford to set up temporary distributive machinery whenever it moves into a stricken area. The groups to be served by continuing programs may conceivably need another type of distributive organization. In the depression of the 1930's, the relief agencies of the United States tried various

[2] "Distribution Costs—an International Digest," Boston, 1941.

methods of serving impoverished groups. A common one was to set up depots which dispensed the foods to those authorized to call for them. Such distribution did not prove very efficient, and many evils developed in connection with it. Moreover, it was opposed by the local merchants and the food trade generally. It is clear that some system of distribution is needed that will distribute the particular foods required to malnourished families with as few as possible of the nonessential services. Whether or not this can be achieved through our regular distributing channels is a question that must be answered for each country, and probably for particular regions and population groups within countries.

The general public has not been unaware of the seriousness of our marketing problem, of the increasing absorption of consumer income in the marketing process, and of the burden of this on low-income families. The first explosion over this came in the period around 1910 to 1913. Food prices had been rising faster than other prices since 1880 and especially since 1900. Wages had risen scarcely at all from 1900 to 1910. There was wide discussion of the high cost of living, and this was attributed in large measure to the high cost of marketing. *The Country Gentleman* ran a cartoon that showed a big black splotch with a farmer on one side of it and a consumer on the other and the heading "What takes place in the dark?" This was reprinted and circulated widely over the country. The agricultural colleges came under attack for not helping the farmers with their marketing problems, and professorships in marketing began to be set up for the first time. The professors of marketing busied themselves for the first ten years in collecting data to show "what happened in the dark." The results were commonly published in the form of pie diagrams that demonstrated how big a slice was taken by the retailers, by the wholesalers, by the railroads, and by the country buyers. In 1913 a division called Rural Organization and Markets, and later the Bureau of Markets, was created in the U.S. Department of Agriculture. By 1918, this Bureau had a staff of over 1,000 in Washington and throughout the states helping with problems of grading and inspection, price quoting, market news, and the like.

The next big explosion was when the price of farm products began to break in 1920–1921. Congress set up a Commission of Agricultural Enquiry, which held hearings and published three volumes mostly devoted to marketing. A number of acts were passed by Congress, and most of the states set up departments of marketing. All this movement, however, was in the interest of better prices for the farmer; the consumer was rarely mentioned. The culmination of this legislative movement was the passage of the Hoover Agricultural Marketing Act of 1929, which created

the Federal Farm Board. We shall not take time to write an obituary notice for this Board.

The New Deal legislation beginning in 1933 undertook to raise the prices of farm products by controlling production, but provided little in the way of marketing aids or controls. However, in the guise of distributing surplus food to families on relief, there developed a system of surplus-food distribution that eventually grew into a school feeding program and a stamp program.

With the end of the Second World War came a new burst of interest in marketing, differing from that engendered in 1920–1921 in that it arose in anticipation of the appearance of surpluses at almost any time and a sharp break in prices of farm products. Congress in 1946 passed the Hope-Flannagan Act, now technically called the Research and Marketing Act of 1946. The method by which it is proposed to improve marketing under this new program is to conduct a large volume of research, particularly in the utilization of farm products, including the substitution of industrial for food uses. Amazing statements are being made as to what marketing research can do to protect the farmers against loss of income. Nine million dollars was appropriated for carrying out this act for the fiscal year beginning July, 1947, and increasing amounts are authorized in succeeding years until a level is reached that will make about $1,000,000 a year available in the state of Texas and $200,000 in Massachusetts.

Meanwhile, those who are faced by the task of conducting this research have few illusions as to how much they can accomplish along these lines in a short time. None of the methods of research and extension now employed in the field of marketing will reduce consumer prices and increase the farmer's share in the consumer dollar at any startling rate. Research will need to be unusually effective in marketing if it offsets the rises in wages and rents that are in prospect. Only a departure from established methods of marketing and concentration of effort on the kind of marketing organization that will integrate more effectively the various steps in the marketing process and adapt marketing services to the needs and interests of consumers can achieve any large gains.

One of the most promising lines that such research might take would be to develop standardized grades for food products of all descriptions and forms of informative labeling. The consumers would then know exactly what they are buying and would be saved the expense of a vast amount of sales effort directed toward inducing them to buy particular brands of foods that are no better than any standard grade ought to be. One of the things that democracy means in the economic sense is what

economists call "perfect competition." Such competition exists when all the buyers and sellers are all fully informed about what is being bought and sold and about supply and demand. Under the democratic system that we presume we have, *every buyer of food or anything else has a right to know exactly what he is buying.* This is what *free* enterprise really means. Unfortunately, many of those who shout "free enterprise" the loudest do not want consumers to know what they are buying and are doing their utmost to delude them.

It should be apparent from what has been said, however, that no reforms of our present marketing system in prospect are going to meet the situation which faces social workers and doctors when they set out to improve the health of the large low-income fraction of our population by getting them more of the right kinds of food to eat. If employment can be kept at a high level, the number of low-income families will be kept from mounting; but still there will be many who do not have enough earning power to feed themselves properly. The only conclusion that can reasonably be reached is that the needs of this situation can be met only by supplementary food-distribution methods. Let us consider these briefly, one at a time, beginning with school feeding.

In the United States, around 150 million dollars was spent in 1946 in school feeding by the Federal government and local governmental units combined. The National School Lunch Act of June, 1946, authorized an increase of a half in the Federal allotment for such feeding. The major reason why school feeding is favored is that it has high educational value. The children learn in the most effective way, by doing, at a time in life when they are forming lifetime food habits. They also carry these new habits into their homes and thus change the food patterns of their families and later of their own households. Because of the high effectiveness of school feeding, the foods served need to be carefully considered from the standpoint of how they fit into the economy of both food production and food consumption as projected into the future, since the habits formed will have their effect far into the future. So far as feasible, the food served should even be adapted to the income and occupational groups in the school district or part of the city served by the school.

There is also strong support in many quarters for programs designed to supplement the diets of expectant and nursing mothers and children of preschool age in low-income families, to the extent of supplying them with a few of the highly essential foods, including especially milk, orange juice, and cod-liver oil. The number of stillbirths and maternal mortalities has been considerably reduced by such programs in Great Britain and elsewhere. The period between weaning from the breast or bottle and starting in school is a critical period in the life of many children.

Deficiencies in intake of calcium, vitamin D, and other food elements in these critical early years cause structural or other bodily defects that may never be outgrown. The method of getting foods distributed to such mothers and children is one of the problems of this type of nutrition program. In May, 1946, schools and child-care centers operating child-feeding programs in the United States were receiving supplementary foods from the Department of Agriculture for 2.4 million children. England and Wales have nearly 5,000 infant-welfare centers, which are the main distribution centers for milk, orange juice, cod-liver oil, and vitamin tablets for mothers and preschool children. A recent report is to the effect that 90 per cent of the mothers entitled to milk are receiving it, 54 per cent of those entitled to fruit juices, and 26 per cent of those entitled to cod-liver oil. A number of other countries are evolving programs of this type.

In-plant or in-service feeding may take the form merely of ensuring good midday or night-shift meals for workers; of providing breakfasts for workers who travel long distances to work or do not eat a proper breakfast before reporting for work; or of mid-shift lunches to restore the energies of the workers as well as to afford relaxation. Good collaboration between employer and worker is highly essential, and some degree of joint management is usually arranged. At the peak of the war effort in 1945, around 45 per cent of the workers in manufacturing plants in the United States were provided with in-plant facilities of one sort or another. The percentage was much lower in mining, construction, and trade and transportation. In-plant feeding is still further developed in the United Kingdom, where, during the war, it provided a method of differential rationing.

The stamp program, in operation in the United States from May, 1939, to March, 1945, was designed to make available to families and persons on relief or receiving public assistance a select list of foods that were in surplus in the United States and that at the same time were valuable supplements to the diet. Thus pork was being included in early 1942 because it was relatively abundant and low-priced. These foods were paid for with blue stamps, which were issued free, at the rate usually of 50 cents' worth for every dollar's worth of orange stamps purchased. The orange stamps were supposed to be bought for the full amount of the foods purchased before the blue stamps were available, so that the blue stamps would all be used to buy additions to the diet. At one time the foods on the list included pork, lard, butter, eggs, rice, flour, dry beans, and fresh fruits and vegetables in season. At its peak in May, 1940, the stamp program reached 3,970,000 persons in 345 areas. The average blue-stamp distribution was then at the rate of $40 per person

annually. In operation, some of the orange stamps were used to buy soap and other nonfood items sold in the same stores, and blue stamps were used to buy food normally bought. Perhaps half of the extra 50 cents bought additional food. The program was conceived more largely as a surplus-disposal than as a nutrition program, and it was dropped when food was no longer in surplus.

As stated above, the first method of disposing of surplus foods in the United States was by direct distribution through relief agencies or food depots. These foods were furnished free. The stamp program largely took its place after 1939. In a few cities, however, milk continued to be distributed from depots at reduced prices or free. Milk was distributed in some other cities from wagons to families certified as on relief and to schools to be sold to the children at 1 cent per glass. The milk-distributing companies did this distributing, usually on the basis of bids, and the milk producers commonly received less than the full Class I price.

Hospitals, homes for the aged or indigent, mental and other similar public institutions may share in feeding programs that have somewhat the character of school-feeding programs and somewhat that of direct distribution. In May, 1946, around 565,000 inmates of such institutions were receiving food from the U.S. Department of Agriculture to supplement their other available foods.

The most far-reaching legislation proposed up to 1947 was the Aiken national food-allotment plan introduced in much its present form as a bill in the Senate by Senator Aiken of Vermont and in the House by LaFollette of Indiana, in June, 1945. Under this plan, the government would sell a family enough coupons to buy the basic food allotment, which is essentially the Stiebeling-Ward low-cost adequate diet, for up to 40 per cent of its income. Families with good incomes would find the coupons purchased on this basis costing them more than the food and hence would not buy them. Only the low-income families, those who normally spend more than 40 per cent of their income on food, would save money by buying the coupons, and many of these would not save enough to want to trouble with the coupons. The families really eligible for the coupons would contain fully 40 per cent of the population of the United States under normal income conditions. As to the cost of such a program, Dr. Rainer Schickele estimates a range of 2 or 2.5 billion dollars in severe depressions, to 500 or 600 million dollars in times of full employment.[3] But Senator Aiken does not expect that all the eligible families will take advantage of this program—only two-thirds of the eligibles used the stamp program. Nor does he expect Congress to vote enough funds for a full program, at least at the start. If as

[3] *Jour. Farm Economics*, May, 1946.

little as 1 billion dollars were provided, even in depression periods this would take care of most of the low-income families with severely deficient diets.

The Aiken plan would let families spend most of their coupons for whatever foods they choose. Educational measures would have to guide their purchases. (The bill authorized liberal expenditures on such education.) Many thought that this was a weakness of the plan. This could be remedied in part by designating more coupons as acceptable in payment only for certain foods, such as dairy products and eggs.

The objectives of the Aiken plan are obviously twofold, to promote better nutrition and to provide a larger outlet for farm products. Rainer Schickele, as stated in Chap. XIII, has estimated that the Aiken plan, operating on a full scale in 1941 with all eligibles participating, would have increased food consumption as much as 17 per cent.[4] At 1946 levels of income the increase would have been very much smaller—10 per cent according to his figuring—fewer families would be spending 40 per cent or more of their incomes for food. According to a recent analysis by Cochrane and Masucci, as little as 1 billion dollars spent on the Aiken plan at levels of income such as would prevail if a mild business recession set in now might very well raise prices received by farmers by as much as 7 per cent, if one may judge by past relationships.[5]

An increasingly important part of the food distribution process that we have been discussing is the processing that the foods require on the way. In general, this processing has been able to take advantage of the increasing efficiencies in manufacturing. The selling costs of many of the processing firms, however, have not done so, nor the selling costs of the jobbers and retailers handling the heavily advertised products of processing firms. There is no need to discuss this aspect of the problem further; but there is need to discuss another aspect of processing, namely, the destruction of nutritional values in the foods by the processing and the possibilities of preventing or offsetting this. Wide differences of opinion have arisen even among nutritionists as to the best method of dealing with this problem. Some would put the emphasis on keeping foods as nearly as possible in their natural state while still preparing them for storage and use in cooking; and others say that this need not be a matter of much concern since methods have been developed for artificial restoration of the vitamins and minerals destroyed.

Several important circumstances are involved in this issue. One is that the natural foods probably contain vitamins that have not been isolated, that are destroyed in processing along with the known vitamins,

[4] *Jour. Farm Economics*, May, 1946.

[5] *Ibid.*, August, 1947.

and that are not replaced by restoring the known vitamins. Also, there are probably important balances and linkages among the vitamins in natural foods and between the vitamins and minerals that are broken down by removing some of them. Highly important also is it that the diets which are now prevalent in many regions or countries are no longer largely indigenous to them but rather are based on foods which have been brought into the region and acclimated there—as potatoes, tomatoes, and corn were in Europe—and these may not provide a well-balanced diet. Again, the rice that forms the staple diet in so many tropical and subtropical plantation economies was no doubt the principal food of many of these people before the Europeans came; but in most of them it was not so large a part of the diet as in recent centuries; and the rice has not always been milled and polished as it is now.

The first of these circumstances leads toward recommendations that diets always include liberal fractions of foods not commercially processed and even one or two portions a day of uncooked vegetables or fruits. The second points to the need of careful analysis of the diets of large population groups, especially low-income worker groups, and supplying lacking nutrients as efficiently as possible. This may involve supplementing some diets with synthetic vitamins and minerals. Whatever it means, the distributive system must be such as will get the needed foods actually into the households.

The extreme form of the elimination of food values occurs in the case of processing milk into butter and then discarding the skim milk, as still happens in some situations, or feeding it to livestock. The butterfat reserved for food in this operation is the least important part of the milk—it can be replaced in most ordinary diets by much cheaper vegetable oils. The proteins in the skim milk are the particular types that are most essential for bodily growth and defense against disease. Plants were built during the war for converting large amounts of skim milk to powder, which was used freely in foods for the armed forces of the United States and allied nations and in supplementing civilian diets. It was used after the war in UNRRA and military-government feeding programs. It is now available for expanded domestic and foreign uses. The simplest way of using skim milk powder is in white bread, since it makes the loaf more palatable and more nutritious at the same time. No single nutritional advance would contribute so much to better diets in the United States as including 6 per cent of skim milk powder in bread, the staple food of the mass of the population.

Some favor regulations requiring the use of milk powder in all bakery bread. This could be done, so far as any legal issues are involved, as readily as the requiring of the use of certain vitamins and minerals in

white bread under the compulsory "enrichment" laws now in force in 20 states and in corn products under similar laws in 5 states. But more favor letting education and competition among bakers bring about a general use of skim milk powder in bread; and some of these even favor keeping the enrichment of bread on this basis. To enrich bread under present state laws, however, adds only 24 cents to the cost of a barrel of flour, which makes 320 1-pound loaves, and to add 6 per cent of skim milk powder at 10 cents per pound would cost $1.20 per barrel of flour, or 0.4 cents per loaf.

An alternative is to subsidize bakers in the use of skim milk powder in bread. No cheaper or better form of use of subsidies to improve nutrition in the United States has ever been suggested. Another proposal is to devise a national brand name that denotes the inclusion of milk powder in bread, as "enriched" denotes the inclusion of certain vitamins and minerals, and to prohibit the use of this term, under regulations imposed by the Food and Drug Administration, except when the milk powder is added. A combination of these methods with a vigorous educational program would induce rapid progress in the use of milk powder in bread.

Of some importance in the United States, particularly in the South, and of very great importance in Puerto Rico, the Philippines, and the tropics generally, as well as in China and parts of India, is raising the vitamin content of white rice. In areas where rice is grown, fortunately many farm families still eat it in its brown form and thus escape the deficiency diseases suffered by the more sophisticated populations. Also in southern India, Ceylon, the Malay Peninsula, British Guiana, and the British West Indies, most of the rice is parboiled, which has the effect of driving the vitamins to the interior of the kernels. This process is now being developed commercially in the United States, the product being called "converted rice" or by other names. Also, a method has been developed of impregnating a few of the kernels with a substance that protects the vitamins in these from being washed off in the hot-water rinsing to which rice is usually subjected before or after cooking.

The vitamin and mineral content of processed fruits and vegetables varies greatly. The varieties processed have something to do with this; for example, some varieties of apples have nearly five times the vitamin-C content of others. Methods of culture may also be a factor—vegetables grown in soils low in iron, phosphorus, and other essential minerals are known frequently to be low in these minerals, and the school children living in the soil areas may be anemic as a result. A proper use of fertilizers may help correct these deficiencies. Of the deficiencies in the content of processed food, however, more arise from processing methods

than otherwise. This problem therefore needs to be studied and watched carefully. Some form of regulation may prove to be necessary in the end.

The processing of food also has very great opportunities of a positive character. Foods can be developed that, though highly artificial in character, are very rich in nutrients that are in danger of being low in diets. This need not take the form of adding minerals and synthetic vitamins to them, but rather of using other natural foods that are rich in needed nutrients. Continued effort will develop ways of using soybeans more generally in prepared foods. The inventive genius of the food processors can be expected to accomplish much along these lines over the years.

XVII. FOOD TARGETS

We have sufficiently examined the problems of a national food and agricultural program and may now consider ways and means. One question of strategy must be decided first—how high to set the goals of a food and agricultural program. We have already made free use of the targets set up in the FAO "World Food Survey," but we have not reviewed the bases on which they were set. They are, as a matter of fact, what are called "intermediate goals" in the "World Food Survey" and are referred to in the Hot Springs conference report as "more immediate consumption goals which necessarily must be based upon the practical possibilities of improving the food supply" of the population of the particular country.

The goal that the FAO Committee on Nutrition probably would have chosen, if not these intermediate goals, would have been the equivalent of the National Research Council's Recommended Dietary Allowances for each of the countries, expressed as far as possible in terms of the foods now generally available in them. Such goals are referred to in the "World Food Survey" as "optimum standards" and in the Hot Springs Conference report as "the ultimate goal of food and nutrition policy, dietary standards or allowances based upon scientific assessment of the amount and quality of food, in terms of nutrients, which promote health."

Other goals could have been (1) the equivalent of the Stiebeling-Ward "liberal diet" for the whole population of each country; (2) the equivalent of the Wells "best adapted diet," which would provide nutritionally adequate diets for all classes of the population but would compose the diet for each out of the types of foods within the range of the income of the group; (3) a diet in the *optimum population* sense, that is, the types and amounts of food that a country would have if its population numbers were reduced to the level that would give the highest possible level of well-being for its people.

Goals of this third type would have been the highest of the three by long odds; goals of the liberal-diet type, next highest. The Wells best adapted diet would have given goals definitely higher than those of the "World Food Survey" for most of the densely populated countries and, because of the 10 per cent added to take care of the half below the average

of the group, even a little higher than those of the "World Food Survey" for the United States, Australia, New Zealand, Argentina, the United Kingdom, and the countries of northwestern Europe.[1] The targets that the "World Food Survey" sets for these countries is an average moderate-cost diet for the whole population. This leaves half the countries below this level and many of them well below the level set by the Wells diet for low-income families. Under the Wells diet, the great masses of low-income people have at least an adequate minimum-cost diet.

If the food and agricultural policy and program that we are exploring in this book were a nutrition program only, it might be argued by some that an adequate diet at minimum cost is the only rational goal that can be set; even that the modified Stigler type of minimum-cost diet is the only rational goal. But such an argument overlooks the overwhelmingly important circumstance that human beings are far from being rational—that large numbers of them will spend some of their limited resources and income on more expensive foods and deprive themselves of part of the cheaper foods which they need for adequate diets. Need the reader be reminded that many of them will even spend income on whisky and tobacco that their children greatly need for more calories? This being true, as a practical matter somewhat higher targets should be set.

Moreover, the policy and program here being considered concern the welfare of farmers as producers as well as the welfare of food consumers. Farmers are interested in having those who can afford it spend liberally for the more expensive foods. They would like to see urban families prefer high living in terms of food to high living in terms of amusements, automobiles, clothing, and even housing. A well-balanced food and agricultural program for a nation must supply, out of home production and imports, at least as much of the different kinds of foods as poeple will normally buy with such incomes as they have; and to these amounts should be added for nutritional reasons the amounts necessary to raise to acceptable levels the diets of the low-income and malnourished groups.

The targets or intermediate goals set up in the "World Food Survey" for the countries with high ratios of population to resources are difficult to describe in terms of the foregoing goals. In general, they are well below the Stiebeling-Ward moderate-cost adequate diets, and some of them are lower than the Stiebeling-Ward minimum-cost adequate diets. *They are more nearly in line with what Stiebeling and Ward would have set up as low-cost diets if they had been working these out in the different countries.* The only way one can judge the levels of these targets is to read carefully the principles

[1] For the United States, an index of 116 compared with 113 for the "World Food Survey" target.

and methods that were applied in setting them. The exact description of these appearing in the "World Food Survey" is as follows:

(a) A per-capita calorie intake of 2,550 to 2,650 should be taken as the minimum level to which intake should be raised in the low-calorie countries, and the quantities of additional foods required should be estimated on this basis.

(b) *Cereals.* If calories from cereals fall between 1,200 and 1,800, no change should generally be recommended. If they fall below 1,200, and if total calorie intake is below 2,600, some increase in cereal intake may be recommended unless the total calories from cereals, starchy roots and tubers and starchy fruits, sugar, fats, and pulses exceed 2,000 to 2,100.

If cereal calories exceed 1,800 and total calories are high, the question of decreasing the former should be considered. In deciding the quantities of other foods which in such circumstance can replace cereals, weight must be given to the dietary pattern as a whole and the objective of improving nutrition must be kept in view.

(c) *Starchy roots and tubers and starchy fruits* (for example, bananas, which in composition resemble roots and tubers). An intake of 100 to 200 calories from these foods may be taken as a desirable objective. A larger consumption may, however, be advocated if intake of cereals is low and adequate amounts of protein can be obtained from such foods as pulses, milk, meat, and fish. But where these cannot easily be made available, as for example in certain manioc-eating countries, too high a consumption of starchy roots may seriously lower protein intake.

(d) *Sugars.* In general, no increase in the intake of sugars should be recommended. If calories from sugar exceed 10 to 15 per cent of total calories, some reduction may be considered, with due regard to the dietary pattern as a whole.

(e) *Fats.* Total daily calories from fats (as a separate food group) should be at least 100 and preferably 150 to 200. Intake of fat through the medium of other food groups must be taken into consideration.

(f) *Pulses.* In countries in which pulses are already an important feature of the dietary pattern, calories from this source may well reach 250 to 300 daily. In general, this means countries in which meat supplies are of necessity low (say below 150 calories from meat daily) and sources of animal protein limited. But even when meat calories are as high as 200 to 250, calories from pulses may be pushed to 200 to 250 if this is in general conformity with dietary habits. Pulse intake must be considered in relation to intake of cereals, starchy roots and tubers and starchy fruits, milk, and meat.

(g) *Fruits and Vegetables.* Total calories from these foods (excluding starchy vegetables and fruits) should be at least 100 per capita daily. Preference must be given to leafy green and yellow vegetables and fruits and to fruits and vegetables which are good sources of vitamin C. The quantities of fruits and vegetables recommended should be considered in relation to their nutritive value. If the kinds grown are of low vitamin content, daily calories from this source should be raised. If the reverse, they can perhaps be slightly reduced.

(*h*) *Meat (including poultry), fish, and eggs.* Not less than 100 calories per capita

daily, and preferably 150 to 200, should be derived from these sources. If intake of milk and pulses is high, that of this group can be correspondingly reduced. Fish can replace meat in countries in which the latter cannot easily be produced in quantity and where fish supplies can be readily increased.

(*i*) *Milk and milk products.* An intake of 300 to 400 calories per capita daily represents a desirable minimum level of consumption. In recommending milk-supply targets, weight must, however, be given (1) to existing dietary habits in respect to milk consumption, (2) to the present level of milk intake, and (3) to the possibility of providing certain important nutrients of milk through a combination of pulses and leafy green and yellow vegetables. Small fish eaten whole can supply calcium to replace milk calcium, but this is not the case when only fish muscle is eaten. In countries in which milk supplies are at present negligible or nonexistent. the milk calorie target may temporarily be set at 50 to 100 calories, which will represent a very large percentage increase over existing supplies.

It thus appears that the FAO targets are carefully considered, practical adaptations of the concept of dietary adequacy to the particular conditions in each country.

They have been criticized on two scores: one, that the adaptations have not been properly made; the other, that they should have provided the same level of nutrition for all countries alike. The FAO Committee on Nutrition is ready to accept the first criticism and asks only for help from the different countries in making better adaptations.

The only way to meet the second criticism strictly would be to set up vigorously defined minimum-cost diets of the Stigler type for all the countries. These would indeed be interesting and informative, but they would have no value as targets for at least most of the world. The human race, except when it is starving or close to it most of the time, as in the Malthusian areas, is not going to live like cattle on simple rations of a few foods. Diets set at any higher level are bound to take as given the accepted patterns of food consumption of a country, as did the FAO Committee on Nutrition, and adapt it as needed to make it provide enough of the different nutrients. The most that can be asked is that the margins of safety be as nearly as possible the same for all countries. These margins of safety in a national target must allow not only for enough nutrients to make up for past arrears, as explained in Chap. II, but for large unevenness in the distribution of food between high-income and low-income families and for considerable poor judgment in choosing the foods needed for balanced diets. Obviously there is no scientific way of determining how large the margins need to be in different countries. No doubt the margins allowed are higher for some of the FAO targets than for others. But who can say that they are not in keeping with the situation in each country?

The FAO targets have one other characteristic, which is suggested by the terms "intermediate" and "immediate" applied to them. The adaptations of present patterns of food consumption to make them adequate nutritionally do not in most of the countries go the full distance that is needed. Thus even in the United States they probably do not go the full distance in adding milk to the diets of the South that an ideal national diet would prescribe, and certainly they do not go that far in the United Kingdom targets. They provide only a small fraction of the milk that the Chinese diet needs and of the meat or fish that the Indian diet needs.

Why were the targets not set to go the whole distance at once? Simply because it is better national strategy at the outset of a food and nutrition program to bring the diets of the poorly fed groups up to a fair level than it is to try to raise the diets of all classes at once to an optimum level. A given amount of good food will go much farther in improving the level of health of a whole population if it is eaten by those who need it most than if it is eaten by those already pretty well nourished. The FAO targets were set up primarily as guides to each of the countries in directing their own food and nutrition programs, and it is highly important that they recognize and follow this simple principle of food strategy. As a corollary of this principle, it is much more important that a country like China or India get enough calories for its millions now largely incapacitated because of not eating food enough to provide energy for work than that its other millions now having calories enough be supplied with meat, fish, eggs, or milk. If this principle furnishes good guidance to a nation in the conduct of its own food program, it should be equally valid in any program of international collaboration in providing better diets. Surely there should not be two food programs for a nation, one that its own nationals are trying to promote and another that the FAO is trying to promote.

But someone may point to the targets for the different countries and say that they call for raising the milk consumption of the United States more than that of his country when it is already much higher. Why not? What will help the United States diet most as the next step may be more milk; what will help the diet of another country most as the next step may be more pulses, or even rice.

And as for the general argument that the countries with good diets should share their food with the peoples of the densely populated regions, one has only to point out that, if they had done this in the past three hundred years, most of them would now be down close to the Malthusian level of subsistence. The hope of the world is in the countries that have escaped such a fate and that can now help the rest of the world to escape from it. And if these fortunate countries are not to dissipate their pre-

cious chance to help, they must guard carefully against measures that may seem helpful on the surface but in the end will only drag them down toward the Malthusian level. And the Malthusian countries must guard equally carefully against permitting such mistakes to be made ostensibly in their behalf.

PART III

PROGRAMS

XVIII. THE FOOD AND AGRICULTURE PROGRAMS OF THE UNITED STATES

THE future food and agricultural programs of the world will evolve out of those the world now has. In the main, they will evolve out of those which the world had before the war. Now features added during the war will in some countries be retained, and changes wrought by the war will force changes in programs. In this and the following chapter, the authors undertake to outline the programs that evolved before the war and the wartime changes that seem likely to persist, beginning as heretofore with the United States.

One must be careful not to define the term "program" narrowly to mean only the *public-* or *governmental-action* part of programs. The actions taken by all the farmers of the United States are much more important as parts of programs than those taken by the persons on the pay rolls of governments. This is even more true in respect to consumption. In the field of processing and distribution, private action, especially if by large corporations, as in the food trades, may affect food distribution and consumption tremendously—and even more at times the collective action of cooperatives or other groups. The programs considered, therefore, include individual and collective action as well as public action. In this chapter and the one following, however, the analysis is limited largely to the public-action phases of food and agricultural programs. Chapters XXIV and following will introduce discussion of the private and collective phases of such programs.

The term which has come into ordinary use in referring to public measures needed in order to attain desired ends is *adjustment*. We used it in Chap. XVI in describing the emergence of undertakings to improve agriculture through marketing and in other chapters as applied to production and consumption. Measures to secure needed agricultural adjustments seem to have a certain historical sequence. A reasonable expectation would have been emphasis on production adjustment immediately following the First World War, since the common explanation at the time of the agricultural surpluses was that the food-exporting nations had overexpanded their production during the war. But, as pointed out in Chap. XVI, what occurred instead was a strong drive for marketing-adjustment measures. The early marketing measures were not

concerned in the least with more and better food for anyone. Their sponsors gave no thought to more or better consumption as a remedy for the surpluses alleged to exist.

Not until 1935 did consumption adjustment receive any attention. There were persons who talked about underconsumption as the cause of depressions, and books with such titles as "The Road to Plenty" were written, but their authors were not thinking much about food consumption; besides, they were looked upon as crackpots. The prevailing notion of the agriculture statesmen of the United States and other exporting countries was that they could dispose of their surpluses by dumping them in Europe. Little did they worry about the ability of the importing countries to take their foods and pay for them. They concerned themselves not at all with the adjustments in consumption required in the receiving countries if they were to take more of our exports. The tariff policy of the United States had always made these same bland assumptions. The United States tried to export as much as it could and buy as little as it could in return. And so it was with other food-exporting countries.

The Agricultural Marketing Act, enacted into law in 1929, the first year of the Hoover administration, was designed as a way for the government to help the agricultural cooperatives, and especially to help them to raise the prices of farm products, by creating a set of "farmer-owned and farmer-controlled" national cooperatives that would feed farm products to the market in such a way as to obtain the highest possible price for them, meanwhile loaning them money with which to do this. Also quasi-public agencies, called "stabilization corporations," were set up to do the same thing. To be sure, there was talk about how these cooperatives would make marketing more efficient, but the real drive behind these measures was the use of monopoly position to promote "orderly marketing" and to raise prices.

The purpose of the production-adjustment measures adopted beginning in 1933 was also to secure higher prices for the producers. That they would raise the cost of food to consumers was of little concern. The farmers, it was said, could not be asked to feed the rest of the people at an unfairly low price. There was some talk of orderly production during the 1920's. The "outlook program" was started in 1923. Its conception was that, if the producers of food and fibers were told in plain language, while they were still making their plans for next year's production, what the price outlook was for the different products, they would make the needed shifts. It soon became evident, however, that many farmers needed help in finding out what other products they could best turn to or what was the best rebalance of their production program. Thus the outlook program

began growing into an "outlook and adjustment" program. The adjustment part of this never received much support. At any rate, it did not gain a foothold in time to head off the more drastic production control written into the Agricultural Adjustment Act of 1933.

This act was a catchall measure with a little of all forms of adjustment in it. Even dumping abroad, according to the proposals rejected in the 1920's, could be resorted to and was resorted to in a small way when wheat was sent to the Orient. But the main line of attack was to curtail production, reduce the export surpluses, and raise prices. Producers were bribed into shifting out of the surplus lines or in some cases penalized if they did not do so. From voluntary adjustment, as proposed in the 1920's, the country had turned to enforced adjustment.

The original Adjustment Act itself contained no provisions for aiding farmers to shift in the right direction. Any help the farmer got in this respect came from the Agricultural Extension Service. Some of the drafters of the measure, however—and certainly some of those called upon to administer it—had a strong interest in getting sound production programs substituted for the old ones. It is no misstatement to say that this group was responsible for the middle "A" in AAA and that the *adjustment* they had in mind was adjustment, not just out of cotton production, but also into other more desirable lines. Howard R. Tolley and his group in the Program Planning Division of the AAA worked out an analysis of these adjustments in terms of the Stiebeling-Ward diets at four levels of nutritive content and cost, and they pointed out the need for shifting considerable of our production away from cereals and cotton toward dairy products, meat, eggs, vegetables, fruit, and other protective foods.

Then when the act was largely redrafted in 1936 and Tolley was put in charge of its administration, the bribes to farmers were conditioned upon the crops and products *to which* the farmers shifted as well as those *from which* they shifted. It therefore became, on paper, a full-fledged two-way production-adjustment program. Those who administered it needed to concern themselves almost as much with the crops expanded as with the crops contracted. The basis for the payments, however, it is highly important to make clear at this point, was not *consumption* needs but *soil-conservation* needs. These two needs, fortunately, ran together a good part of the way. This was not wholly a coincidence, for Tolley and his program planners had consumption needs also in mind. But this was not true of many among those who were finally responsible for enactment of the Soil Conservation and Domestic Allotment Act of 1936.

The qualification "on paper" (above) needs clarification. In operation, the 1936 act realized only in minor measure its possibilities. For

one thing, too many of the producers of the basic crops were not much interested in substituting other crops for cotton, wheat, tobacco, corn, and rice. They were willing to grow fewer acres of these *provided* that they got a satisfactory income from the fewer acres. Then, when the new price declines came in 1938, they converted the 1936 act in good part into an instrumentality for passing out checks while they kept on producing altogether too much as they had before.

Was this a "scarcity" program, or was it not? In final effect, it certainly was not. Agricultural production was as large in the United States in 1940 as it would have been with no AAA program. Moreover, the program was a little better balanced as a result, and the land was in better condition. Wartime production has been larger and better distributed because of the AAA program. But what about *intentions?* A majority of the AAA staff members—Federal, state, and local—and some of its high officials have been scarcity-minded and have sold their ideas of this sort to a million or so of our farmers. The most favorable statement of their position that can be made is that they have held to the general philosophy that industry manages to reduce its output when prices sag and that agriculture must learn how to do the same thing and needs the help of government in doing it. The best statement of the position of those who have thought like Henry Wallace and Howard Tolley is that they have wanted to reduce total output of food calories but increase the output of proteins, calcium, vitamins, and minerals in the form of protective foods. They realized that this would raise the general level of prices of farm products; in fact, they believed that farm incomes were unbearably low and needed to be raised. And they recognized that consumers would need to have more purchasing power to buy this more expensive combination of foods. Hence they favored a consumption-adjustment program to go with the production adjustment.

The major consumption-adjustment measures undertaken in this country until the time of the Second World War were of the indirect educational type, such as the work of the home-demonstration agents of the agricultural extension service. These educational measures have played a large part, merely to illustrate, in the increased use of dairy products in this country. They have contributed much more in this country in the last twenty years to the increased consumption of citrus fruits and green, leafy, and yellow vegetables and tomatoes than has heavy advertising to the increased consumption of citrus fruits. The increases in acreage between 1919 and 1939 shown in the accompanying tabulation were without the aid of any advertising programs. Spinach is not included in this list because some might say that it has been well advertised by "Pop

Eye." Its acreage increased 590 per cent. The parallel increase for the greatly advertised citrus fruits was only 106 per cent.

	Per Cent		Per Cent
Tomatoes	64	Asparagus	300
Celery	80	Green beans	310
Green peas	196	Lettuce	475
Kale	290	Carrots	745

The first direct public measures taken in this country to secure a wider distribution of surplus farm products were for wheat and cotton, through the American Red Cross, in 1932. The 1933 adjustment act expressed a little solicitude for the consumers but provided nothing for them except that it permitted use of the income from the processing taxes to be used for diverting surpluses of agricultural products to domestic-relief purposes and to expanding domestic and foreign markets. Part of the meat and lard from the pig-slaughtering program of 1933 and of the meat from the cattle-purchase program in 1934 found their way into relief channels. Then, in 1935, specific provision was made for using up to 30 per cent of the customs revenues of the country for diverting farm products "outside the normal channels of trade and commerce."

The object of these provisions, of course, was mainly to take these products off the market and keep them from depressing prices. But two other circumstances figured in the growing support for such measures. First, it was hoped that people on relief would form habits of using these foods, especially the school children. Second, the congressmen were not very happy, after all, about having want and surplus in such close juxtaposition.

The direct distribution of food was objected to increasingly by the retailers—it was encroachment by government. As explained in Chap. XVI, the retailers proposed the stamp program as a way of using them to do the distributing; and Secretary Wallace and Milo Perkins took them up on their offer. The stamp program made possible larger public acceptance of relief distribution of foods. It and the school-lunch program became the two principal outlets for surplus-food distribution.

Even at its peak just before the war, the amount of money spent on food distribution equaled not more than a fifth of what was being spent by the AAA, not to mention the advances to the Commodity Credit Corporation for the purpose of supporting prices. And in the last few years before the war the diversion programs met objection from the farm bloc because the appropriations for them began to come up in Congress in such a way as to suggest that they were taking the place of appropriations for benefit payments. The farm-bloc congressmen preferred a check in the hand of

the farmer and price bottoms at 90 per cent of parity to the less tangible gains of improved prices from surplus diversion. Even the school-lunch program came to be opposed.

Yet a good basis can be established for the judgment that, if the half billion dollars or more a year spent from 1933 on for production-control bribes and rewards for improved practices had been used for the diversion programs instead, this would have added fully as much to the income of the farmers and in addition the low-income families of the country would have had the food to eat.

The ways and means of consumption adjustment, however, have been very little developed. Disposing of occasional surplus foods for such a purpose is only a makeshift. When the war broke out, the nation still had ahead of it the task of developing systematic procedures for ascertaining the nutritional deficiencies of its people by areas and groups and of helping them to make the adjustments that would correct these deficiencies.

The real purpose of most of the adjustments that have been outlined, one can say without distorting the truth greatly, was better prices. Marketing adjustment was first chosen as the instrumentality by which to achieve these better prices, and later production adjustment. Increasingly after 1935, the two were combined. Consumption adjustment when it emerged was made to fit into the same pattern. "Parity" was made the yardstick by which to determine the desired level to which prices of a list of "basic" farm products should be raised. The basic crops were wheat and cotton, corn, tobacco, rice, and peanuts. Parity prices were defined as the prices of farm products that would have the same purchasing power as the same products had in the 1910–1914 period chosen as a base. Purchasing power was measured by index numbers of prices paid in the current year as compared with prices in the 1910–1914 base period. The Agricultural Adjustment Act of 1933 specified that its administrators were to raise prices of farm products toward parity at as rapid a rate as possible without disrupting the economy too seriously. The AAA program was strongly supported by the farmers during 1933–1937 while the parity ratio was rising from close to 50 in the winter of 1932–1933 to 91 in 1937. The farmers in normally Republican states who had been drawn away from their party in the November, 1932, elections voted Democratic again in 1936. But they flocked back to their party in the congressional election of 1938 when the parity ratio dropped to 76.

Fitting into the program of raising prices toward parity were the activities of the Commodity Credit Corporation in buying farm products and holding them off the market. This procedure became regularized with

the inclusion of Secretary Wallace's ever-normal granary in the new act passed in 1936, called the Soil Conservation and Domestic Allotment Act. This granary program provided loans "without recourse," that is, loans upon which collection was not to be enforced and which the farmers were not really expected to pay unless the market price rose higher than the loan value. At the start, these loans were made at 52 per cent of parity

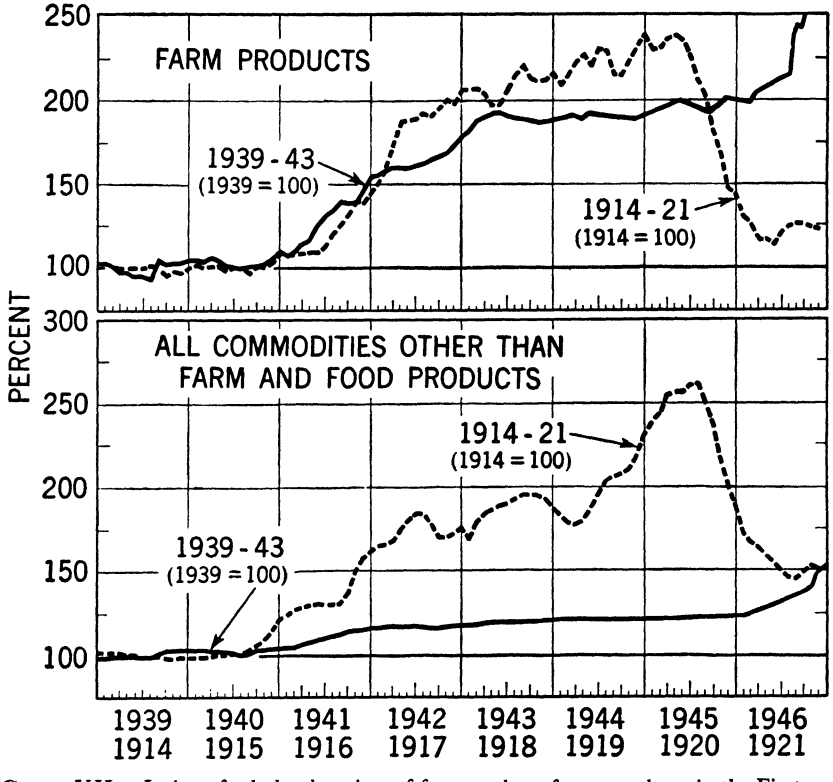


CHART XII.—Index of wholesale prices of farm and nonfarm products in the First and Second World Wars.

prices. In Public Law 79 of May, 1941, Congress raised the loans to 85 per cent of parity. Wheat, cotton, and corn prices at that time stood at 69, 72, and 79 per cent, respectively, of their parities.

The strictly war measures consisted of a combination of price supports and price ceilings under which farm prices rose as in the upper section of Chart XII and other products rose as in the lower section. The supports were included in Public Law 79, already mentioned. The Steagall Amendment, Public Law 147, of July, 1941, required support at "comparable" prices for any other products that were considered necessary for

the prosecution of the war. Comparable prices for the nonbasic products were calculated by the Department of Agriculture by allowing the same increases over their 1934–1939 price as the average increase in the same period for the six basic products. The Stabilization Act passed in October, 1942, despite President Roosevelt's request that farm prices be restored to parity, provided that no ceilings on farm products should be set below 110 per cent of parity or at some alternative levels that were still higher. This act also provided that prices were to be supported at 90 per cent of parity (92½ per cent for cotton) for 2 years after the war was officially declared to be ended.

The ceilings on farm and other products were established by the OPA under the Emergency Price Control Act of January, 1942. It was under this act that the OPA issued the General Maximum Price Regulation, effective in May, 1942. This undertook to flatten out prices at the level of the preceding March. This general blanket procedure was understood from the beginning as a temporary device to serve only until ceilings could be established on the basis of fixed margins. The upper section of Chart XII shows clearly the points at which the original and subsequent regulations were imposed and their effects. The OPA was restricted in setting ceilings on farm products not only by the Stabilization Act of 1942 but also by the requirement that no ceilings on farm products should be imposed without approval of the Secretary of Agriculture. This was interpreted as applying to prices of farm products at the farm or local market but not to processed farm products. History will have to report that the OPA did a remarkable job of holding even farm prices in line, in spite of the checks imposed upon it, from 1942 to 1945 and that prices skyrocketed when OPA was broken up in 1946.

Prices of farm products are being supported at this writing on the basis of the 90 and 92½ of parity provided in the Stabilization Act of 1942. All ceilings except on sugar were removed finally in the fall of 1946.

Although price enhancement was the essential objective of the control programs from 1933 until the war, and price support during the war, the associated effects on production need to be noted. So far as the basic crops are concerned, the effects were very direct. Each participating farmer was assigned acreage quotas based on his acreages in precontrol years, in return for which he received bonuses derived from taxes per unit of product collected at the processing point. Presently this procedure was declared unconstitutional, but the new legislation substituted continued the use of quotas calculated on a historical base. The bonuses now paid out of the public treasury were reckoned on the basis of normal yields on the alloted acres. Also, "agricultural conservation payments" were made according to the number of acres shifted from soil-depleting to

soil-conserving or soil-improving crops, and for specific soil-conservation practices. These practices included applications of lime and fertilizer, seeding to legumes, winter-cover and green-manure crops, strip cropping, terracing, pasture improvement, and the like.

TABLE 19.—CHANGES IN ACREAGES AND YIELDS OF PRINCIPAL CROPS UNDER THE AAA AND DURING THE SECOND WORLD WAR
(Acreages in thousands)

Crop	1925–1932		1938–1940		1944–1496	
	Planted acreage	Yields per harvested acre	Planted acreage	Yields per harvested acre	Planted acreage	Yields per harvested acre
Basic:						
Wheat	66,870	14.2 (bu.)	67,973	14.2	68,692	17.4
Corn	106,358	24.2 (bu.)	91,693	28.4	92,771	34.3
Cotton	40,845	177 (lb.)	24,857	242	18,547	259
Tobacco[a]	1,874	766 (lb.)	1,671	947	1,850	1,122
Rice	916	46.6 (bu.)	1,070	50.5	1,529	45.8
Peanuts	1,719	680 (lb.)	2,459	752	3,951	657
Nonbasic:						
Soybeans	3,260	14.1 (bu.)	9,137	19.2	12,893	19.0
Dry field peas	278	932 (lb.)	255	1,031	574	1,257
Dry field beans	1,990	689 (lb.)	1,906	913	1,876	881
Alfalfa hay[a]	11,871	1.99 (tons)	13,507	2.10	....	2.21
Other legume hays[a]	6,590	1.28 (tons)[b]	13,528	1.38[b]	.....	1.47[b]
Other tame hay[a]	37,029		30,535			
Oats	43,294	29.8 (bu.)	38,932	31.3	44,815	33.7
Barley	14,165	21.3 (bu.)	14,436	23.0	12,346	24.5

[a] Harvested.
[b] Tame hay.

The first sections of Table 19 show the changes in acreage and yields between 1929 to 1932 and the immediate prewar years. The acreages are given as planted wherever available in this form. Important reductions in acreages of some crops were attained, but these were offset by increases in yields per acre on the one hand and by increases in acreages of nonbasic crops on the other hand, with the result that total agricultural

production increased, as pointed out in Chap. III, from an index of 96 in 1932 to one of 110 in 1940. The main purpose of the program, however, was to shift production away from the surplus crops, and in this considerable success was achieved.

With the onset of the war, the quotas were shifted to goals, although grudgingly at first. It was not until 1943 that the limits were taken off the acreages and production. The support prices provided under the Steagall amendment were in part designed to increase production to meet the goals. The last column in Table 19 shows the changes in acreages between the prewar and 1944–1946. As already stated, the increases in yields in the war years were to some extent due to favorable weather, but increased application of lime and fertilizer and use of improved varieties and methods of disease and pest control contributed in larger measure.

In general, the gains were not so great during the war as under the AAA program up to 1940. As already pointed out, livestock production increased more than crop production, especially in the first half of the war while reserves of wheat and of feed crops were being used up.

The account of food and agricultural programs of the United States is not complete without mention of measures designed to deal with other problems facing agriculture. The attempts to conserve the soil under the AAA program were supplemented in a large way, especially beginning in 1936, with the passage of the Soil Conservation Act. The procedure under this program consists for the most part in working with individual farmers in soil-conservation districts in developing physical plans for checking runoff and preventing wind and water erosion on their farms. At the time of writing, around 83 per cent of the farming land of the United States was in soil-conservation districts, and around 320,000 farms were under contract with the districts to carry out soil-conservation plans. These efforts plus those carried out under the AAA act have been an important factor in the increased yield of recent years and in maintaining the productivity of the soil in spite of its more intensive cropping.

The problems of low-income farmers have been the special concern of the program of the Farm Security Administration, now called the Farmers' Home Administration. This program started in the form of relief aid to farm families stricken by droughts in the years 1934 and 1936 especially and also those suffering greatly from the effects of low prices in 1930 to 1933. The relief grants were presently converted to loans whenever there was prospect that the family could repay. Altogether too many grants were converted to loans in the early stages. In many cases later, the loans were supplemented by grants-in-aid. In the last years before the war, the grants were eliminated almost altogether. The typical standard rehabilitation loan ran for 5 years and included advances to

cover the purchases of machinery and equipment and other capital improvements, to be repaid over the 5 years, and annual advances to cover the costs of growing each year's crop, these to be repaid at the end of the year. Around ½ million of these standard rehabilitation loans had been made by 1942. Around 20 per cent of the standard loans were behind schedule on payments in 1941, but this number included many of the earlier ones that were made to families really needing grants in place of loans. The repayments of the standard loans were very rapid during the war.

A second phase of the Farmers' Home Administration program, begun with the passage of the Bankhead-Jones Tenant Purchase Act in 1938, provides loans to finance the purchase of farms by tenants under liberal terms. Around 50,000 such purchase loans had been made, and only a small fraction of them were delinquent in 1941 in spite of the low prices that had prevailed.

Both the rehabilitation and the Jones-Bankhead loans are made on the basis of farm and home plans that contain budgets of probable receipts and expenses with net balances to show funds available for living expenses of the family and for repayment of loans. The plans for the tenant-purchase loans are very carefully made, and this contributes importantly to the success of the program. Plans for the rehabilitation loans were often made too hurriedly in the past because of budget limitations and a shortage of competent personnel. Not enough persons have been trained in this country to do this kind of planning. But the point is that actual plans were made. Here was a farm-by-farm approach, in contrast with the general blanket approach of the AAA. This offers more possibilities for the future in this country than does the AAA method. In fact, it may be the only approach that we can safely take. The Soil Conservation Service (SCS) also does individual farm planning, directed primarily, however, toward control of water and wind erosion. Its plans can be fitted into all-round production adjustment. It is obvious, also, that both the Farmers' Home Administration and the SCS farm plans will need national and international orientation if they become our main reliance in this country.

The Agricultural Extension Service has, of course, given some attention to production adjustment over the years, especially since the outlook program was initiated in 1923. In general, its emphasis has been much more on technology than on production planning. The county-planning program, begun in 1938 under the leadership of Tolley and the Bureau of Agricultural Economics, offered the extension service large opportunities to shift more emphasis to production adjustment. It is probably not unfair to say that the extension service did not appreciate these opportuni-

ties enough, or soon enough, to keep the program from being largely pinched off by the combined opposition of farm organizations, which did not want any concerted effort by farmers in the counties except under their own guidance, and of the SCS, which at that time seemed to want no over-all plans developed in the counties except their own somewhat limited-objective plans.

XIX. THE FOOD AND AGRICULTURE PROGRAMS OF OTHER COUNTRIES[1]

Now let us take a brief look at the public programs of other countries in the interwar years and how they adapted themselves to the recent war and see what seems to be on the cards at the present writing. It will be best to begin with the so-called exporting nations, Argentina, Australia, South Africa, and Canada.

Argentina.—Few countries are as dependent upon exports as Argentina. It is the world's leading exporter of flaxseed, beef, corn, oats, sunflower seed, and cattle hides and skins. It is the second ranking exporter of wheat after Canada and of wool after Australia. Countries in this position are vulnerable in times of depression and generally resort to many types of restrictions on imports and exports. After the First World War, Argentina began imposing import duties for the purpose of protecting its foodstuffs, tobacco, textiles, leather, paint and varnish. The object of these duties was support of the processing industries that were developing. Export quotas were used even more freely than import duties, and bilateral trading agreements, especially with the British Empire, were established at the Ottawa Conference in 1932. Argentina's exchange-control arrangements were initiated in 1921 and strengthened from time to time. In 1933 Argentina began its first undertaking in price fixing and acreage control. This was intended to be temporary but, as with most of such temporary arrangements, was continued from year to year. With the rising prices after 1933, the government made a clear profit on these operations.

With the outbreak of the war, some of the major export markets of Argentina largely disappeared for a while, and it set up what was virtually a state grain monopoly in 1941, with a full array of guaranteed prices and production quotas. Future trading was virtually abolished. No relaxation of these controls seems to be in immediate prospect.

Australia.—Australia, like the United States, is more an industrial than an agricultural nation. Still, 75 per cent of its exports are agricultural.

[1] The discussion in this chapter is based upon a general reading over the years of reports upon different countries. The reports in *Foreign Agriculture* published by the Office of Foreign Agricultural Relations of the U.S. Department of Agriculture have contributed most in recent years.

In the interwar period, wool, wheat, sugar, dairy products, meats, and fruits were sold on the world market in large quantity; and the export markets of those years were low-priced markets. A series of export-control acts were passed that provided varying degrees of control over trade in dairy products, fruits, meat, apples, and pears and commonly employed some form of two-price scheme. These schemes virtually amounted to subsidies on exports paid by the consumers. The product was sold in the world market at world-market prices, and the consumers paid a higher price in the home market. Of Australia's principal exports, only meat and wool were not covered by such schemes. Morris Wright of the Office of Foreign Agricultural Relations has estimated that these cost the consumers 40 million dollars in the fiscal year 1938–1939, the sugar subsidy taking over half of this and dairy production most of the rest.

In respect to marketing controls, wheat has had the most varied history of any of Australia's products. Compulsory government-managed marketing pools with fixed prices to growers were set up in the First World War and continued until 1921. The voluntary cooperative wheat pools that followed did not satisfy the growers, and in the depression of 1930 the growers were paid a bounty from funds collected from an excise tax on flour. In the Assistance Act of 1938, the price of wheat was pegged and taxes collected as before. With the onset of the Second World War, compulsory pooling was resumed, the government taking over the whole crop; and when exports declined, production quotas were imposed.

The production and export of sugar have long been heavily subsidized in Australia. The home price of sugar has been fixed by the government, and the processors have been paid enough out of the treasury to make up for losses on exports. The increased domestic prices for butter and cheese and dried fruits have been obtained by requiring processors to export enough to maintain domestic prices at the desired level—after the manner of what was proposed under the McNary-Haugen bills in the United States during the 1920's.

Throughout the Second World War, the Australian export supplies of wool, meat, cheese, butter, and fruit were sold at guaranteed prices to the British government. These agreements continue in effect through 1948, so that no other additional postwar price supports have thus far been considered necessary.

The British Empire countries during the war generally shifted their production toward livestock products to save shipping costs, whereas the United Kingdom shifted toward food for direct human consumption. Australia, Canada, South Africa, and New Zealand all attempted to direct their agriculture toward dairy products and meats.

Union of South Africa.—The Union of South Africa had been following a

program over the years of subsidizing exports, especially of corn. This policy has been criticized increasingly at home; it is described as depleting the soils for the sake of maintaining exports. During the war, the home demand for farm products expanded greatly, because of the increase in the income of the people, and severe droughts in the early years cut down supplies, so that export policy ceased to be an issue. The Union government found it necessary instead to regulate domestic consumption.

New Zealand.—The exports of New Zealand are practically all of animal products, mainly butter, cheese, and meat. Nearly all of the exports go to the United Kingdom. New Zealand has less industry than Australia and therefore larger imports of industrial goods, and these in turn mostly come from the United Kingdom. New Zealand is thus even more affected by Empire preference than the other British countries. Most of New Zealand's products after the Ottawa Conference entered England free of duty. By 1936, nearly all the meat from non-Empire sources had been squeezed out of the British market except that from Argentina, so that New Zealand's meat quota was increased slightly.

The exports of New Zealand came under increasing control after the passage of the first Export Control Act in 1921. The New Zealanders had the same experience as the Canadians and the Australians of seeing the prices of farm products drop abruptly with decontrol in 1920–1921. They therefore came to associate high prices with control and low prices with *laissez faire*. A Dairy Produce Control Board was set up in 1923, and other boards followed. These boards, however, exercised control over such things as shipping, freight rates, and grades and standards, except during a period in 1926–1927 of absolute control, which soon broke down.

When the new Labor party came into power, it promptly passed the Primary Products Marketing Act of 1936, which guaranteed the price of dairy products and probably would have done the same for meat and wool except that the prices of these were favorable at the time. The level of prices was set at the preceding 8- to 10-year average, and thereafter the price was to "be such that any efficient producer engaged in the dairy industry and under usual conditions and in normal circumstances should be assured of a sufficient net return from his business to enable him to maintain himself and his family in a reasonable state of comfort." Provision was also made presently for internal marketing controls with guaranteed domestic prices of butter in line with the export prices.

In general, however, the farm prices set in New Zealand and most of its control efforts have been in reasonable relation to normal marketing conditions. The effort has been primarily to stabilize prices and not to raise them. New Zealand has recognized that its position in export markets is dependent upon keeping its production efficient and its costs

low. There has been very little capitalization of artificially high prices in land values and costs, more or less in contrast with Australia in this respect. In keeping with this policy, the subsidy element has been small. The government, however, has sustained some net losses on butter marketing and has subsidized out of the treasury continuing exports of apples and pears. Wheat growing for domestic consumption has also been subsidized to some extent.

As with Australia, the United Kingdom contracts to buy all New Zealand's exports at guaranteed prices, these contracts to run until 1949.

Canada.—Canada's public program for agriculture has consisted of the following, in more or less historical sequence:

1. In the 1920's, import duties directed against United States fruits and vegetables and a few other products. Participation in Empire preference from 1932 on. Some trade concessions in reciprocal trade agreements with the United States in 1935.

2. Baling out the Canadian Wheat Pool in 1930 and following.

3. Direct cash relief to wheat growers in prairie provinces from 1932 to 1935.

4. Setting up the Canadian Wheat Board in 1935, which subsidized exports by advancing growers more than the export price. In 1935–1936, the advance price was 87.5 cents. It was lowered by steps to 70 cents by 1939 as world wheat supplies increased.

5. During the war years, a production-goals program; ceilings on prices of farm products plus subsidies; import and export controls, by a Wheat Board, a Meat Board, and a Dairy Products Board. Deliveries of wheat to market were restricted after 1941 as a means of production control and also those of feed grains at times.

6. An Act for the Support of Agricultural Prices, to apply during the transition from war to peace, passed in August, 1944. Under this act, an Agricultural Prices Support Board sets minimum prices at which the government will buy or private agencies may buy. No exact terminal date is specified in the act.

7. Great Britain is now taking all available exports of beef, pork, cheese, and eggs.

It should be obvious from the foregoing that all these exporting countries went farther in the interwar years than the United States in controlling the marketing of export farm products and in supporting their prices. The United States, however, went farther in production control than they did. The farmers in all these countries wanted to produce and dispose of, in Europe especially, more of the products that they had been accustomed to produce than the receiving countries were ready to buy at equilibrium prices. During the Second World War, all of them adopted rigorous

export- and price-controlling measures, going further than the United States in these also. These support arrangements are all being continued for the time being.

The United Kingdom.—Now let us return to the receiving countries of Europe. For several important reasons, the recent developments in United Kingdom policy are particularly worth examining. They can be fully appreciated only against a backdrop of British history. In the long stretch from the repeal of the Corn Laws in 1846 to the First World War, British policy generally was to let agriculture stand on its own feet in competition with the food supplies of the rest of the world. Britain's agriculture in consequence had shifted in large measure from arable to grassland farming. This had kept the prices of foods down and had enabled British industry to compete successfully in the export markets of the world. It had also made possible a considerable improvement in the British diet.

The submarine menace of the First World War gave the British a very bad scare, but in spite of this only a few products, especially sugar, were subsidized heavily immediately following the war. Not until the depression of the 1930's were vigorous measures really adopted. The wheat plan presently introduced subsidized the wheat growers by the difference between specified prices and the amounts that the farmers received in the domestic market, as evidenced by their bills of sale, the money for this subsidy being collected from the importers. Then, with the establishment of Empire preference in 1932, import quotas were established for beef, mutton, and lamb, and subsidies paid to the domestic producers of these. Later some of these subsidies were put on a quality basis so as to encourage a higher order of livestock farming. The agricultural legislation enacted in this period provided for "marketing schemes," which were designed to encourage domestic production and restrict imports. The pig- and bacon-marketing schemes were only fairly successful in attaining these objectives and in 1935 were expanded to include a "bacon-development" scheme. Definite subsidies were paid on beef and bacon production, especially in legislation of 1937 and 1938 in support of fixed prices.

With the onset of the war, a vigorous effort was made to expand arable farming and crops for direct human consumption, especially wheat and potatoes. A subsidy of £2 per acre was paid for plowing up pastures and £10 per acre for growing potatoes. As indicated above, British Empire wartime policy took the form of causing the dominions to produce meat, milk, and cheese and the United Kingdom root crops and wheat. This program was effective, and Great Britain by 1944 had shifted from something less than one-half self-sufficiency in calories before the war to two-thirds self-sufficiency. A rigorous program of rationing was necessary

to force the shift in the diet away from meats. To achieve this, the British took over marketing completely. They bought the entire farm output, paying the farmers at levels of prices designed to call forth the needed production, and made up the deficit by subsidies.

These wartime developments in the British program are worth studying carefully. They were introduced while the Conservative party was in power and have been continued by the Labor party. The feature of the program most worth considering is the basis on which prices of farm products have been set. Many will still have in mind how the British Parliament provided in 1919 for the guaranteeing of prices of farm products at cost-of-production levels, how 12 (now 10) costings centers were set up to compute these costs à la Orwin, and how this legislation was repealed when the bottom dropped out of farm prices presently, but not quickly enough to save the government from large payments to its farmers. And, noting the recent developments in price setting in the United Kingdom, they may be wondering if United Kingdom history is not to repeat itself after this war. The present procedure is to review the prices of the various products in February of each year and adjust them for any changes in costs, the new prices to hold for the crop next to be harvested and that following. Livestock and livestock-product prices are reviewed at the same time and set for a 12-month period beginning from April to July for the several products. The prices set are to call for efficiency and economy in methods of production and to be adjusted from year to year to take account of technological advances.

It is easy to see that such a directive could have led to the same attempts at determination of absolute unit costs of production as were made in 1920. The Ministry of Agriculture has avoided this by assuming, in essence, that prices and costs were in proper relation at the outset and has made price adjustments only for *changes* in costs.

As a matter of fact, the adjustments are based mainly on income rather than upon costs. The Advisory Centers, really research centers, in the 10 "provinces" into which England and Wales is divided for record keeping and related purposes, now have 2,200 farmers keeping financial accounts. These provinces in turn are divided into 70 type-of-farming areas. Average gross incomes, expenses, and net incomes are calculated for each of these areas. The movements in the net income figures are one of the three sets of magnitudes used in the price reviews. Another set consists of the over-all receipts and expenses for all of England and Wales. The total receipts item is accurately determinable because the Ministry of Food buys all the farm products sold. The totals by provinces and areas are made to check with these national aggregates. This, in fact, usually means increasing the net incomes—the financial records kept

by the individual farmers are considerably influenced by the expenses that the farmers report on their income-tax returns. It should be apparent, also, that changing physical volume of output may also be a highly disturbing factor.

The Advisory Centers have continued the enterprise cost keeping à la Orwin that they began in 1920, although most of them have done relatively little of it. Cambridge has pushed this type of work as much as any of them, cost studies having been made in recent years for wheat, sugar beets, potatoes, barley, and dairy products. The Ministry of Agriculture in setting prices, however, makes no *direct* use of the unit costs derived from such analyses. Instead, it uses only the percentage distribution of total acre or cow costs, and the like, among labor, land, equipment, buildings, feed, fertilizer, etc. These percentage distributions become the weightings applied to changes in farm wages, feed prices, fertilizer prices, etc., in estimating unit-cost changes. It was at once discovered, however, that the total of cost increases thus calculated is likely to exceed the increase in the over-all national expense, for it does not allow for the current savings in costs achieved by mechanization and otherwise—it is in the nature of unit-cost data to be historical and hence out-of-date. Hence, in practice, the cost changes obtained by applying the weightings serve only as a basis for allocating the over-all expense among the products.

The three sets of data thus obtained are all fitted together in the manner indicated and laid on the bargaining table when the Ministry of Food meets with the representatives of the National Farmers' Union. The union has access to all the data available to the Ministry and in addition is now assembling data and making analyses of its own. The only data not available to the general public are the national totals used as a final check. It is apparent that these serve a highly useful purpose in these price adjustments.

It should be apparent that the Ministry of Food has worked out an eminently sensible way of dealing with the problem facing it. Probably it has been helped to do this by having to face the task of inducing the farmers to produce the foods needed. There was no time or place for abstractions and arbitrary assumptions about unit costs of production. If the wages of labor rose, or prices of fertilizers the farmer had to be compensated for these increases if he was to continue his production.

A major contributing factor to the success of the British price-fixing procedures is, of course, the thoroughness of the controls exercised over distribution. The farm products are all bought by the Ministry of Food at the prices named in the bargaining and then mostly sold to the trade at a lower price, the difference being made up by subsidies. The middlemen all receive a fixed fee per unit of product passing from producer to

consumer, even though their function may have been modified considerably. This means that, if the prices are raised, the increase comes out of the public treasury, since consumer prices have been changed little since they were first set. The subsidies paid in 1946 amounted to $1,250,000,000, which is a considerable amount for a relatively small country like the United Kingdom. Of course, part of this sum covers losses on foods imported.

It will be apparent at once that price fixing is much easier to administer with controls of this completeness. The middlemen seem to be well satisfied with the fees that they are receiving and to be cooperating with the price-control officers to an extent not common elsewhere.

This leads to the question as to how long controls and price fixing are to be continued. The government has already guaranteed *minimum* prices for fat cattle, sheep, milk, and eggs for 4 years at levels approximating 1944–1945 prices, or around 90 to 95 per cent of those set for 1946–1947. Lord de la War recently moved in the House of Peers that production goals also be continued for 4 more years. The Ministry of Food deemed this unwise, but the peers supported the resolution by a vote of 43 to 12. To understand this vote, we need to realize that the price guarantees are for definite volumes of production referred to as production goals. These are amounts that the Ministry of Food and Agriculture consider needed from domestic sources and possible to be produced. Few people in the United Kingdom expect food to be sufficient sooner than 1950, and they are looking forward to 3 or 4 more years of food scarcity. They therefore want to give their farmers every assurance that they will have an outlet at good prices for all the food they can produce. If it should happen that overseas supplies become abundant in the meantime, the losses will be a small price to pay for the insurance afforded. Although the Ministry of Food did not favor the 4-year guarantee, it probably expects to continue setting prices for several years at close to present levels at its annual February reviews.

The production goals set in England and Wales are not just something for the farmers to "shoot at." They are prorated and assigned to individual farmers, each farmer being required to plant a specified acreage of wheat, potatoes, sugar beets, or other arable crops. The acreage of wheat, potatoes, and sugar beets, was increased greatly under such orders. The County War Executive Committees, which do the apportioning, have authority to take over the land and farm it in case a farmer refuses to obey his orders. It is true that up to August, 1945, only 2,714 farmers in all of England and Wales had been evicted for nonperformance. Nevertheless, the enforcement authority has always been at hand. And it still is.

In keeping with this conditioning, very many are expecting that present controls will be retained for five or ten years; some of the controls indefinitely. John Maxton, of the Institute of Agrarian Affairs, in his recent pamphlet "The Control of Husbandry," points out that each of the recent party reports on postwar agricultural policy favors the continuance of the County Agricultural War Executive Committees, though this probably does not mean a continuance of all their wartime powers.

A special further factor in the situation is the opinion of very many, perhaps a good majority, of the British citizenry that the United Kingdom cannot spare its limited exchange balances for food and must therefore produce its own. The percentage of home-produced food has risen from around a third before the war to nearly a half. The National Farmers' Union wants it kept at this level, and this position has strong support outside of agriculture. The British, along with some of the rest of us, no doubt scoffed at the "Battle of the Wheat" that Mussolini's Italy waged in the 1920's to save his foreign purchasing power; but the British, now in much the same position, feel a strong urge toward similar programs. Needless to say, many among them point out that a continuance of Britain's historic program of low living costs, low wages, and low manufacturing costs is needed to enable her to sell her factory products abroad and build up her sterling balances.

If, however, the decision is in favor of subsidizing food production at a high level, it will probably be done in the main not by imposing protective tariffs, but by continuing the present policy of buying high and selling to consumers for less, paying the difference out of the public treasury, and hence at no sizable burden on the working classes. *This will require a continuance of all the present control of distribution.* The logic and the facts of the situation are therefore pushing a large fraction of the British population toward a continuance of wartime controls—not merely while food scarcity persists, but until the foreign exchange situation is much improved.

John Maxton, however, doubts greatly whether the farmers of England and Wales intend to keep on taking orders from the County War Executive Committees as to what they will produce and how, once food becomes abundant and world prices for farm products subside. He thinks that they will tolerate them while the population of England is in danger because of the lack of food, but not a day longer. Strong statements are also being made by middle-class groups in opposition to the heavy subsidies to consumers, the argument being advanced that wages are now at high levels and that the working classes are able to pay for their food without public doles.

The first major issue as to production programming is that already introduced, whether the United Kingdom will continue its present

emphasis on arable farming once food can be obtained in abundance in the world market. That without controls or very heavy subsidies the wheat acreage will decline, no one seems to doubt. Nevertheless, the Farmer's Union is asking for a continuance of arable farming at its present level or near it. The official and much more generally accepted policy is for a rapid expansion of milk production, at the expense not only of arable farming but also even of beef production. Half or more of the fresh milk now sold is set aside for children, the ration for children under five years and for mothers, as explained earlier, being 5 pints per week. Adults have been allowed 2 pints per week. The first group is, of course, consuming much more milk than before the war, with resulting improvements in health that have been amply demonstrated. Children over five years also need a full ration of milk. There seems to be a determination on the part of the British to give themselves all the milk that they can be induced to drink. (Considerable inducement will be needed before anything like the levels prevalent in the northern part of the United States are attained.)

The British insist that they can easily produce for themselves all the fresh milk they need. The Dutch have offered to supply them with milk in semicondensed form, and the Danes are talking of shipping them fresh milk in tank ships. But neither of these proposals is acceptable to the British. They point out that milk can be shipped much longer distances in the United Kingdom itself—150 miles is about the present limit—and that dairy herds can be enlarged on present farms, that production per cow can be increased, and that many more herds can be shifted over to dairy breeds.

The Ministry's program includes the following: (1) Vigorous development of artificial insemination. (2) Keeping breeds of cattle clearly separate. This to the British means especially the keeping of beef types of Shorthorn cattle from being mixed with milking types. (3) Through artificial insemination, making it possible for farmers to breed to beef-type bulls the cows whose heifers they do not wish to raise as milkers. This will help a little to supply the country with beef. (4) A more vigorous program of disease control. Tuberculosis control is still largely on a voluntary basis. Herds free of tuberculosis when tested each year are allowed to call themselves "tested" herds, but as low as 5 or 6 per cent of the herds are tested in some counties. One of the reasons for the spread of the Ayrshire breed is that the herds in the Ayrshire districts of northern England and Scotland are much freer of tuberculosis. Bang's disease is also still widely prevalent, although vaccines are coming into general use.

The feeding-stuffs problem is concerning the British greatly, as one would expect in view of their wartime experiences. They have concluded,

with some reason, that export supplies of grains, oil cake, and other concentrates will be shorter in the future than in the past, for other countries are also bent on expanding their output of dairy and poultry products and meats. There could, of course, be a compensating expansion of feed-grain output in the exporting countries; but optimism on such subjects does not color the British mind at present. The conclusion drawn from this situation is that the United Kingdom must grow much more of its own dairy feedstuffs and that these should take the form of forage more largely than in the past, with more emphasis on legumes. No doubt this is a sound conclusion in any case. Up to the point at which any European country can produce its own dairy forage at no prohibitive sacrifices of foods for direct human consumption, it should do so in preference to importing concentrates. Probably the Danes have been going about as far in this direction as it is reasonable to go, and possibly the Dutch, but surely not the British. In the first place, forage for dairy herds can be increased much by pasture improvements. The British have known much about how to do this for a long time, but the known practices have not been widely adopted. Secondly, hay crops can be made to contribute to better balanced rations by including more legumes in them.

The effect of the proposed program on the British diet in the years immediately ahead is particularly worth noting. No doubt the British population would like to shift back to a larger consumption of meats and eggs and imported fruits. Unavoidably the United Kingdom will need to import cereals, butter, cheese, and sugar. If it is going to expand its beef and poultry production, it will need to import feedstuffs. These will make heavy demands on foreign exchange. How far will the government wish to go in supporting such a program? One of the largest foreign bills paid by the United Kingdon in 1946 was for American motion pictures. If these could be afforded, surely the foods needed for a prewar diet could be afforded. Nevertheless, it does not seem probable that the British diet will equal more than the prewar levels within the next five years; and attaining the FAO consumption target will have to wait still longer.

Other developments in British agriculture during the war are worthy of note. One of these is a considerable shift toward mechanization, stimulated by the shortage of labor. The use of combines in harvesting grains in England is made difficult by the amount of rainy weather during the harvesting period. Grain driers have come into limited use on a few of the larger farms. Whether such mechanization continues depends largely upon whether labor is kept continuously employed in the cities and mines. Supplies of fertilizers were more generally available in Great Britain than on the Continent during the war. Phosphates were shipped

from the United States and later from North Africa. No doubt the plowing up of pastures has made heavy drains on reserve supplies of plant nutrients, but these can easily be replaced in the years ahead even though arable farming is continued at somewhere near its present levels. Some of the extreme statements about the deterioration of the soils of the United Kingdom in the interwar period are examined by R. N. Dixey of the University of Oxford in a statement in the *Farm Economist* of the Agricultural Economics Research Institute of the University of Oxford. Dixey concludes that there may have been some losses in the interwar period because the low prices of farm products did not warrant the usual purchases of lime and fertilizer but that the effects were not at all serious.

This is the best point at which to introduce a note on the international wool situation. The wartime program of cooperation between Great Britain and its dominions left as an aftermath a total stock of 3,250,000,000 pounds of wool in the hands of Great Britain, with small additional stocks in the United States, Argentina, and Uruguay. These stocks are equivalent to more than 2-year's normal world consumption of wool. If these immense stocks are thrown on the wool market, they will demoralize it completely. At a conference held in London early in 1947, a plan was worked out for the disposal of these stocks over a 10- to 15-year period without, it was hoped, breaking the market at any time. Analyses made of probable postwar wool consumption indicated that it would expand enough to absorb the stocks in that period of time. The Joint Disposal Organization set up is to buy, hold, and sell wool on behalf of Great Britain and the dominion governments. It is to publish schedules of prices at which it will stand ready to buy wool whenever the price weakens. The wool auctions will function in the normal manner except that the government will step in and buy when the auction prices fall below the reserve price set. The Joint Organization will therefore undertake to prevent any sharp price declines.

Continental Europe.—The general economic history of the rest of Europe—excluding Russia, which has a history of its own—was one of rapid recovery after the First World War and a general rise in standards of living. Agricultural production was largely restored to prewar levels within two or three years. In general, the countries tried to be more self-sufficient. The Smoot-Hawley Tariff Act, which was enacted by the United States in 1929, may have furnished new stimulus to the raising of tariff duties on the continent of Europe, but probably most of the increases would have occurred in any case. They were really induced by the rapid decline of prices of farm products that set in in Europe in 1929 or even earlier. The tariff acts were passed under pressure of agrarian political groups. Indirectly, one can say that the reasons for raising tariff duties were

military security, the governments not being willing to let their agriculture decline. But military security surely was not the main reason for the increases in the tariff duties, which in some cases amounted to more than $1 per bushel on wheat and more than 10 cents per pound on sugar. The depression, of course, caused a further decline in food imports. The recovery from the depression had by 1937–1938 offset this decline only in part, when the impending war started a wave of stockpiling.

Continental Europe was normally about 90 per cent self-sufficient in foods at the outset of the war. J. E. Richter of the Office of Foreign Agricultural Relations in the U. S. Department of Agriculture has made a calculation to the effect that 78 per cent of the caloric intake of Continental Europe was then from plant foods for direct human consumption and only 22 per cent from animal foods. He concluded that a shift of this ratio only to 80:20 would have made Europe self-sufficient in food in a normal year, and shifts of this kind were immediately undertaken in the countries at war or threatened with war.

As the war developed, however, military operations interfered increasingly with production, and man power and fertilizers became scarce. Production therefore declined considerably, perhaps to 80 per cent of prewar requirements. The occupied areas shifted strongly to cereals, potatoes, and vegetables. Livestock production declined, poultry most, pork next, then dairy cattle, and, least of all, sheep. Pork production declined one-half in Denmark, and the numbers of dairy cattle one-sixth. Milk production declined more than cattle numbers because the dairy cattle had to subsist largely on roughages. Other occupied countries had to make larger shifts than Denmark.

Sweden may be taken as an example of a neutral country. It had been expanding both its crop and its livestock production in the interwar years but was still dependent on the outside world for a number of its important foods and even for some of its calories. With the onset of the war, it shifted its land to food crops and high-yielding feed crops such as turnips and mangel-wurzels. It grew less barley and oats and plowed up some of its old meadows. It attempted to make up for its shortages of fats by expanding butter production.

As stated above, *Italy* found itself very short of foreign exchange following the First World War and started a vigorous campaign to make itself more nearly food sufficient. Between 1926 to 1929 and 1934 to 1937, Italian imports of calories declined from 19 per cent to 6 per cent. The emphasis on wheat was not always effective. It sometimes meant substituting wheat followed by fallow for wheat followed by beans, which had the effect of producing more wheat but fewer total calories and certainly less protein. Exports of rice, olive oil, and some other foods were

increased at the same time. Available figures indicate that the Italian calorie consumption was reduced in this period from 2,900 to 2,600 daily per capita.

The decline of prices in the depression years of the 1930's finally led to compulsory pooling of crops as an aid to supporting prices. These pools were taken over by the Nazis during the occupation period and therefore became unpopular. They were resumed in 1944 under the name of Peoples' Granaries, with mainly local control as distinguished from the centralized control of the Fascist and Nazi periods. They undertake to control the production and distribution of the products. They have been fairly successful thus far. The assignments of food to local communitites, however, have commonly been relatively high and not as much food has been assigned to the cities as they have needed.

Most important to note concerning *Germany* is the great progress it made in increasing its agricultural output in the decades between 1880 and the First World War. Yields of some crops were almost doubled. The principal basis for these increases was a free use of commercial fertilizers and the adoption of rotation systems combining root and legume crops with cereals. Tariffs and other subsidies were used to support these developments. The principal deficiency in German production revealed by the First World War was in fats and oils. In the interwar years, an attempt was made to overcome this by the growing of rapeseed in Germany and encouraging the growing of rapeseed and soybeans in the Danubian countries. The future of German agriculture is, of course, strongly conditioned by political arrangements. Foods need to be shipped freely between different parts of Germany before the near self-sufficiency of prewar can be attained again in all parts of it.

The principal characteristic of the *Russian* economy in the interwar years was a forced industrialization that included a large shift of workers from agriculture to industry, replacing them with power and machinery.

Agriculture was by no means neglected. The mechanization program was supplemented by attempts to apply modern scientific methods to all forms of farming. Cotton growing was pushed vigorously in southern Russia, including the northern Caucasus. The yields obtained have been so low, however, that recent plans call for a large reduction in cotton acreages. In general, the terms of trade in Russia were set against agriculture. The standard of living of the Russian people, even the food standard, was kept down so as to make resources available for the industrialization program. Food was even exported in order to obtain purchasing power needed in foreign markets.

The rapidly growing population of Russia is now calling for more

and more food. There is every reason to believe that Russia can produce all the food needed for the nearly 300 million people now forecast for her at the peak, at a higher level of food consumption than at present.

An example of methods that may be developed in a totalitarian economy is the recent undertaking in *Spain* to stimulate the expansion of hop production by granting concessions at guaranteed prices to a few large growers.

The Middle East.—The policy problems in the Middle East center in tenure and population pressure mostly. The lands tend to be held in semifeudal estates, with established families owning whole villages. *Turkey* enacted a land law in 1945 that provides for distributing public lands and expropriating these estates. Credit to small proprietors is advanced under 20-year contracts carrying 6 per cent interest. *Egypt* is also embarking on a program to assist small holders in acquiring land, partly from holdings of more than 50 acres and partly by reclamation of desert lands by pump irrigation and better use of present water supplies.

The Latin-American Countries.—Let us now consider the Latin-American countries. These, except for Argentina, are ordinarily in a position more or less intermediate between the two groups of countries already described, the exporting and the importing countries. *Brazil* is in about the same position as Argentina, and so also are Uruguay and Paraguay. Brazil has been expanding its cotton production rapidly and during the war started jute production while Indian supplies were cut off. It is likely to continue this after the war. *Peru* similarly expanded its flax production under government support and even with help from the Commodity Credit Corporation of the United States. Ecuador similarly expanded its rice production during the war.

It will be helpful to consider a few of the programs of the Latin-American countries in a little detail. *Chile* began its program of aid to agriculture in 1926 with provision of agricultural credit and aids to settlement in central and southern Chile. Such settlement schemes could even include expropriation of large holdings, but little of this has been done. With the break in prices in 1930, an Agricultural Export Board undertook to set prices of grain, fruit and other products and to regulate exports. Beginning in 1932, the Commissariat-General of Subsistence and Prices was authorized to fix prices and regulate trade in eight products but was not very active along these lines until following the 1939 earthquake. An Institute of Agricultural Economy was set up in 1943 and began a wheat-subsidy scheme like that of the British wheat plan. Finally in 1944, the Chilean government announced an 18-year agricultural plan that provides for development of Chile's agricultural resources, improve-

ment of marketing, and the like. The Chilean government is looking to the future apprehensively because of the uncertain future of its export trade in copper and nitrates.

Venezuela furnishes an example of another set of conditions that prevails in some Latin-American countries. It has an extremely high cost economy. Prices and wages are all maintained on stilts by high protective tariffs, exchange controls, and other devices. Marketing costs are extremely high, and also marketing margins and profits. The retail prices of imported products are from two to five times the import prices. Large quantities of flour are used by the population, but its import price is only 17 per cent of its retail price. Agriculture appears superficially to be favored by high protective duties, subsidies, and fixed prices, but the wages of labor are so high that agricultural products cannot find foreign markets except under subsidies. The government has made loans to producers, but they have not stimulated much new agriculture. The principal agricultural exports are coffee and cacao, but by long odds the principal export of the country is petroleum. The agriculture has been slow to develop. Much of it is in foothill and mountain terrain where erosion is high.

Some reforms have recently been undertaken—specifically, the Agrarian Reform Act of 1945, which is designed to distribute large holdings of land now owned by the government and to expropriate large private holdings. The present revolutionary government is proceeding rapidly under this Act. It has also reduced some of the import duties. Venezuela has some great natural difficulties in developing a good agriculture. The areas with sufficient rainfall mostly have rough topography, and the rainfall is inadequate on most of the level lands. Still, much progress can be made if sound national policies are established. Venezuela is a good example of a country that in starting to promote and regulate its economy has wound up with everything tied in a hard knot. It wanted to be as self-sufficient as possible agriculturally and has ended with high living costs and probably no more self-sufficiency than it would otherwise have had.

Oscar Moore of the Office of Foreign Agricultural Relations in writing of *Colombia*, which is afflicted in a similar manner, but not in so extreme a degree, has said:

> The problem which Colombia or any other such country needs to solve in its own interest is not how to be self-sufficient, but rather how to obtain the greatest possible amount of goods and services for its people . . . . Self-sufficiency has become impossible to such nations, except at a terrible economic cost. The pressures in favor of protection for such interest groups are no less in these than in the larger countries, but the consequences are more serious because of the lack of diversity . . .

The final outcome is that in spite of relatively high prices, Colombian agriculture and industry are giving the working classes very little return for their labor.

No doubt these two countries could produce more foods for their own consumption than at present if they would choose the right products and the right methods to encourage their production. The diets of most of these countries are low in vegetables and fruits, but these can be grown readily in their climates. An experiment conducted recently in a neighboring country showed that tomatoes could be produced much more cheaply than in the United States, because of an abundance of labor, and distributed at extremely low prices to city populations and that at these prices the low-income classes will consume large quantities of them. Corn and beans are staples in the diets of many Latin-American countries, but their cultivation has not received adequate attention. The emphasis has been too much on improving the export crops.

Ecuador offers another example of this same type of mistake. During the war its people were actually short of its staple foods, which are produced in the Andes, whereas sugar production was being expanded on the coastal lowlands.

Tanganyika.—The programs presented in the foregoing are mainly production, marketing, and price programs. We shall conclude our discussion of programs of this type in the different countries by selecting for particular notice one developed for Tanganyika in British East Africa, bordering on the Indian Ocean, a country with 9,000 Europeans, 33,000 Asiatics, mostly Indians, and 5,000,000 natives. The exports of Tanganyika are mainly sisal, cotton, coffee, hides and skins, rice, peanuts, copra, and tobacco. Beginning in 1940, the government began resorting to producer subsidies and guaranteed minimum prices to assist the shift from the export crops not marketable abroad to food and essential wartime export crops. It made use of a system of direct extension committees to encourage and direct the production adjustments needed. Following is the exact description of the new program that went into effect in April, 1940, from an article by Lucille Corder, in *Foreign Agriculture* of the U.S. Department of Agriculture, November, 1944:

> This new law empowers the Director of Agriculture to direct the production and disposal of crops, and provides for a guaranteed minimum return to nonnative producers. It is an outgrowth of District Production Committees set up earlier for the purpose of encouraging farmers to grow more food and to assist them in obtaining agricultural equipment through loans bearing no interest.
>
> Each nonnative (white and Asiatic) farmer is required to submit to his District Production Committee a program of his intended production. He may at the same time apply for any Government grants needed to carry out his program. After the Committee has considered the program, it is forwarded to the Director,

who may modify, vary, or reject it as he sees fit. Decisions by the Director are final and conclusive. He may submit an order in writing to any farmer requiring him to carry out any operation connected with crop cultivation. If the farmer cannot carry out the order, he may appeal to the Director through the Committee, and his case will be reconsidered. Otherwise noncompliance represents a violation of the Act.

If a farmer wishes to expand his production program, he must notify the District Production Committee and obtain the consent of the Director. The Director is also authorized to take possession of certain lands not being cultivated and cause them to be cultivated. Furthermore, lands may be taken over when the Committee and the Director consider such action to be in the interest of increased production or in the interest of the Territory.

Immediately after harvesting, the farmer must report to the Director the returns from his crops, at the same time stating what quantities he wishes to retain for his own use and how much he wants to sell. The crops must be disposed of as prescribed by the Tanganyika Government. The Director of Agriculture has stated that farmers will not be requested to store crops any longer than absolutely necessary.

Official minimum prices are established by the Director and published in the official gazette. A minimum monetary return per acre cultivated is also guaranteed. At the end of the planting year, if the farmer can prove that the total value of his crop did not equal or exceed the guaranteed minimum monetary return per acre, and the failure to obtain this amount was not due to his default or neglect, he is paid the amount of the guaranteed minimum return less the market price received for his crop, provided he has carried out the terms of his order. This phase of the law is believed to be a guaranty to producers against loss and not an aid to greater profits.

The passage of this legislation was an outgrowth not only of Tanganyika's wartime policy, but also of the prewar success of district extension work and the benefits so obtained. The hope is that the Act will provide a means whereby officials and producers will cooperate in such measures as are necessary to nullify the effects of wartime conditions on the economy of the country, and to assure a maximum contribution to the war effort of the United Nations.

We have taken the trouble to present Miss Corder's statement in full because of the several highly significant features of this program. First is the use of government grants to finance the desired adjustment in production; second is the use of loans bearing no interest to assist farmers in obtaining needed equipment; third is the basing of these grants on farm plans showing intended shifts in production; fourth is the use of the district production committees to help implement the program; fifth is the farmer's submitting evidence as to returns from the sale of his crop and being paid the difference between these returns and the guaranteed minimum monetary return. All these have definite possibilities of being incorporated in production-adjustment plans in other countries. Certain

more rigorous features of the program, however, such as the director's taking over lands not being properly cultivated, compulsory selling to the director, and even the guaranteed minimum prices, are not necessary parts of such a program and probably would not be adapted to conditions in many other countries. Nor would most countries want to restrict the program to the native or some other minority group in the population.

Consumption Adjustment.—This chapter is not complete without brief coverage of the consumption-adjustment measures of the different countries. Those of the United Kingdom have already been mentioned in Chap. XVI. School feeding has received the most attention, and the discussion following relates to this almost exclusively. School feeding is, of course, not a recent development in Europe. It was in 1882 that Paris first made mandatory the provision of lunches for all its school children. Before long over most of France, and in various other European countries, including Holland, Switzerland, Scotland, Denmark, Italy, Austria, Belgium, and Russia, the school lunch became as much a part of educational activity as the hiring of teachers and the building of schools.[2]

It was in connection with Norway's school lunches that it was discovered that the "Oslo breakfast" gave better results than the hot lunches previously served. The Oslo breakfast consisted of ⅓ quart of milk, one-half orange, one rusk or rye crisp with butter or whey cheese, and one raw carrot or one half apple. This meal contains more than a half day's supply of vitamins A and C and a sizable fraction of the calcium, iron, protein, and B vitamins. Requiring very little preparation, it was easily administered with a minimum of equipment and personnel. In fact, the teachers administered the program in the smaller schools of Norway. The children receiving the Oslo breakfast were assured of at least one good meal a day. Their health improved, they grew taller, and they did better work in school.

Ordinarily the areas where children are in greatest need of extra food are backward areas where school administration is poorly developed. Where equipment and personnel are scarce or very inadequate, it has generally been found that the Oslo-type lunch, uncooked, is better than the substandard hot meal that tends to be served. Frequently the hot lunch is simply more of the same type of food the children are receiving at home and makes little contribution to the balance of the day's food. Ordinarily the greatest deficiencies are the protective foods, which are easily provided in uncooked and easily distributed forms.

School feeding was undertaken early in some other parts of the world also. A survey of the development of school-feeding programs in South

[2] Southworth, H. M., and M. I. Klayman, The School Lunch Program and Agricultural Surplus Disposal, *U.S. Dept. Agr. Misc. Pub.* 467 (1941).

America shows that, while such feeding was not put into operation on a national scale until the 1920's in any one country, scattered projects were initiated by private organizations early in the twentieth century. In 1908, a social agency set up a school-lunch project in Santiago, Chile. Today several South American countries provide some supplementary food for school children. In Colombia in 1939, over 30,000 of the poorest children were being given free breakfasts or lunches. National funds assisted local projects, and most of the food came from school gardens. Chile, Bolivia, Ecuador, Brazil, Costa Rica, Argentina, Peru, and Venezuela have some national funds set aside for free meals to children. El Salvador and the Dominican Republic have school-garden projects to provide food for free lunches. Most of the South American countries have free milk depots for infants.

Uruguay was a pioneer in the field of popular restaurants. Furthermore, its child-feeding program is more than twenty years old. Montevideo's Copas de Leche, founded in the 1920's and administered by the National Council of Primary Education is responsible for the distribution of milk to school children. Uruguay had a school-lunch program as early as 1926. In 1940, more than 600 school lunchrooms provided food for 35,000 children. In 1942, the Uruguayan Association for the Protection of Childhood operated 12 lunchrooms. This association also feeds children in day nurseries.

The Children's Fund, Inc., of the American Relief Administration started the school-feeding program of Puerto Rico. By Jan. 29, 1930, 1,000 lunchrooms had been established. With this impetus to the program, the work continued to develop under the Insular Department of Education, but rather slowly because of limited funds. In 1939, a great improvement in the service was made through the efforts of the WPA. This agency furnished personnel to supervise the school lunchrooms and supplied part of the food from WPA gardens. In December, 1942, lunches were being served to 157,000 children in 1,440 lunchrooms established throughout the island. With the cessation of the WPA and the Federal Works Agency in Puerto Rico in 1943, the Insular War Emergency Program took over the school lunchroom activities. It is estimated that this program contributed 60 per cent of all the food served in the school lunchrooms during 1943 and that lunches, consisting of the needed milk, meat, cereals, fruits, and vegetables, were served to two-fifths the total number of children in the eight- to fifteen-year age group in the island.

In the British West Indies, it was found, as earlier in Norway, that, owing to a lack of sufficient organization, help, and equipment, it was better not to use the hot midday meal unless the children would other-

wise get no meal at all. For the other children, the meals were not enough better than the home meals to justify the expense.

In the Union of South Africa, the Department of Social Welfare and the Research Committee of the National Nutrition Council drew up in 1940 a scheme for providing free food daily to all school children regardless of race. The proposal was made that the meal should follow roughly the lines of the Oslo breakfast and should include the protective foods available in the district. In March, 1943, the Minister of Finance announced that the government had offered to contribute to a joint program with the provinces on a 2-to-1 basis. In the fall of 1946, the school feeding program consisted of 12 ounces of milk with a serving of dried fruit, usually raisins, given at midmorning. Hot soup was sometimes provided in large schools where equipment and service were available. It has since been recommended by the South African Nutrition Council that the term "protective food supplement" be used rather than the term "school meal." If such supplements are purchased under government contract and served uncooked, the cost is very little.

School-lunch or midday-meal schemes on a payment basis have been in existence in a small number of secondary schools in some of the provinces of India within the last twenty years. They were curtailed considerably during the war. In Bombay and its suburbs, children up to the age of ten years and expectant and nursing mothers receive 8 ounces of milk a day at half the prevailing market rate. Over 260,000 priority consumers are reported to be taking advantage of this subsidized milk ration. Each priority consumer is issued a milk ration card. A scheme is under consideration to give skim-milk tablets, reinforced with vitamins A and D, to school children between the ages of five and ten and attending compulsory education schools. The government of Bombay has also sanctioned a scheme under which shark-liver oil will be given to children in primary schools in dispensary towns in the East Khandesh district.

The government of Madras also has provided free milk depots for infants, preschool children, and expectant and nursing mothers. Midday meals of rice, dal, vegetable oil, and vegetables are provided for about 7,000 school children.

XX. PRODUCTION-CONSUMPTION ADJUSTMENT

It should now be obvious that the major problems facing the agriculture of the world are problems not of production alone, or of consumption alone but of fitting one to the other. If they were production problems alone, all that would be needed would be for each country, and each part of each country, to find out what crops or livestock it was best fitted for and produce this product to the limit and as efficiently as possible. If they were consumption problems alone, all that would be required would be for each consumer group to figure out the combination of foods that would best reconcile its nutritional needs with its food habits and preferences and then expect these foods to be produced. If the first were done, the producers would have to wait a long time before anyone came to buy some of their output; if the second, the consumers would wait long for some of their foods.

The forces operating in the market are supposed to prevent any such maladjustments as these. The market is supposed to set up a schedule of relative prices for different goods that will cause the producers to offer just what the consumers want. And the market does go far, we must all admit, toward achieving such an adjustment. But unhappily it does not go far enough or, though it might with assistance of the right sort, it is never given a chance to show what it really could do. Be that as it may, as the market does operate a number of serious maladjustments do arise, which were discussed in detail in Chaps. VII to XVI. And vast efforts are being made to deal with them through the instrumentality of the programs that we discussed in the last two chapters. The program that we shall present in Chap. XXI is just another of the same general sort. It is hoped, however, that it is one which upon trial would prove a better instrument for adjusting production and consumption to each other than those thus far employed in the United States.

Before discussing this better program, however, it has seemed best in this chapter to try to get a clear conception of the essential nature of the production-consumption-adjustment process. Probably the best way to do this is to take a number of concrete situations involving such adjustment. As the first of these, let us consider the countries, usually small ones, that do not have varied enough resources to produce well-balanced diets for their peoples. Tropical countries, for example, may not have much

land suited to meat or milk production. They may lack protein feeds for livestock. Or, like Greece, they may have relatively little land suited to cereal production or land too nearly arid to grow any cereal except millets and sorghums, like considerable parts of India and western China. In general, the diets of peoples are largely based on the foods that grow best in the region, or at least in the same country, and properly so. Thus the northern and western Chinese have diets largely of wheat or millet; the central Chinese, diets of both wheat and rice; the southern Chinese, diets of rice and sweet potatoes. The Italians eat the glutinous durum wheats suitable only for macaroni, because they require less rainfall than the regular wheats and are better adapted to Mediterranean climates.[1] The native peoples living in the very high Altiplano of Bolivia eat quinoa in place of wheat because it withstands frosts as no cereal crop can. Fortunately it is a better food than any of the cereals. But though basing diets on the foods easily produced in an area or region is good food policy, it is not a policy that should be carried to the point of limiting diets to these foods when others are needed for well-balanced diets.[2] Areas or whole countries with undiversified food-producing resources need deliberately to plan to produce surpluses of those to which they are adapted and to exchange these for the needed foods from other areas or countries. More than this, if any food fitting well into a local diet can be obtained with less effort by exchanging some other local product for it, this ordinarily should be done. Thus the Greeks live better by producing olive oil, raisins, and almonds, and exchanging these for wheat than by trying to grow enough wheat or other cereals; and several European countries now producing their own sugar could wisely follow a similar principle.

Producing for the market, however, as we noted in our last chapter, can be carried too far. The food that millions of workers on sugar, tea, banana, and other plantations obtain with their wages is a poor substitute for some of the food they could have produced on small holdings of their

[1] Even in the United States, diets are based upon local food production in considerable measure, the Southern diets including much corn in place of wheat, sweet potatoes in place of white potatoes, and pork in place of beef; and the Western diets are probably based too much on cereals and beef. Simon Patton, who in his day wrote much on consumption problems, used to scold Midwesterners for their failure to eat freely of the corn to which their land is so well adapted.

[2] Some have carried the argument in favor of having each people live on its own foods to the point of saying that only the foods indigenous to the region should be used, these being the foods that the natives have found over the ages to contribute most to their survival. If a rule of this kind had been followed, potatoes, corn, soybeans, and tomatoes would never have been introduced into Europe or wheat into North America. The rule rather should be to grow in each area any foods that will grow there no matter what their origin, provided that they make the resources of the area go further in providing good diets.

own in periods of the year when they were not working on the plantations. The plantations are not evils in themselves. In fact, properly fitted into many economies, they can add importantly to incomes and well-being. The evil is in too much dependence on the plantations.

Extreme forms of such plantation economies are found in Java and the East Indies and in Ceylon, off the coast of India, which devotes most of its energies to producing rubber and tea on big plantations and imports two-thirds of the rice and other food it consumes. In the West Indies, Puerto Rico shifted away from a more self-sufficing food economy toward more plantations after its acquisition by the United States and only recently has begun to retrieve these losses in a small way. It had difficulty obtaining its usual supplies of rice, beans, and salt fish from the United States during the war. Cuba was once almost as largely given over to producing sugar and tobacco for export. In the past two decades, however, it has reduced considerably its imports of black beans, corn, potatoes, and pork and expanded its livestock production. Protective tariffs have been used to this end, but other influences have been more important.

Some of the Central American economies are in the same dilemma. Foreign capitalists have developed plantation production of bananas, coffee, or cacao, and the production of corn, beans, rice and potatoes has scarcely kept pace with the growth of population. All these countries need more of what are called "family-sized" farms in the United States, which would grow more of the foods needed for local consumption. Several Central American countries have set up credit agencies to make advances to small proprietors, but, as in Mexico before the last revolution, they have made but little headway. Possibly a more communal type of tenure, as in the *ejidos* of Mexico, is more in keeping with historical cultures and would promote the growing of the needed foods.

Such plantation economies are highly vulnerable during wars. In the Second World War, they lost most of their banana markets and were forced to shift toward food production for home use. Jamaica shifted from bananas to sugar cane. It was the sugar crop that suffered most in the East Indies.

This too great dependence on production for export and distant markets is not, of course, confined to plantation systems. Several million of the so-called "family" farms of North America, Australia, and other newer regions have worsened the diets of their families by living increasingly out of grocery stores and less and less on home-produced foods. Many of these families cannot afford to buy needed foods if they do not produce them at home or, if they could afford it, they do not.

One must be careful not to confuse the foregoing argument for production for home use with an argument for national self-sufficiency in foods.

A sizable list of countries in addition to Cuba, Puerto Rico, and others named could advantageously undertake to improve the diets of their peoples by producing a wider variety of foods for home markets. Changes of this sort could improve diets without making them more costly. Of another description altogether are the measures that force a people into producing staple foods at home, in an effort to be self-sufficient in foods, at higher than import costs. The two familiar arguments for imposing on a people the higher costs of producing wheat, sugar, and other staples at home are the "military-security" and so-called "infant-industry" arguments. Both are valid if properly applied. In more cases than not, they are not valid as applied. New crops in a country need to be tried out thoroughly before they are recommended by governments. And they should not be recommended till their ability to compete with present crops without subsidies, once established, becomes clearly evident.

Our review of the actual program of different countries in the last two chapters disclosed many policies counter to the principles just outlined. Most governments seem to want to produce in their own countries all they can of the food and fiber their people need, and many of them resort to coercive measures such as protective tariffs and import quotas to achieve such an end. In so doing, they are commonly reflecting the disposition of their farmers to keep on producing what they have been producing, and even to expand production, and to force their products on the consumers of other countries. These same tendencies appear within countries, but ordinarily there is much less that local producers can do about it. Occasionally one encounters a group in a country that would be willing to go so far as to prevent other sections of the country from competing with them. For example, when the senior author first came to New England twenty years ago, he heard a cotton-textile manufacturer in New England say that the United States ought to pass a constitutional amendment that would make it possible to shut the products of the Southern states out of the large textile markets of the Northeast. When the same situation develops among nations, these groups present their special interests in the guise of the national interest and are frequently able to obtain restrictions on the free movement of products. Few of them get themselves so completely tied up in a knot of import duties, export subsidies, quotas, exchange controls, and the like, as we discovered in our review of the Venezuelan and Colombian programs, but many are well on the way toward such a strangling of their economies.

The method of correcting such a situation would seem to be simple enough—merely take off all the controls, and let the resources of a country flow into those uses and products in which they are most effectively used.

Unfortunately, experience indicates that the solution is not this simple. Under such freedom to develop the resources of the different countries, sugar production has got out of hand at times and afflicted the industry with chronic surpluses, likewise wheat growing in the United States and several other countries and surely cotton growing in the United States. When the binder was invented, wheat production expanded in the Midwest and precipitated a period of prolonged depression in that region. The development of the grain combine caused another great expansion into the semiarid portions of this and other countries. Chinese export tea production found itself confronted in the last two decades by the lower cost plantation system of Ceylon and the East Indies. Declining demand, such as for cigar tobacco in the 1920's, and now for cotton and wool because of the competition of synthetic fibers, produces similar strains. Japan and China are now faced with an adjustment in silk production for similar reasons.

Even more important, simple competition has failed grievously in providing great masses of the population with the foods needed for good diets. It may be said that one cannot expect competition to provide incomes to enable all classes of the population to buy themselves good diets; that some are either so incompetent or so irresponsible that they do not produce enough to feed and clothe themselves. Many societies have taken it upon themselves to supplement competition by offsetting the deficiencies it produces in education, health, and the like. Why should not competition be supplemented in the case of diets that are essential to health?

Competition, therefore, must be guided and supplemented in various important ways if it is to propel our national economies in the directions toward which they must move if they are to realize the ends of human civilization. Chapter XXI undertakes to lay out the forms which such supplementation can best take in an economy and a political system such as that of the United States. The aids and controls that are provided for such a purpose must be such as will lead production in the direction of the most effective use of resources and to those uses which will contribute most to improved consumption and standards of living. The controls must be used to make production and distribution orderly without preventing shifts in production needed to take advantage of improved technologies and changing demands. They must point in the direction of giving us the use of resources which free competition and no controls would give if these worked perfectly.

It follows from the foregoing that the nations need generally to do a more careful job of analyzing their food and fiber production than in the past and work out more thoroughgoing programs for fitting production and consumption to each other. Such analysis must take full account

of the possible advantages of obtaining some of the foods and fibers by import and of producing others in excess of domestic needs for sale in other countries. An international food and agricultural organization can be of help to individual nations in all phases of such analysis and programing. Its help is almost essential in the international aspects. The FAO's first step in furnishing such aid has been to look at the consumption needs of the different countries. This is the best first step for each individual nation. But the moment the food needs begin to be translated into terms of specific foods, the production side must be brought in. The foods chosen to supply the needs of the countries must be from those which can be advantageously produced in the country or obtained more advantageously in international exchange.

We must not go about such an undertaking with any false notions as to its ease and simplicity. It is easy enough to figure out on paper a program that if carried out will adjust the production and consumption of a country or group of countries. It is altogether another to get it accepted. Once it is accepted, there is constant danger that special-interest groups will try to direct it in ways temporarily favorable to them—as they did the AAA program adopted in the United States in 1933. They may even try to use the program to protect them from desirable forms of competition, to maintain lines of production no longer able to stand alone without protection, or to expand uneconomical production. What the paper program may become under such pressures may easily prove more of a handicap to a country than the failures of competition to achieve well-balanced and orderly production.

XXI. A BALANCED FOOD AND AGRICULTURE PROGRAM FOR THE UNITED STATES

THIS chapter undertakes to outline a food and agricultural program for the United States that integrates all the parts of such a program that are discussed in Part II and does this in terms of the social arrangements existing in the United States. This program will not fit any other country exactly as here outlined but with no large adaptations might fit a sizable number of them. Some of the adaptations needed will be discussed briefly in the following chapter. As presented, the program will present alternatives at several points but usually will state a preference for one.

Although the program presented is a comprehensive one, covering in some measure about all the parts of the problem analyzed in Part II, it need not be adopted in full in the next year or two. Instead, it represents a goal toward which whatever measures are adopted in the next five or ten years could advantageously verge. The authors do not expect to see any full-fledged agricultural measures adopted in the near future. What we shall probably have at the start are makeshift measures. This will especially be true if Congress acts in anticipation of surpluses, before they really become serious. The lines that such action will take are likely in any event to include attempts at control of acreages and production, at supporting prices at desired levels, and at disposal of surpluses at home or abroad, these lines of action either separately or in combination. The program here outlined includes all three of these, in the order named.

SECTION I

A cardinal feature of the program here proposed is that *no individual producer quotas will be employed*, that the old AAA system of quotas on historical bases will be abandoned. This may seem to some like a sweeping proposal. It was in Chap. X of the senior author's "Agricultural Reform in the United States" (published in 1929) that the plan of individual producer quotas on historical bases was first presented in full. The senior author is now ready to say that this procedure has been tested and found to work badly in practice. As outlined in "Agricultural Reform," the quota system was designed to be flexible and adjustable. As applied, it proved to be the opposite of this, and there is little prospect that a flexible procedure could be made to work.

What is here proposed instead is a system of *total annual quotas* for each farm product, these to be announced in advance of planting or breeding, at the same time as the support prices or loan values are announced. The price or loan guarantee is to cover only this volume of production. The cotton growers, for example, will know before they plant their cotton that the total cotton quota for which a price of, say, 15 cents per pound is guaranteed is, say, 12 million bales. How is the 12 million bales to be distributed among the individual producers? *On the basis of their actual individual sales of cotton in that year.* As soon as data are available as to the size of all crops, which at present is on Dec. 15, the Department of Agriculture will announce what fraction of each crop is to receive the guaranteed prices. If the crop reported in December were 15 million bales, the fraction would be 12/15, or 80 per cent.

In the case of livestock and livestock products, such announcements will be made after the Feb. 15 annual summary. They could be made twice a year if it was thought desirable in the case of livestock, for example, in time to affect spring and fall pig crops, or the seasonal flow of milk production.

The procedure could be left in this simple form, with no regard for carry-overs. It will work better, however, if carry-overs are figured in with the annual crops. The announced total will then read in terms of 12 million bales of new cotton, with an allowance, let us say, of 2 million bales of carry-over cotton (or whatever is deemed to be a normal carry-over). If it should happen that the carry-over on the preceding Aug.1 was 4 million bales instead of the normal 2 million, the support prices will cover only 12/17, or 70 per cent, of the new crop, the 2 million bales' excess carry-over being added into the new crop.

This procedure will not give rigid production control such as the individual quotas were expected to and in the main did so far as acreage was concerned. But the growers will realize that if they expand their production and carry-overs pile up, they will get support prices on a smaller fraction of their output. If, for example, in the year following the cotton crop rose to 16 million bales and the carry-over to 5 million, the supplementary payments would cover only 12/19, or 63 per cent, of the crop; and a similar increase the year following would reduce it to 57 per cent. Also, in this way of figuring, increases in yields will contribute to the same result as larger plantings.

It is obvious that this procedure will not freeze production according to historical bases. It will permit the areas that produce most efficiently to expand and force the less efficient areas to shift to other lines of production. Only by allowing areas to compete with one another in this way can national costs be reduced as needed to enable United States cotton pro-

duction to compete with that of other countries in the export markets of the world or with other fibers at home. At the same time, this procedure will make it possible for new producers to start at any time and also prevent individual farms from acquiring vested interests in quotas derived from historical bases. In fact, the whole burden of assigning quotas to individual farmers and all the inequities inescapably connected with this will be dispensed with, and all the petty business of checking compliance. Instead, each grower will need only to furnish evidence, ordinarily in the form of bills of sale, of having sold a certain quantity of his product within the official production year, say, Aug. 1 to July 31 for cotton. The evidence will, of course, need to be checked carefully.

In the case of wheat and products used on the home farm for food, feed, seed, and the like, the total quotas announced will cover only the sales off farms.

Subsection I*A*.—The main features of the procedure just outlined can be applied to almost any crop or livestock product produced for sale, whether nonperishable or perishable, and whether sold in a local or national market; but some adaptations will need to be worked out. With crops that are not carried over at all from one year to another, of course it will not be possible to add in any carry-overs in figuring fractions of crops to receive supplementary payments. Carry-overs of canned goods, including fruit juices, may, however, be counted in. For products having alternative uses, like milk, the prices of the alternative products will need to be kept in line with each other in each area.

SECTION II

No doubt the reader is wondering by this time what is to become of the rest of the crop. Perhaps he is assuming that it will be put into some ever-normal granary and held until production falls off or that it is to be moved into consumption at home and/or abroad at some reduced, or "Class II," or "concession" price. This may indeed be the type of makeshift arrangement that Congress will devise. What is here proposed instead is that the *whole crop or output be sold in the regular open markets at whatever price it will bring and that the producer be compensated for the difference between what he gets for his product, as evidenced by bills of sale, and the guaranteed price.* This means that actual market prices will be allowed to establish themselves in the usual manner, without any public price fixing. Farm products will move freely among the different markets in the United States and also into export markets at world prices, with no export subsidies or the like. The authors do not believe that the people of the United States will submit to general farm-product price fixing of the sort that was practiced in many other countries in the 1930's and during the

war in nearly all the participating countries and that still is practiced in most of them. They may accept it in the case of milk and a few special products, but not generally.

SECTION III

It is recognized that some unbearably low prices will develop in such markets, in single years from time to time because of high yields or overplanting and overbreeding, over several years in the case of livestock and perennial fruits, and over a run of years in the case of crops afflicted with chronic surpluses and in periods of business depression. The proposal for remedying these defects is to let them go on the market at whatever prices they will bring and *to supplement their market prices by payments of one kind or another. These supplementary payments are to be the difference between the actual prices received in the market, when these are the lower, and support prices, here referred to as "total" prices,* which are announced in advance of the planting or breeding. The farmer will thus know before he plants or breeds that his *total price per unit of product* will measure up to this level before he plants or breeds.[1] He will thus be able to plan his production with assurance of these total prices at least. In years of short crops, with prices above the preannounced total price, the farmer will get all his price in the market. Since the price of most farm products rises faster than the volume of product declines, with the result that short crops sell for more money than large ones, the farmers in general need no supplementary payments when yields and output are below average.

The supplementary payments will thus be made, not on the whole crop or output of any year, but only on the fraction of it represented by the preannounced annual quota. Thus if the cotton crop harvested is 15 million bales, as against an annual quota of 12 million bales, and the market price declines to 11 cents a pound, each producer will get the supplementary payment of 4 cents per pound on only 12/15 of his sales. If carry-overs pile up, the price will decline further and the supplementary payments will be larger per pound of cotton, but the fraction will get smaller.

SECTION IV

The reader probably has been assuming thus far that these supplementary payments are to be paid in cash or by check—like the "parity payments" of the prewar AAA program. This need not be true. They can instead be paid like the "agricultural conservation payments" (ACP)

[1] These total prices are therefore in effect a form of the "forward" prices that Prof. T. W. Schultz has presented in his "Agriculture in an Unstable Economy," New York, 1945.

now still being paid by the AAA, in the form of aids to farmers for approved production practices. It is here proposed that in normal years they be largely made in the form of aids to the individual farmer and farm family in needed production, marketing, and consumption adjustments; in helping them in making changes that will increase their income and well-being. The type of adjustment that is assisted should depend upon the circumstances. If the cause of the low prices is a chronic surplus, the most important use of the supplementary payments is in helping the farmers to shift part of their production to other lines. This is often true also in the case of temporary overexpansion, as in a phase of a production cycle. In any case, a wide range of choices should be open to the farmer and family as to the form in which they will take their supplementary payments; the range of choices should be adapted to different sections of the country; and the list of choices be varied from year to year according to the form that the readjustments need to take. Following is a list of readjustment aids within which the choice should ordinarily be made.

A. Production adjustments.

1. Aids in the form of equipment, breeding animals, seeds, and other supplies that are needed in shifting to other lines of production or simply to raise the income of the farmer.
2. Aids in land improvements, or improving the use of the land, that may contribute to shifts in production or to better farm incomes and in effect to enlarging farm businesses because of supplying more feed and pasture for livestock or providing more productive work on the farm. These might include any of the following:
   a. Improving or developing pastures—seed, fertilizer, lime, contour ridging, brushing, mowing, sprigging with Bermuda grass, etc.
   b. Legume seeding—alfalfa, ladino clover, and kudzu, plus liming and phosphate.
   c. Water- and wind-erosion control—strip cropping, terraces, meadow strips, basin listing, etc.
   d. Land clearing and removal of stones and stone fences.
   e. Land drainage and preparation of land for irrigation.
   f. Woodland improvements.
   g. Water supply—for livestock, irrigation, etc.
3. Aid in building repairs, enlargements, additions, and improvements needed in shifting to other lines of production, expanding farm businesses, and the like.
4. Aid to a farmer in enlarging a farm by buying land, in case, and *only in case*, it is smaller than an economic family-size unit. A family-size economic unit is defined for this purpose as a unit of the size that the average proprietor and family labor force in the area can handle without hiring labor except for particular operations like harvesting or threshing.
5. Aid to a farmer to enable him to join with others in his community in the following types of joint or cooperative undertakings: purchase of harvesting, threshing, spraying, terracing, and land-clearing equipment; becoming members in dairy-herd-improvement associations, breeding and artificial insemination associations, farm-accounting associations, and the like.

6. Aid to a farmer in the preparation of a careful plan for his farm and farm business, with maps showing soil types, slopes, cover, and present and proposed land use, and with operating statements showing prospective yields, production, receipts, and expenses.

B. Marketing adjustments. Under this could be included:

1. Aids in securing equipment needed in preparing farm products for the market, in home processing, and the like.
2. Aids in providing group or community processing facilities.
3. Aids in setting up cooperative marketing or buying associations, insofar as these need facilities.
4. Aid in marketing timber in the form of marking trees to be cut and helping the farmer to get bids on these.

C. Consumption adjustments. Under this head could be included:

1. Aids in housing repairs and improvements and additions needed for the health and working efficiency of the farm family.
2. Aids in obtaining household facilities answering the same description.
3. Aids in developing more adequate production of food for the use of the family.
4. Aids in securing a better family water supply.
5. Home plans paralleling and accompanying the farm plans described under *A.*
6. Membership fees in community health and hospital associations.

Subsection IV*A.*—Under special circumstances, the following additional types of aids may be considered:

1. Aids to transfer of the family or members of the family to other areas or employments, such as traveling and moving expenses.
2. Training courses for members of the family in nonagricultural trades and occupations.
3. Medical expenses.
4. Aids in securing essential supplements to family diets.

SECTION V

The supplementary payments should not cover in full many of the foregoing items. They should in a majority of cases be in the form of grants-in-aid that match, on a fifty-fifty or some other basis, expenditures made by the farmer for the purposes defined or match labor performed by the farm working force.

SECTION VI

A firm rule should be established that no grants-in-aid will be made to any farmer for production adjustments except on the basis of a farm plan which shows how the aid will be applied and how it will contribute to the objectives herein designated or other objectives that may subsequently be defined as matters of public policy. The making of such plans will therefore be the first step in the making of any supplementary payments.

These plans will be plans for development of the farm and farm business

over the next five or ten years. They will include any farm plans made by the Agricultural Extension Service, any plans for soil conservation or woodland improvement worked out with the farmers in soil-conservation districts, any plans for unit-test-demonstration farms worked out in conjunction with the TVA, any plans made as a basis of rehabilitation loans by the Farmers' Home Administration (FHA), any plans for the development of Bankhead-Jones tenant-purchase farms worked out under the FHA. Similarly, all aids in consumption adjustment should be based on home plans; and these home plans will include any plans developed in cooperation with the home-demonstration branch of the Agricultural Extension Service or the home supervisors of the FHA. Likewise, all aids to farm-woodland improvement will be based on plans that include the plans worked out with the help of the farm foresters jointly engaged in each state; and all aids in marketing adjustments, other than in the marketing of woodland products, will be based on plans that include plans worked out in cooperation with marketing-extension specialists in the Agricultural Extension Service or state departments of marketing. The final responsibility for these plans will rest with the county, state, and Federal food and agriculture program boards designated in Section XXV. These boards will determine their form and content and organize the task of getting these plans made.

There may also need to be simple plans for carrying out the over-all five- or ten-year programs from year to year. These will ordinarily be worked out by the agency that is most directly involved—for example, the AAA if it is making grants-in-aid, the Farm Credit Administration (FCA) if it is making a production-credit loan, the FHA if it is making a loan. The Agricultural Extension Service can look after any year-to-year plans not looked after by other agencies

SECTION VII

If the farmer is unable to make the cash outlays involved, he should be made loans to cover them at going rates of interest, these loans to be obtained from local banks whenever possible and otherwise through local production-credit associations or county offices of the FHA. The farm plans worked out in such cases must include a schedule of advances by the loaning agency and of repayment by the farmer.

Types of aids in which the grants-in-aid would be a minor fraction of the cost would be those for ordinary commercial fertilizers, especially those running high in nitrogen; those for purchase of standard farm equipment even when needed for the purposes named; for additions to farm buildings; and for the purchase of additional land. For some of these, the aid might not be much more than an advance to cover the

interest payments for the first few years. Aids that would be covered by grants in full or in large part would be fees for farm and home planning, for farm-woodland planning, and for membership in some types of associations. The aids might in normal times cover half or more of the cash outlays and labor by the farm working force on erosion control and farm-woodland improvements; in depression periods, still larger fractions.

SECTION VIII

Three steps will thus be involved in the handling of any grant-in-aid. The first will be to get an approved plan for using it; the second, inspection of what is done under the grant, or furnishing evidence that the expenditure has been made; the third, reimbursing the farmer for his expenditures under the grant or paying him for work done under it. If the farmer does not have the money with which to make the expenditures, the credit provisions of the program come into use.

SECTION IX

The supplementary payments, in the forms outlined in Section IV, need not be received in the year in which they are due. Instead, they can be entered as credits to individual farmers and claimed by them at any time, say, within ten years after they are available. They can thus accumulate until the farmer has funds with which to match them, or until large enough for some sizable venture, or until particularly needed in a depression period. They will thus tend to form a pool of reserve aid to farmers in periods of low incomes or in sequence of years when readjustments are much needed.

SECTION X

Such a program could be importantly countercyclical in its effects with reference to business cycles. First, in depression years the supplementary payments would be much higher than usual. Second, as above indicated, a reserve of supplementary payments in the form of grants-in-aid would tend to accumulate in good years and be available to draw upon in series of depression years. Third, the availability of these larger matching funds at these times would stimulate borrowing just at the time when an expansion of credit is much needed. They would also stimulate the undertaking of land and building improvements at such times, thus providing employment for construction workers, woods workers, and others, as well as for the farm working force. This latter form of employment would provide income needed by the farm family to supplement reduced income from its sale of farm products.

At such times the loans and matching grants or grants only could be made to compensate the farmer for work done by himself, his family working force, or his hired labor force on such as the following:

1. Pasture improvement.
2. Woodland improvement.
3. Erosion-control work.
4. Repairs to buildings and new construction.

If grants were used to cover such work, they would be in the nature of payments to farmers to enable them to work on their own farms and make needed improvements and repairs, and obtain a current income while doing this. To the extent that such work was covered by loans, the amounts loaned would be in the nature of advances to be repaid from the subsequent increased income of the farm. The supplementary grants might have to be fairly liberal in the case of work done on this basis. In such case the percentage of outlay plus labor by the farm working force covered by supplementary payments could be increased, partly to give farm families additional aid when it is most needed and partly to induce more undertakings and larger loans. There would also be less inducement to maintain full farm production if other employment were available on the farm. No large decline of farm output is socially desirable in depressions, but a decline of as much as 3 to 5 per cent in a severe depression, we have observed, probably would be generally helpful, especially for the types of products most likely to be in surplus at such times.

SECTION XI

Such a program would likewise tend to level out production cycles for particular farm products. By offsetting the low incomes of the high-production phases, it would reduce the amplitude of the reactions. It would also act strongly to end chronic surpluses, since the supplementary payments to aid needed readjustments would accumulate rapidly from the start.

SECTION XII

Thus far, the whole matter of better food and nutrition for the nonfarm population has been almost entirely ignored, the program having been presented almost exclusively in terms of its effect on agriculture. The proposals offered would in fact help the general economy and therefore urban consumers of farm products. They would help to maintain general purchasing power, without raising prices to consumers. They would lower food prices generally and gradually, because they would lower costs by inducing a better and more efficient use of resources in agriculture, and

would help farm people at the same time. But more than this is required for a program of improving the nutrition of the people of the United States.

We have noted in earlier chapters the manner in which food consumption increases with national income—at a very slow rate, but still enough to improve diets significantly. Moreover, we noted in Chart V that the increase takes the form largely of increased consumption of the protective foods—namely, the dairy and poultry products, meats, vegetables, and fruits that are required for better diets. One might take the position that all that is needed to obtain the improvement in nutrition reasonably to be expected is to raise the national income as fast as possible and keep it from sagging badly in business recessions and depressions and therefore that the whole effort so far as nutrition is concerned should be concentrated on improving the functioning of the general economy by employing the various measures now proposed for obtaining and maintaining full employment. This point of view has strong adherents in this country and had strong support from some of the economists from a few other countries at the Hot Springs Conference on Food and Agriculture.

Obviously, however, in the simple form just stated, *such a program is not a nutrition program. It affirms in effect, instead, that a nutrition program is not needed.* If the exponents of this view are entirely consistent, moreover, and many of them are, they must also insist that no adjustment programs are needed for agriculture itself. The program here presented assumes that both agriculture and nutrition programs are needed if progress toward desired ends is to be made. It does not reject larger and more certain incomes as aids to improved nutrition; it recognizes in full the importance of their contribution to improved nutrition; but it does not include an outline of a program for improving the functioning of the general economy. That is an assignment of another order, different from the one here undertaken. The program here presented is one that will *improve agriculture and improve nutrition even if national incomes are not raised or made more certain,* except insofar as food and agricultural programs as such will contribute to this end. But this program will work much more easily and effectively and accomplish more for farm people and for consumers if the functioning of the general economy can be improved at the same time and will, in turn, contribute more to the rest of the economy. Each helps the other.

SECTION XIII

A departure from the foregoing that is favored in many quarters but still is not really part of a nutrition program as such is the proposal that income distribution be improved so that the lower income groups have

larger and more assured purchasing power, since it is these groups whose consumption expands and improves most with better incomes. The procedures for improving income distribution that are now generally in use but that are favored for expansion are the following:

1. Free general public education, public health, fire and police protection, and a long list of public services available equally to all groups in the population.
2. Progressive income taxes, partly used to finance the foregoing free public services.
3. Social security, financed in the United States partly out of the public treasury and partly by enforced saving.
4. A group of related measures, such as reducing prices with increasing efficiency of production, so that consumers will have more real purchasing power. If this fails, raising wages so that the worker groups at least will have more purchasing power; strengthening the bargaining position of labor so that it can force higher wages in such circumstances; and making commodity distribution more efficient, so that retail prices are lowered and real incomes increased in this way.

Again, as with the measures for raising the national income, these measures for improving the income distribution, *if carefully and discriminatingly chosen and combined*, will improve nutrition and make the agricultural program here outlined more effective, but they are not part of a food and agricultural program as such.

SECTION XIV

Most of those who strongly favor the approach to improved nutrition by raising and stabilizing the national income, as outlined in Section XII, prefer, not the form of departure of Section XIII, but instead a program of educating people to eat better by choosing their foods more wisely and cooking and serving them better. And a major fraction of those who advocate the Section XII approach favor an educational program along with it. Now obviously a program of nutritional education is a food and nutrition program, or at least one part of it. We are therefore now beginning to consider an approach that is part of a food and agricultural program as such. And it is an approach that has wide acceptance among all classes of the population.

This chapter is not, however, the place to outline the details of a program of nutritional education. Suffice it here to say that it properly includes public education in the schools and among adults; education by labor unions, farm organizations, and the like, of their members and their families; education by the press and radio; and education by private firms and cooperatives through advertising and other mediums.

SECTION XV

Nutritional education, by itself, however, will not suffice to build up food consumption at the rate required by the circumstances outlined in

earlier chapters. Nothing short of a vigorous program of direct food-distribution measures will meet the needs of the situation facing this country and the world in the next ten years.

The form of supplementary food distribution that comes first in order of acceptability is school feeding, for, as was explained in Chap. XVI, it is at least half a form of education. Next in order comes the program for supplementing diets of mothers, infants, and preschool children. Then comes the in-plant-feeding programs, the stamp programs, and various forms of direct distribution. All these forms of supplementary food distribution have some part in a balanced agricultural program that includes nutrition along with agriculture.

SECTION XVI

The form of an over-all nutrition program to be fashioned from these individual programs depends in large measure upon how the program is to be financed. The obvious procedure is to set up the nutrition program independently of all other programs and to appropriate the necessary funds directly out of the public treasury. The effect of this would be a transfer of income *from* those buying their food in the regular markets at increased prices, (1) *to* the producers and (2) *to* those receiving the food at reduced prices through supplementary distribution schemes. Of course, even after this transfer, those paying the increased prices might be getting their food at prices that did not give agricultural producers as good incomes as most of the consumers would be receiving.

SECTION XVII

We have purposely refrained up to this point from discussing the financing of the production, marketing, and consumption adjustments outlined in Sections I to XI for the agricultural part of the program. The simple, obvious way of doing this is also to appropriate the funds directly out of the public treasury. This would amount to a transfer of income from consumers to producers of food, but it might well be only a temporary transfer, offset in five or ten years by a more than compensating lowering of costs of food production and prices. Also, again, the consumers might still be getting their food at prices that did not give the producers as good incomes as all but the low-income food consumers have. These latter might be provided for by supplementary food-distribution schemes.

SECTION XVIII

Out of the foregoing circumstances at once comes the suggestion that the two types of programs should not be financed independently of each

a few years. The farmers will get supplementary payments in the surplus years only. As explained above, the rise in prices in deficit years will offset the loss in volume. Since the supplementary payments in surplus years will be additional compensation, the actual price set will need to be lower than equilibrium price in a completely free market—probably only a little lower, however, if the supplementary payments are made in the manner indicated, and not mostly in cash.

If total prices are set at such an equilibrium level, they will also provide for the low prices in the depressed phases of livestock-production cycles. But the supplementary payments in this case will continue over several years and then disappear for a while. With chronic surpluses, it will be difficult to determine equilibrium prices. Whenever a product is in chronic surplus, low prices will maintain present levels of output probably for the next five or ten years, and perhaps longer. These low prices are therefore equilibrium prices—in the short run. But they leave the producers in depressed conditions. A long-run equilibrium price will more nearly accord with the ideas of the equilibrium economists. With total prices set at the long-run equilibrium, the supplementary payments would continue rather large year after year until they had induced enough shifts in production to bring supply and demand in balance at the total price level set.

If this rule for total prices were followed, it would, of course, be necessary to change the equilibrium price from time to time, not year by year, but whenever evidence accumulated that basic changes had occurred in technology and production costs or in competition with other products or areas in the market for any particular product.

Needless to state, determining the equilibrium prices according to the foregoing definition will be difficult. The best statisticians and economists in the world could forecast too high and too low as to what price will balance supply and demand over a run of years. But if such determinations are objectively made, without strong pressures from special-interest groups, they will usually be near enough to the definition of equilibrium price to provide a workable basis for action.

It is not likely, however, that in practice the Congress would be willing to leave the decisions as to total price in the hands of a group of economists and statisticians or even in the hands of a board upon which producer interests were represented without more explicit definition than is given here. They would want some more tangible rule, such as that proposed by Prof. T. W. Schultz—the average of prices in the several years before, excluding depression years or war years. Professor Schultz recognizes, however, that his procedure could not be applied in the period ahead, for 1935–1939 farm prices were very low.

Others have proposed the average of the preceding ten years. These might *accidentally* come out about right in many situations. That they would not fit the present situation well is evident in Table 21 (page 228), which compares such average prices with parity and "comparable" prices as now figured.[2] They average around 10 per cent lower than the 90 to 92½ per cent of parity provided in existing legislation; and the range is from scarcely half of parity prices for hay, to around 70 per cent for wheat and cotton, to around 90 per cent for most livestock and livestock products except hogs. In general, however, the departures from parity are in the right direction.

Subsection XX–1*a*.—Attention is called to the fact that the procedures outlined under Section XX–1 call for no purchasing by the government when prices fall to a level, such as 10 per cent, below the price set, as is proposed in the buffer-stock and ever-normal-granary schemes. Instead, the market price goes as low as it will, and the difference between this price and the total price is made up by supplementary payments. Similarly, no level of prices, such as 10 per cent, above the price set becomes a signal for selling out of stocks. Such procedures are, of course, price fixing, which the program here outlined undertakes to avoid because it interferes with the free movement of the product between markets.

If, however, the government wished to combine trading operations, designed to influence prices in the desired direction, with the proposal here outlined, it could do so simply by going into the market and buying whenever prices fall to the vicinity of a certain level and starting selling at certain levels above the total price set. Or it could lay out its program in terms of maintaining a given general volume in the granary by buying when prices are low and selling when they are high. It should be pointed out, however, that such a procedure will tend to unstabilize the income derived from some products at least, since it will generally check the rise in prices that normally offsets low outputs.

Such a procedure will, at the same time, increase the income from large crops because of holding prices up to a level that gives a larger price times quantity than there otherwise would be. For if it did not do this, it would in effect lower the total value of large and small crops combined. Thus such buying and selling operations tend to reduce prices when they need to be high to offset low volume and to raise them when this is not needed—at any levels above and below the 10 per cent leeway allowed in either direction. The amount of the income distortion produced will depend upon the slope and shape of the demand curve for the particular product.

[2] This table and the two following were prepared at the author's request by the Bureau of Agricultural Economics.

2. A *second alternative* is based on the assumption that what will appear to economists as equilibrium prices within a few years will be lower than the farmers of the United States will tolerate, especially with industrial

TABLE 21.—TEN-YEAR AVERAGE PRICES COMPARED WITH PARITY PRICES

Food groups	Average price, 1937–1946[a] (1)	Parity price, 1946[b] (2)	Percentage 1937–1946 price is of parity price in 1946 (3)
Wheat, bu.	$ 1.21	$ 1.71	71
Rice, bu.	1.32	1.58	84
Corn, bu.	0.94	1.25	75
Oats, bu.	0.50	0.77	65
Hay, tons	11.05	23.03	48
Cotton, lb.	0.176	0.240	73
Soybeans, bu.	1.46	1.86[c]	78
Peanuts,[d] lb.	0.056	0.093	60
Potatoes,[e] bu.	0.98	1.42[f]	69
Apples, bu.	1.65	1.86	89
Oranges on tree,[e] boxes.	1.53	2.91[f]	53
Hogs, cwt.	10.98	14.10	78
Beef cattle, cwt.	9.78	10.51	93
Veal calves, cwt.	11.11	13.10	85
Lambs,	10.71	11.41	94
Butterfat, lb.	0.452	0.510	89
Milk, wholesale, cwt.	2.89	3.10	93
Chickens, lb.	0.193	0.221	87
Eggs, doz.	0.288	0.417	69
Wool, lb.	0.341	0.355	96

[a] Includes ACP and parity payments, 1938–1943, for cotton, corn, wheat, peanuts, rice and potatoes and dairy-production payments, October, 1943 to June, 1946, for butterfat and milk, wholesale. The payments were distributed over the 10-year period and added to the average prices for the various commodities.

[b] Average base-period prices, August, 1909, to July, 1914, multiplied by 1.94, which is the ratio of prices paid, interest, and taxes for 1946 (1.94) to prices received for all commodities August, 1909, to July, 1914 (1.00).

[c] Comparable price.

[d] For edible purposes.

[e] Base-period prices are averages of weighted season averages.

[f] Parity base period 1919–1929.

wages at present or prospective levels, or than farmers can reasonably be expected to accept. Moreover, total prices set at an equilibrium level will not provide, year in and year out, a very wide spread between total and market prices for supplementary prices or payments, hence not a very

large sum to be used in needed production, marketing, and consumption adjustments, and certainly not a sufficient margin in the period of postwar adjustments.

However, when one starts to find a *practical working basis* for determining total prices reasonably above the equilibrium level one comes out with nothing much better than taking some period averages, such as 1937–1946 average prices, and applying to these some arbitrary percentages that can be agreed upon as fair and reasonable.

3. A *third* alternative is based on the assumption that there will continue to be a strong demand for *adhering to the parity-price standards.* The present high levels of urban wages conduce strongly to such a demand. High urban wages mean high prices paid, and these raise parity prices. If parity prices are retained, however, they surely will need to be revised. The most reasonable and practical revisions that have been proposed are the following:

a. Use a moving average of the last ten years to get the relative prices of the different products. (The more recent the period, the more nearly the relative prices will reflect current conditions of cost, supply, and demand.) If these changes alone were made, the parity prices for 20 farm products would have been changed for 1946 as in the first revision in Table 22. It will be noted that some prices are lowered—wheat, because of lowered costs, cotton because of lowered demand. Others have been raised, for opposite reasons mainly. The changes are very much in the desired directions.

b. Base the average level of all farm products on the last five-year period in which the relation between prices of farm products and urban wages, or prices received and prices paid, *was approximately normal.*

According to this test, the 1925–1929 period is the one to use. The economy was still much unbalanced in 1935–1939, with large continuing unemployment of labor and capital. Agriculture was still overexpanded. As a result, farm prices were altogether too low. On the other hand, labor and capital were pretty well employed in 1925–1929. Judged by long-time relationships, farm prices and urban wages were in pretty good balance. Labor groups have a right to say that wages were abnormally low in 1910–1914, but not in 1925–1929. The crucial reason for using this period as a base, however, is that it is the last one in which our economy was in somewhere nearly normal balance. *If base periods are to be used in determining the average level of parity prices, the general principle of always using the most recent normal or near normal one is worth establishing.* Of course, in shifting from an old to a new base period, some adjustments, like taking a particular percentage of parity on the new base, will nearly always have to be made.

TABLE 22.—PARITY REVISIONS, RETAINING THE 1910–1914 BASE

Food groups	Average prices received at farm, 1937–1946[a] (1)	Parity prices as now figured, 1946[b] (2)	First revision, parity prices, 1946, distributed according to 1937–1946 prices in Col. 1[g] (3)	Second revision—first revision adjusted to include wages of hired farm labor[h] (4)	Third revision—second revision adjusted to include wages of proprietor and unpaid family labor as if hired[i] (5)
Wheat, bu.	$ 1.21	$ 1.71	$ 1.55	$ 1.69	$ 2.00
Rice, bu.	1.32	1.58	1.69	1.85	2.18
Corn, bu.	0.94	1.25	1.20	1.32	1.55
Oats, bu.	0.50	0.77	0.63	0.69	0.82
Hay, tons	11.05	23.03	14.14	15.47	18.23
Cotton, lb.	0.176	0.240	0.226	0.247	0.291
Soybeans, bu.	1.46	0.186[c]	1.87	2.04	2.41
Peanuts,[d] lb.	0.056	0.093	0.072	0.079	0.093
Potatoes, bu.	0.98	1.42[b]	1.25	1.37	1.61
Apples, bu.	1.65	1.86	2.11	2.31	2.72
Oranges (on tree),[e] boxes	1.53	2.91[f]	1.96	2.14	2.52
Hogs, cwt.	10.98	14.10	14.05	15.37	18.12
Beef cattle, cwt.	9.78	10.51	12.52	13.69	16.14
Veal calves, cwt.	11.11	13.10	14.22	15.55	18.33
Lambs, cwt.	10.71	11.41	13.71	14.99	17.67
Butterfat, lb.	0 452	0.510	0.579	0.633	0.746
Milk, wholesale, cwt.	2.89	3.10	3 69	4.04	4.76
Chickens, lb.	0.193	0.221	0.247	0.270	0.318
Eggs, doz.	0 288	0.417	0.369	0.403	0.475
Wool, lb.	0.341	0.355	0.436	0.477	0.563

[a–f] See Table 21.

[g] Column 1 multiplied by 1.28, which is the ratio of prices paid, interest, and taxes for 1946 (1.94) to prices received for all commodities, January, 1937, to December, 1946 (1.52).

[h] Column 1 multiplied by 1.40, which is the ratio of prices paid, interest, taxes, and hired labor for 1946 (2.13) to prices received for all commodities, January, 1937, to December, 1946 (1.52). Index of farm wages given a weight of 11 per cent.

[i] Column 1 multiplied by 1.65, which is the ratio of prices paid, interest, taxes, and all labor for 1946 (2.51) to prices received for all commodities, January, 1937, to December, 1946 (1.52). Index of farm wage rates is given a weight of 32 per cent in calculating the combined index.

TABLE 23.—PARITY REVISIONS, WITH 1925 TO 1929 AS THE BASE FOR THE AVERAGE LEVEL

Food groups	Average prices received at farm, 1937–1946[a] (1)	Parity prices as now figured, 1946[b] (2)	Fourth revision—first revision but in terms of 1925–1929 as the base[g] (3)	Fifth revision—second revision but on the 1925–1929 base[h] (4)	Sixth revision—third revision but on the 1925–1929 base[i] (5)
Wheat, bu.	$ 1.21	$ 1.71	$ 1.37	$ 1.50	$ 1.73
Rice, bu.	1.32	1.58	1.49	1.64	1.89
Corn, bu.	0.94	1.25	1.06	1.17	1.35
Oats, bu.	0 50	0.77	0.56	0.61	0.71
Hay, tons	11 05	23 03	12.49	13.70	15.80
Cotton, lb.	0.176	0.240	0.20	0.22	0.25
Soybeans,[d] bu.	1.46	1.86[c]	1.65	1.81	2.09
Peanuts,[d] lb.	0.056	0.093[c]	0.063	0.07	0.08
Potatoes,[e] bu.	0.98	1.42[f]	1.10	1.21	1.40
Apples, bu.	1.65	1.86	1.86	2.05	2.36
Oranges (on tree),[e] boxes	1.53	2.91[f]	1.73	1.90	2.19
Hogs, cwt.	10.98	14.10	12.41	13.62	15.70
Beef cattle, cwt.	9.78	10.51	11.05	12.13	13.99
Veal calves, cwt.	11.11	13.10	12.55	13.78	15.89
Lambs, cwt.	10 71	11.41	12.10	13.28	15.32
Butterfat, lb.	0 452	0.510	0.51	0.56	0.65
Milk, wholesale, cwt.	2.89	3.10	3.26	3.58	4.13
Chickens, lb.	0 193	0.221	0.218	0.239	0.276
Eggs, doz.	0.288	0.417	0 325	0.357	0.412
Wool, lb.	0.341	0.355	0.385	0.423	0.488

[a–f] See Table 21.

[g] Column 1 multiplied by 1.13, which is the ratio of prices paid, interest, and taxes for 1946 (1.15) to prices received for all commodities, January, 1937, to December, 1946 (1.02), both on a 1925–1929 base.

[h] Column 1 multiplied by 1.24, which is the ratio of prices paid, interest, taxes, and hired labor for 1946 (1.26) to prices received for all commodities, January, 1937, to December, 1946 (1.02), both on a 1925–1929 base. Index of farm wage rates given a weight of 11 per cent in calculating the combined index.

[i] Column 1 multiplied by 1.43, which is the ratio of prices paid, interest, taxes, and all labor for 1946 (1.46) to prices received for all commodities, January, 1937, to December, 1946 (1.02), both on a 1925–1929 base. Index of farm wage rates given a weight of 32 per cent in calculating the combined index.

The percentage of parity taken as a standard—whether 90 per cent, 95 per cent, 100 per cent, etc.,—can be adjusted to make up for any differences resulting from the base period chosen. No one base period, however, can be expected to fit exactly. The fourth revision, in Table 23, shows the effects of using the 1925–1929 base period to establish the *average* level. This 100 per cent of parity on the 1925–1929 base is the equivalent of the first revision reduced to 89 per cent of parity, which is very close to the 90 per cent of parity provided in existing legislation for all products except 92½ per cent for cotton. If farmers refuse to accept this, a very simple solution would be to raise the standard to 105 per cent of parity figured on the 1925–1929 base or whatever level could be agreed upon. The higher it is raised, the larger the supplementary payments and the more matching funds for readjustments.

Some agricultural leaders, however, want to raise parity prices by including wages of farm labor in the index number of prices paid. The index number of hired-labor wages in 1946 averaged 380 on a 1910–1914 base, compared with 194 for commodities and services bought plus interest and taxes. Obviously to include such wages will raise parity prices. To include such wages for hired labor only will raise them 9 per cent as in the second revision in Table 22. This is equivalent to 12 per cent of parity on the 1910–1914 base. To include wages for labor done by the farmer and his family as if hired would raise parity prices by 29 per cent, as in the third revision in Table 22—equivalent to 37 per cent on the 1910–1914 base.

The same result could be obtained simply by raising the percentage of parity to be used from 90 to whatever is deemed reasonable. The real question is as to what is reasonable and practicable.

The last two revisions in Table 23 are like the second and third revisions in Table 22, but in terms of 1925–1929 relationships between farm product and other prices. The 12 points added by including hired labor offsets the 11 points lost by shifting to the 1925–1929 base. The fifth revision therefore gives a general level of parity prices almost exactly at parity on the 1910–1914 base. The sixth revision gives parity prices averaging about 15 per cent higher than the fifth revision. If the parity basis is finally negotiated by some form of compromise, the fifth revision has many points in its favor. The third and sixth revisions have the disadvantage that they will raise parity prices when they need it least, namely, in periods of high wages and labor shortages, and lower them when they need most to be raised, as in 1933–1940.

We have considered three possible alternatives for setting the level of total prices. There is really no scientific basis for determining which is the *right* level to use. Nor should one call upon the principle of equity

to serve as a guide. Rather, the criterion should be *whatever will work out best for the general economy.* This means that it must be something that can be made to work and that will induce changes in accord with public policy.

SECTION XXI

The form of the proposal that comes out of all the foregoing is that a total sum of perhaps around 2 billion dollars a year in a normal year, such as we can expect within a few years, be appropriated to cover a program including (1) production, marketing and, consumption adjustments in agriculture and (2) supplementary food and fiber distribution, the total sum to be divided between these each year according to certain rules or principles laid down by Congress.[8] The exact amount will need to be determined by careful analysis of the relevant facts and to be varied upward and downward year by year as required. The amount to be authorized could well be sufficient to maintain *total* prices averaging 100 per cent of parity on the 1925–1929 base with wages of hired farm labor included, or 85 per cent of parity on this base with all farm labor included. The relative levels of prices for different farm products should be based on a moving average of the last ten years, except as indicated in Subsection XXI*A* following. The total prices, it is understood, are to be maintained so far as possible in two ways, (1) by supplementary payments of the kind described above (to assist in production, marketing, and consumption adjustments in agriculture) and (2) by supplementary food-distribution measures that raise the prices of foods in the market place by increasing the demand for them.

Subsection XXI*A.*—It is not expected that the statistical procedure outlined above for establishing the set of relative total prices for the different products will fit closely or that any one procedure could be devised that would. The procedure designated simply seems to fit better than any other. Some adjustments from the set established are likely to be needed. The enabling act should therefore provide for having a price conference called, when deemed necessary, of representatives of farm organizations, of commodity groups, of members of Congress, and of other public agencies concerned, with the assistance of a technical staff, to examine the set of relative total prices obtained in the manner indicated,

[8] With present high levels of farm income, the financial needs of this program would be little more than now being appropriated. Financing would be required for the products already in surplus, such as citrus fruits, raisins, and prunes, and would provide mainly for distribution of these outside the usual channels of trade to improve diets of low-income families. It is unlikely that grants-in-aid to finance shifts out of production of these fruits would be good national economy. As surpluses of other types of products developed, additional funds would be needed, to be used more largely in grants-in-aid than in the case of the fruits named.

and make recommendations as to minor adjustments needed. The prices set are to be prices in local receiving markets.

SECTION XXII

The distribution of the supplementary payments between the different types of production, marketing, and consumption adjustments in agriculture will have to be worked out very carefully at the start, and each year, so that the payments are applied in the ways that will prove most helpful to agriculture. The Bureau of the Budget should help in making decisions on this point and should cooperate with appropriate food-and-agricultural-program boards and other divisions of the U.S. Department of Agriculture in reviewing the operations of the different parts of the general program.

It is here suggested, however, that emphasis be given in somewhat the following order:

1. Aids in farm and home planning, and associated educational effort.
2. Aids in reconversions and shifting out of surplus lines of production into lines needed by the nutrition part of the program.
3. Aids to low-income farm families.
4. Aids to consumption adjustment.
5. Erosion control—of course, much of this is included under items 1 to 3.
6. Marketing of woodland products, and woodland improvement—included in part in items 1 to 3 and 5.

SECTION XXIII

The choice of supplementary food- and fiber-distribution measures and the relative emphasis upon each should be decided in similar manner. It is here suggested, however, that they be supported in the following order:

1. A vigorous program of public education in nutrition, including home planning for nonfarm families when desired by the families.
2. School feeding.
3. Distribution of special foods to mothers, infants, and preschool children.
4. Institutional feeding.
5. In-plant feeding—limited to aid in organizing such services in plants or on jobs and to subsidizing the consumption in such feeding of a few key foods whose consumption needs to be expanded and in selected plants in low-income areas.
6. Stamp programs—to supplement the foregoing when needed by the total program, especially in periods of surplus food production while production-adjustment programs are getting under way. Two general principles should be followed in expanding stamp programs:

a. Extend them to groups in the population in the following order: first, families or persons already receiving public assistance; second, families or persons certified by competent local reviewing committees as malnourished because of low incomes, upon recommendation of physicians, teachers, extension workers, etc.; third, low-income

families generally on the basis of income and food-budget statements. The stamps should cover additions to diets only. This means requiring purchase of other stamps to cover former consumption.

b. Extend them into selected communities at first and into others later. The order of selection will be determined (1) by income and nutritional status and (2) by the adequacy of the local organization provided to administer the program. The central administration of the stamp program will determine the specifications of an adequate local administrative setup and offer the stamp program only to communities with administrative setups that meet these specifications. Competent and responsible reviewing committees would be necessary before stamps could be sold to the second and, especially, to the third groups named above.

The stamp program here outlined does not include the whole Aiken plan, but it provides the foundation for it, and could develop into it if this proved to be needed. It would develop into it rapidly if severe unemployment were to develop in this country or prices of farm products were to break to low levels for other reasons.

Subsection XXIII*A*.—It should be understood that to administer the Aiken plan would require getting income statements from each family making application for coupons and also reducing the number of coupons issued for meals eaten out and for home-produced food on farms and in family gardens in cities. The administration of this plan is therefore a considerable undertaking. The authors, however, think that it can be administered successfully if protected as here indicated.

SECTION XXIV

Up to this point, the program here presented has provided nothing specific in the form of the two-way integration of production and consumption that was discussed in the last chapter. Still, much of such two-way adjustment is involved in the procedures outlined. Thus education in nutrition is not very effective in terms of abstract calories, proteins, vitamins, and minerals. It needs to be in terms of foods and meals. In these terms, it affects the demand for different farm products and hence the production plans of farmers. Educational programs and direct distribution programs should therefore always be related to the production situations on farms—to the farm products that can be most advantageously produced as well as most advantageously consumed, and temporarily, to the relative supplies of the different products. The production programs in turn should consider what foods can be most advantageously consumed as well as produced and should at times be revised to increase the output promptly of foods then in short supply, that is, the foods lacking in accustomed diets and not likely to be successfully replaced by others.

Special mention should be made of one general type of production-consumption adjustment that may largely mean the difference between

the success and failure of the program here outlined, namely, changing the proportion of production and consumption that is of food products from animal sources. If surpluses develop within a few years as is now expected, the surest way to reduce them is to grow more feed and forage crops and feed these to poultry for quickest results, to hogs for next quickest results, then to lambs, then to dairy cattle, and then to beef cattle. Heavier feeding of existing herds of dairy and beef cattle will, however, also obtain rather prompt results. The most *efficient* conversion of feeds to human foods, on the other hand, will come from dairy products if the whole of the milk is used in human food in one form or another and proper weighting is given all the nutrient values in the foods and from feeding hogs if calories and fats and oil alone are considered. Moreover, a given amount of grain fed as a supplement to forage, which is abundant in many sections of the country, as in the case of dairy feeding, has a higher marginal efficiency than the same grain fed additionally to hogs.

To produce these additional livestock products and meats, however, will not meet the surplus situation unless these are consumed. This means that the supplementary food-distribution programs must expand the use of these foods. But diets including large percentages of these foods, although excellent nutritionally, are relatively expensive. And to subsidize the high-cost diets for low-income families indefinitely is poor national economy. Consequently, the foods in these groups chosen for expanded production and consumption programs should be those which the low-income families can most easily afford as their working efficiency and incomes improve. The efficiency of the food consumption must always be considered along with the production adjustments.

SECTION XXV

The authors will not undertake to outline the details of the organization for administration of such a program. They assume that its administration will be headed up in the U.S. Department of Agriculture. They believe, however, that highly essential for its successful conduct will be a national Food and Agriculture Program Board, with state and county branches. The county boards can set up subordinate local boards if they see fit. Upon these boards, at all levels, there must be representation of the Federal and state agencies working with farmers in the territory, of the AAA, the SCS, the FCA, and the FHA; of whatever form of marketing and food-distribution administration is set up and whatever forms of rural health administrations are set up; of the Agricultural Extension Service and the state departments of agriculture and/or markets. There will also have to be farmer members, part of whom represent the major farm organizations in the area unit and part of whom may not, and con-

sumer and labor members. Banker and merchant groups and social-welfare groups may also be represented to advantage.

The functions of these boards with respect to farm and home plans have already been indicated. The five- or ten-year farm and home plans worked out in this way should be reviewed and approved from the standpoint of how they fit into the general national program of agricultural adjustments and into regional, state, and county divisions of such national programs. They will have similar responsibilities with respect to marketing, nutrition education, and supplementary food distribution.

Ordinarily the chairman of one of these boards should be a distinguished and impartial citizen chosen by the board members from outside the agencies or organizations named.[4]

A few general points remain to be presented with respect to the proposed program and then a few details of application that can be very important. First as to the general points:

SECTION XXVI

A very great advantage of making supplementary payments in the manner here outlined is that the farmer will be less likely to expand his production if the total prices are set too high, or more likely to reduce his production if it is already too high, if he knows that the supplementary part of the total price is in considerable part to be made, not in cash, but in the form of funds to match contributions which he is to make, with

[4] It should be understood that these boards will not be actual operating agencies. Their function is to guide and direct the program at the various levels. Under this direction, the Agricultural Extension Service will carry on the educational and plan-making activities. If no legislation is enacted changing the present setup, the state and local field offices of the Production and Marketing Administration (PMA), the local SCS districts, and the local FCA and FHA offices will operate as at present. The only difference will be that their activities will be more closely integrated, all being unified under one program board. Of course all will be financed out of one common fund.

As to whether the operations of the SCS districts and the PMA field offices should be combined into one unit, the authors take no position; and similarly, as to the consolidation of the present lending programs. If these combinations were made, there would really be three functional agencies in each county: (1) the Agricultural Extension Service, responsible for education and plan making; (2) an operating unit doing what the PMA offices are now doing, plus the physical work on the land now being done by the SCS districts (the SCS districts could conceivably be revamped to take over the present PMA functions); and (3) an operating unit taking over the actual business of making the present FCA and FHA loans. A subcommittee on credit of the program board might be set up to review the loan applications prepared as part of the farm-and-home planning and recommend which agency is to make the loan in case the local banks or other private loaning agencies do not offer to do so. Of course no lending agency would be *required* to accept any loan.

borrowed funds in many cases. The making of compensatory or income-deficiency payments in cash has been found in the United States experience with so-called "parity payments" to help perpetuate the very systems of farming whose continuance has made them necessary. This has been true in important measure with the parity payments to cotton and wheat growers. The method of payment outlined here is carefully designed to have the opposite effect.

SECTION XXVII

It may be argued by some that the program as outlined does not build up sufficient reserves for grants-in-aid for a half million or more of families now farming with very inadequate resources; that these families do not sell enough commercially to obtain the supplementary payments which they need. In reply, it should be explained that the program as outlined is not intended to provide a complete coverage of all the difficulties facing agriculture. Just as it is contemplated that there will be need for much soil-conservation activity in conservation districts which is in addition to what is financed by this program, so it is contemplated that there will be need for help from the FHA which is in addition to what this program will afford. There will also still have to be housing, health, social-security, and other programs.

The aid provided by this program will, however, go a good way toward providing all the help that low-income farmers can use to advantage. It is characteristic of most such families that they learn slowly to make effective use of additional resources. The older among them commonly never do learn. Helping the oncoming generations of such groups is the major concern. For those who do learn to use more resources effectively, supplementary payments will increase from year to year. The functions of the FHA will be to provide more help than this program affords for the minor fraction of such families that can use more resources effectively.

The alternative can be considered, however, of scaling the rate of supplementary payments upward as the annual totals become smaller. Thus 20 per cent might be added to those under $200; 50 per cent to those under $100; 100 per cent to those under $50. This proposal is not part of the program here offered, but some may wish to consider it. The AAA program has inclined somewhat in this direction.

SECTION XXVIII

It may also be pointed out that the program as outlined will make large supplementary payments available to our larger farmers, who ordi-

narily need little or no financial help in their adjustments. This objection could be met, if it were important to do so, as under the AAA—by scaling down the rate of payments percentagewise after a certain level is reached, such, perhaps, as $1,000.

SECTION XXIX

A consideration of how to adapt the program here outlined to the international framework has been reserved for a later chapter. It is necessary first to consider how programs of this general type fit into the economic structures and institutional arrangements of the different countries, which will be done in Chap. XXII. Suffice it to say that the program can be accommodated to any international demand-and-supply situation. If, for example, other countries can use additional foods of several types, this country will be able to produce them as needed under this program, part of them at what was called "special-sales prices" in the recent report of the Preparatory Commission on the World Food Board Proposals.

(The remaining details of procedure are to be considered only as examples of the sort of details that arise in the execution of any program.)

SECTION XXX

The total prices will need to vary according to distances from central market, place of delivery, and types of products. The United States, for purposes of this program, should be mapped out into price zones for each product—and the differentials for the zones should be based on 5-year moving averages of the differentials, these differentials to be adjusted only every 5 years or when significant changes in freight charges are made.

SECTION XXXI

Making the supplementary payments available in subsequent years raises the question as to whether unused payments stay with the farm, in case the farm is sold, or go with the farmer. The answer is that, although they are the property of the owner of the farm, he can sell them only to the new owner of the farm. He can, however, apply them to additional land that he buys or rents, provided that this land can be fitted into a workable farm plan including all the land. They cannot be sold to another farmer or another farm.

Subsection XXXI*A*.—The alternative can be considered of allowing a departing owner to take his reserve aid or some fraction of it to another farm that he may buy.

SECTION XXXII

The farm plans will include the leasing system under which the farm is to operate, and the leasing system must be one under which the needed adjustments can be made.

Handling the supplementary grants in the case of rented farms calls for special consideration. It is important that they contribute to the maintenance of the land of rented farms at a higher level of production than do present rental systems; to land improvements of many descriptions on these farms; and to provision of better farm housing and farm buildings on rented farms. The general principle will be that the supplementary payments due upon presentation of bills of sale will be credited to the farm as a whole, to be drawn upon by the landlord and tenant in certain proportions. The adjustments needed on a farm under rental are ordinarily of sorts that should be made partly by the landlord and partly by the tenant, regardless of the form of the lease. Some of these are best made under some form of collaboration between landlord and tenant. The tenants will share in the higher productivity and better living and working conditions on the farms resulting from improvements made by the landlord. But unless they also share in the supplementary payments, the tenants now on the farm cannot be expected to contribute as they should to improving the farm, since they cannot be sure of remaining on the farm more than a year or so. Moreover, they will not make the shifts to other lines of production that may be needed. Therefore the supplementary payments should be shared between landlord and tenant.

The manner of this sharing must depend to some extent upon the leasing system, the system of farming, and the special conditions in any farming region; and the details of such sharing will have to be worked out in special landlord-tenant conferences in each important type of farming area. The general principle to be followed in the sharing of the supplementary payments is that about half are credited to the landlord and half to the tenant regardless of the form and terms of the lease. The landlord's uses of them will be for land and building improvements mainly in the case of cash leases, but they may include liming and seeding, and the like. They may also include herd improvements in livestock share leases and any of the adjustments listed under Section IV that the landlord normally makes or shares in making under the terms of prevailing leases or any leases that may be drawn that are approved by the aforesaid reviewing board. The tenant's use of supplementary payments will be for adjustments normally made by tenants under such leases and will be of two general sorts—those which he can take with him at the end of the lease, such as equipment and livestock and household facilities, and those the values of which must be realized upon the particular farm, such

as land and building improvements, some home improvements, and some marketing adjustments.

There should be a general provision in all leases that, when a tenant leaves a farm, he will be compensated for any unexhausted contributions which he has made to the farm, either out of his share of the supplementary payments or in the form of labor on land improvements, and the like, this compensation to be made out of any unused credits which the landlord has accumulated in the aid reserve or entered as a first claim against any future payments due him. The value of such unexhausted contributions can be established by an arbitration committee of the usual sort whenever the landlord and tenant do not themselves agree upon it.

The tenant will be free to take his share of any unused matching funds to another farm. If the tenant is quitting farming, however, and has no use for matching funds, he must sell them to the landlord or oncoming tenant at a price to be settled by arbitration if necessary. The tenant or cropper will be expected to do the work of applying the aids to the farm, except that, if labor is involved for which he will not benefit in the usual share, he will be compensated for this out of the landlord's share of the matching payments.

XXII. BALANCED PROGRAMS FOR OTHER COUNTRIES

FAR be it from the authors' intent to prescribe food and agricultural programs for the rest of the world. All this chapter will do is humbly to suggest certain ideas and proposals offered in Chap. XXI as worthy of consideration from the point of view of adaptation to the situations in particular countries. It will begin, as did Chap. XIX, with countries in most nearly the same situation as the United States, namely, the exporting countries. Most of these, however, are more dependent upon export markets than is the United States, and this may make for important differences.

The manner in which these proposals are adapted in a country will, of course, depend upon its political organization and institutions and even upon its prevailing political and social philosophy. As outlined for the United States, the proposals assume a competitive economy. The authors believe that, in spite of the many restrictions on competition that have arisen in the United States, its political and economic system is still fundamentally a competitive one and that no system which its people might undertake to set up in its place would serve so well as one made as truly competitive as it is reasonable to hope to attain. Every part of the program presented is therefore conceived from the standpoint not only of retaining competition but of making it more of a reality than it now is.

On the other hand, the main proposals outlined do not require a free-competition economy in order to be applied. They can be fitted into political and economic systems in which, for example, a good deal of price fixing and regimentation of production is practiced. Even in the United States, the actual market prices will not be free-market prices in the strict sense of that term. The usual import duties will prevail, and the usual devices of imperfect and monopolistic competition, like price leadership and resale-price maintenance, and also the types of public controls exercised in milk markets. It should be the long-time policy of the United States to reduce the levels of its import duties and to eliminate so far as possible all forms of monopolistic competition, but any agricultural program that is to work in the next decade must accept many markets that are far from being freely competitive.

Many procedures that appear on the surface like departures from free

competition are, of course, not departures at all. They may, for example, provide a different cropping and livestock-production setup from that which has prevailed in the past, or a different dietary for many of the people, or even a different set of relative prices. But these production setups, or dietaries, or sets of prices may be only those which would prevail if really true competition prevailed. They are departures, not from true competition, but only from the modified or pseudo competition that actually exists in many parts of the world. Or they may provide arrangements, even such arrangements as sets of prices, that are departures from true competition as it exists at the moment but that will not be so after the accompanying readjustments outlined are carried out. The proposals as outlined for the United States, however, accept the principle of action of setting up no arbitrary price schedules or similar regimens that are departures from the competitive ones, unless they are accompanied by measures that will make the arbitrary ones the truly competitive ones in the near future or as near to these as is practicable under the realities of the situation. But this need not be true as the proposals are applied in other countries.

The prevailing attitude in many countries is, of course, one of opposition to free competition—or at least free competition so far as agriculture is concerned. Their peoples have become opposed to it because of the manner in which it has worked or, more precisely, has been made to work. The authors suggest that the program offered for the United States, if adopted in many of these countries (modified, or course, to fit national institutions) will enable them to operate within the framework of a free-competition society and achieve all that they are now hoping to achieve by other means, with fewer and less rigorous controls.

Argentina.—If Argentina were to move in the direction of the proposals outlined in Chap. XXI, it would first consider substituting the *total* prices of that program, part of them to be paid in the form of supplementary grants-in-aid, for its present program of fixing domestic prices above the market by means of government buying and exporting. Its present system has the effect of perpetuating forms of production that need to be changed. Some of Argentina's agriculture needs reconversion as much as United States cotton growing. Moreover, Argentina's agriculture requires all the kinds of production, marketing, and consumption adjustments that are outlined for the United States; and to use the subsidies now in effect paid by pegging prices at higher levels, to subsidize the making of the needed adjustments, would be the highest order of good sense.

Second, Argentina is in an excellent position to use the production-quota scheme of Chap. XXI, including in its annual total quotas any carry-overs of export crops. It could in this way bring strong influence to

bear on reducing its output of export products to the limits of its foreign markets, except as Argentine growers may want to produce some additional at concession or special-sales prices, and at the same time raise its quotas of products that can be increased to advantage.

Third, even though Argentina's food-consumption index is at a relatively high level, large numbers of her people are underfed, and therefore the full supplementary food-distribution program of Chap. XXI would be in order as fast as it could be worked out. The increased home consumption thus induced would not be sufficient to affect prices of Argentina's large export products directly and in any important way. Indirectly, however, if the foods whose consumption was subsidized most were of dairy and other livestock origins, they would reduce some exports considerably. Argentine diets already average high in meats, but they could contain more milk and its products to excellent advantage.

The level of total prices set as a standard would have to be considered carefully. It could be fairly high without injury to the economy, if the taxes to support it were not mainly collected as sales taxes or as customs duties or provided that supplementary food distribution was ample for the low-income groups.

In applying such a program to Argentina, it is doubtful that market prices should be allowed at once to return fully to the competitive level. It probably would be good strategy to begin by reducing the export duties by one-half, and other direct price subsidies in proportion, and then gradually work toward full competitive prices over the succeeding five or ten years, raising the supplementary payments as the direct price supports were reduced.

One reason for this is that Argentina probably does not have an agricultural-extension service or other government agencies ready to take over a full-fledged program of production, marketing, and consumption adjustments in agriculture, with the farm and home planning that needs to go with it. It would need to build up a service organization to handle these tasks before the full load of it could be carried. By vigorous methods, including selecting good personnel and then giving them specific training, progress can be very rapid; but still a five- or ten-year training period would be needed. Especially important, a large amount of planning information would need to be assembled.

Such a program of farm and home planning, with close collaboration of extension workers and farm people, would develop a form of democratic procedure in the rural areas of Argentina that would be highly significant in its future political evolution. Of course, there would be a parallel problem, with equally important auguries for the future, in developing

the procedures for handling the supplementary food distribution among urban groups.

It needs to be added that countries like Argentina, with large dependence on foreign markets, are particularly subject to world-wide business recessions as well as to chronic surpluses. If they are relatively small countries, they may also have the frequent experiences of having a small crop in years when world crops are relatively large. Such countries therefore need to be equipped with programs that will carry along their producers for export at such times, without, however, tying them down to their old lines of production. Needless to state, Argentina needs now to be preparing for the break in export prices threatened in a year or two and to be ready to meet this break with something better than mere emergency makeshifts.

Will buffer stocks also be needed? The authors would say that, if the world generally finds itself afflicted with a large carry-over of several years' accumulation of some product, something in the nature of a buffer-stock operation may be needed as a way of feeding these carry-overs into the world's market—much as the British Joint Disposal Organization is now handling wool. However, once the leading export countries are operating along the lines here proposed, such emergency operations will not often be needed. As will be explained in Chap. XXIII, this same conclusion holds for the conventional prewar types of international commodity agreements.

How useful will domestic ever-normal-granary operations be within Argentina? Only in the manner indicated in Chap. XXI—perhaps helpful at times, but not essential, except as emergencies may arise in the period while this program is getting into full swing.

Following such a program, Argentina would find itself fitting smoothly into a world program of international production-consumption adjustment, with its agriculture improving year by year, and also the food consumption of its urban population. Its production of export commodities would become more efficient, and its farmers would increasingly be able to compete with the rest of the world without subsidy. If industrialization could be promoted at the same time, more Argentine farm workers could find jobs in cities, mechanization of agriculture would proceed apace, and output per worker on farms would increase rapidly.

Australia.—Australia will need to consider what steps to take when the British purchases of wool, meat, cheese, butter, and fruit at guaranteed prices come to an end on Dec. 31, 1948, as well as what to do when the general break in prices of export farm products comes. However well its statesmen may think Australia has handled its agricultural problem

in the past, one may question whether its two-price systems and related controls with their subsidies to producers at the expense of consumers have not (1) retarded some production and other adjustments that are much needed, (2) imposed something of a burden upon the low-income groups that has not been fully offset in other ways, and (3) been something of a disturbing element in international trade, and whether Australians could not to great advantage undertake the vigorous program of education and production, consumption, and other adjustments, within agriculture and among consumers, that is outlined in Chap. XXI and roughly as suggested for Argentina above. Surely such a program would make Australia a better cooperator in the whole community of nations.

New Zealand.—The same inquiry and comments as for Australia hold for New Zealand, but to a lesser degree except for the last.

Union of South Africa.—It would appear that agriculturally the Union of South Africa is at something of a parting of the ways and is much in need of an overhauling of its food and agricultural program and of a vigorous program of production and other adjustments.

Canada.—For Canada, the authors would suggest a 5-year transition, beginning in another year or two, from its present rather large dependence on minimum-price fixing, export subsidies, and Empire preference, to a program much like that of Chap. XXI. The farmers of Canada need all the reconversion and production adjustments that are needed in the United States, and the consumers the same improvements in their diets. Canada's agricultural extension organization and related agencies would have to strive mightily and grow to handle this assignment, but they could do it.

The United Kingdom.—The key question about the United Kingdom program is whether all that the British are doing for their agriculture or are hoping to do cannot be done within the framework of such a program as here outlined—that is, without the complete control of market prices now exercised, the present complete control of marketing, and the highly specific controls of production exercised by the county executive committees and all the way to the top. It may be that the British like all these controls and after a while will not want anything else or will be afraid to try anything with more "free enterprise" in it after a few more difficult years. But, on the chance that this might not be so, let us consider what some of the possibilities are in the way of gradually relaxing these controls.

Let us suppose, for example, that as a first step the market prices now being set were called *total* prices, of the sort suggested in Chap. XXI, and that they were split into two parts, with one small part, perhaps a shilling per bushel of wheat or a sixpence per gallon of milk, made in the form of

supplementary payments, that is, as grants-in-aid or credit for the same in a reserve-aid fund, and similarly for other farm products. These would permit market prices to move to that extent toward the competitive level and also to that extent remove the subsidies paid to the merchants to enable them to sell wheat and other foods to consumers at low prices. The grants-in-aid, in turn, could be used to help the United Kingdom farmers to make some of the many adjustments that they should make. At the same time, definite limits could be set on the total quotas that would receive these supplementary payments and the payments varied according to whether the product was one needing to be expanded or contracted. Would not the agriculture of Britain shortly be headed more definitely toward where it needs to go than now?

The next step would be to give the supplementary payments a bigger split and possibly raise total prices a little at the same time, so as to make larger adjustment aids available. At about this point, the whole system of county-war-board fixed quotas could be eliminated, and the farmers of the county could sit down in a democratic fashion and work out a county program of production adjustments that would fit into the over-all national production program, which would be worked out in a similar democratic way. At the same time, the funds would be available to finance the development of a vigorous agricultural-extension program with the kind of farm and home planning that has been described.

Also at about this time, the program of supplementary food distribution could be stepped up considerably, and this would take care of low-income families better than at present. Morever, by increasing home demand, the program would support prices of domestically produced foods at a higher level in the home markets. Consumer education could be expanded to go with this.

Perhaps by this time also, the market prices of some of these foods would have reached the competitive level, and the Food Ministry would have stopped buying them—or if not at this stage, then perhaps after a third splitting of total prices.

Probably, however, the controls of prices and the buying of a few farm products would have to be continued for some years. Certainly it would be necessary to continue the restrictions on imports of some of them for five or ten years and perhaps on imports of a few of them indefinitely.

On this last point, the issue is really whether the United Kingdom is going to use its agricultural resources largely to produce the milk, beef, vegetables, root crops, and fruit in which it has the comparative advantage or continue for military security or other reasons to maintain by subsidies a sizable production of wheat, sugar, and other products which it can buy much more cheaply elsewhere. Pigs and poultry are in an intermediate

position. The United Kingdom cannot be blamed for proceeding carefully in these lines until it sees what peace is going to look like in the world. The point to be made here is that anything its statesmen decide on this subject can be fitted into the program just suggested.

One final observation on the United Kingdom agricultural program is needed, although it has more pertinence with respect to the Continent. Many of the present leaders in Great Britain seem to have difficulty in thinking in terms of a program such as is outlined here. To them, there are only two choices; (1) continue the present full controls; (2) nationalize agriculture. Their socialist indoctrination is no doubt responsible for this in part. At any rate, they seem largely unaware of the evolution in the United States and some other countries of programs such as those of the AAA, the SCS, and the FHA, in which needed adjustments are being obtained by the device of furnishing technical aid supplemented by loans, grants-in-aid, and the like.

Europe.—Little will be said about balanced programs for the countries on the Continent. Our analysis for the United Kingdom pretty well indicates the lines of decision. The interwar years in Europe saw definite improvement in the agriculture of most of the countries, but also the institution of more arbitrary controls and attempts at self-sufficiency in farm products. As pointed out earlier, only a slight shift from meats to cereals and root crops would have made the Continent, except Russia, self-sufficient in food. But trade was not free between the countries, and diets were very unequal. Of course, the ratio of population to land resources plus industry was the main factor in determining dietary levels. But some production-consumption adjustments would have helped, too. In some situations, even in Europe, the programs adopted induced concentration on exports of commercial crops at the expense of protective foods needed for home consumption. A little of this production for export was even subsidized by export bounties.

The prevailing situation in Europe, however, is simply a need for production adjustments of one type or another and of improvements in diets among groups in the population, both of which can be fitted together to good advantage into programs of the general type discussed here and an equal need for democratic procedure in fulfilling these needs. A few of the countries, of course, have already started along this road.

The Plantation Economies.—The only thing further that needs to be said about the plantation economies is that most of them do seriously need to develop more balanced agricultural systems, with more family farms included and also small home farms for those working on the plantations. One can properly ask what the value is to some of these countries of their highly efficient plantation production if the people get nothing better out

of it than the kinds of lives they now live. The authors believe that with considerable adaptation a program such as that outlined in Chap. XXI can be made effective in diversifying the agriculture of these countries along the lines suggested. The careful planning of economic units of the two types named and freer use of supervised credit would be important features of such programs.

Venezuela and Colombia.—The readjustments needed in countries tied up in controls as these two are go well beyond what the program of Chap. XXI can provide. But included in such readjustments could well be the use of considerable parts of this program. These countries could, for example, even consider selecting a few of their products whose output is capable of being expanded and should be expanded to provide foods needed by the population and substituting for the present high import duties a system of import quotas plus total prices. The supplementary payments thus made available could be used to finance the production and marketing adjustments and technical aids required. Once production had risen to the point of satisfying domestic-market demand at reasonable prices, supplementary food distribution could be expanded. Needless to state, such a program would have to be introduced slowly in countries like these, which have developed little as yet in the way of services to their farmers.

The Orient.—For these countries, the authors would suggest first some careful experimentation with this program in small areas where the possibilities of needed adjustments seem good and the necessary services can be provided. A type of area that would be likely to afford such a program an opportunity would be one in which considerable migration from farms to new industries was under way. The program could also be used in demonstration areas to develop effective uses of fertilizers and new equipment. As it became possible to develop an organization to render the needed services, the program could gradually be extended to more and more of the country. If population increases absorbed most of the gains, however, not much headway would be made in improving nutrition.

XXIII. INTERNATIONAL

WE are now in position to sense the full meaning of the two statements in the Declaration of the "Final Act" of the Hot Springs Conference, to the effect that (1) attaining the goal of food enough for all is the job for the people of each nation but that (2) they can do this job better and faster if they help each other do it. The preceding 22 chapters of this book have been devoted to analysis of the ways and means of a nation's attaining this goal for itself. This chapter will be devoted to how the nations can work together in attaining the goal.

The first and most important of all the forms and phases of this international collaboration is described by the phrase *international production-consumption adjustment.* We have seen that the gearing of production and consumption each to the other is the core of our problem within the individual nations. It is equally so among nations. Just as each individual nation must organize itself so that it can determine what combination of production and consumption will give its people the best diets and at the same time the most prosperous agriculture and then make a plan that represents that combination and carry this plan into operation, so must the nations proceed who are now undertaking to work together in FAO, and all the other nations presently. That such an undertaking is gigantic and fully attainable at the best only after many years is evident when it is pointed out that full international production-consumption adjustment will be realized only when, first of all, all of each of the foods consumed in the world is produced in that country where it can be produced to best advantage, allowing, of course, for the costs of transportation and marketing. Full international production-consumption adjustment will mean, for example, that most of the wheat in the world will be produced in the parts of the earth that grow it better than they do anything else, and likewise all the sugar and wool and flaxseed, after allowing for the labor and expense of getting them into the hands of those who are to consume them.

The foods that nearly always have first priority of advantage under such an organization of society are fresh vegetables and fruits in season around their home markets. They are best grown as close as possible to their consumers because of their bulk and perishability. Out of season, they are best grown in the nearest area with the necessary climate. Next in

priority, in any area that has grass and forage, comes fresh milk.[1] Areas with very scanty rainfall and no irrigation water commonly can produce nothing but meat and wool, since nothing but grass and shrubs can grow there. Wool and mohair have priority farthest from market and where shrubs grow better than grass. With a little more rainfall, wheat will displace range cattle and sheep—or, in some parts of the world, millet and sorghums.

In like manner, over the whole large stretch of the United States, each area is producing some food or fiber, or more commonly some combination of these, that has priority of advantage in it. Usually it is a combination rather than a single product, for a combination provides a better year-round utilization of the land, labor, and equipment on the farm. Cotton, tobacco, and corn fit together in this way in parts of the South, and cotton and corn in others; corn, oats, hay, hogs, and beef cattle in much of the Corn Belt; wheat and beef cattle in parts of the Great Plains; and so on. There is a similar large extent of specialization by areas within Russia, within Argentina, within Australia, and within each of the smaller countries insofar as their climate and soils and other location factors are diversified.

Is this area specialization within these countries good for them? Few people have any doubts on the subject. They realize that all of us are getting our foods cheaper and better because of it. What would it cost to live in New England if it had to grow its own wheat? What would the diets of New England be like if all the fruits and vegetables it now "imports" from other states were shut out? The simple rule of action that prevails within the United States and all other countries with few internal trade barriers is that the consumers buy everything where they can buy them cheapest and best. They produced nothing in their own communities that they can buy cheaper in some other part of the country.

The same kind of area specialization would be equally good among countries. The people of France and Italy can eat better if they will buy their wheat wherever they can buy it cheapest, the people of the United States and Czechoslovakia if they will buy their sugar wherever they can buy it cheapest, and so with all countries and all foods and fibers.

A reasonable question to ask is: Why is production not distributed in this way if this way is best? The first answer is that it was discovered a long while ago that, if all imports can be stopped of foods or fibers which

[1] Of course, some in the Malthusian areas are living at a level of raw hunger that forces them, not exactly to eat the grass themselves, since their stomachs were not made to handle grass, but to put the grassland into whatever will produce the most calories, and they may not be able to spare even a little land for green, leafy, and yellow vegetables, to say nothing of milk.

are normally imported in part because the country does not have enough land well suited to them, the prices of these foods and fibers can be raised within the country doing this; and the producers of these have for one reason or another been commonly able to get their governments to impose these duties. As long as only a minor fraction of the producer groups of a country is "protected" in this way, these particular groups fare better. But they do it wholly at the expense of the rest of the people of the country. The case is exactly like that of a producer or a small group of producers of some item, like aluminum or sulfur, who obtains a monopoly of a product and makes the people of the country support it. Producer groups who are protected by import duties are simply being given national monopolies by their governments, at the expense of the consumers of these products. If a majority of the products of a country are in effect protected in this way, even those given the monopolies pay enough more for what they buy so that they are worse off because of the system of import duties.

The second answer is that countries going to war in recent centuries have often found their imports of some needed products shut off and have resolved not to get caught in this way again. This country in the Second World War was caught short of tin and had to collect tin cans and melt the tin from them and use glass instead of tin containers. The case for shutting out imports for military reasons has commonly been much overstated, but still it can be a valid one; and hence progress toward getting our foods and fibers produced where they can be produced best is going to be retarded until the threat of war is considerably alleviated.

A third explanation is that nations have discovered that it is easy for a new industry or line of production to get established if it can be given almost a monopoly of the home market while it is getting started. This also is a valid reason for import duties—if the principle is properly applied. The difficulty is that it is often applied to lines of production which never are able to stand on their own feet or at least which would contract a good deal if import duties were removed. Thus sugar production in the United States might well fall off one-third if the sugar duties and import quotas were removed. This one-third is production that cannot stand on its own feet.

Manufacturing industries, however, are more likely to be protected in this way, first as "infants" and later as full-fledged national monopolies, than are lines of agricultural production. In fact, nations largely agricultural at one time have commonly set out to make themselves industrial as well by vigorous use of import duties. This may have been the only expedient method to use; but it should be pointed out that ordinarily, if only a small fraction of the extra money that consumers have paid for protected manufactured goods had been spent on research, technical aid,

liberal low-cost credit, education of consumers in the use of their products and the like, this would have induced more rapid progress than has been achieved. It is to be hoped that this truth will be recognized in international efforts to help some of the nations industrialize in the next fifty years.

Related to the foregoing is the argument about using import duties to support higher wages and standards of living for workingmen. It is true that import duties may make possible fuller employment and higher money wages in the protected industries. And if enough lines of production and industries are covered in this way, the prevailing level of money wages is higher. Employers in the "nonprotected" industries have to pay as high wages as are paid in the protected in order to get the labor they need. Wages even in stores are higher because of this policy. *But the prices the workingmen pay for consumer's goods are still higher than their wages, so that their real or purchasing-power wages are reduced.* They are reduced almost exactly to the extent that the wage receivers are forced to pay more for domestically produced goods than for the same goods produced elsewhere. The general level of standard of living for the whole country is therefore lowered. Only in the protected industries will real wages be higher and not even in these if all the industries are protected.

Someone is always pointing to the relatively high standard of living in the United States and saying: See what our tariff system has done for the American standard of living! They forget that the United States has almost the highest ratio of *natural* resources to population of any country in the world, possible exceptions being New Zealand and Australia, and some of the countries whose natural resources are still largely undeveloped. *It is a reasonable deduction from the available facts and figures that, if this country had a ratio of resources to population no higher than Denmark's and Sweden's, its standard of living would be lower than theirs; and these two countries most nearly of any follow the rule of buying where they can buy the cheapest.*

If "protection" enables an industry to employ more workers, will there not be unemployment if the protection is removed? In the given industry, surely so, at least till the industry gets reorganized. Some of the workers will have to find jobs in other industries. Except in depressions, other jobs will usually be available. They will be most commonly available in the expanding export industries. But these may be in another part of the country. It should be obvious that removing or even just lowering import duties is not something to be entered into lightly. It may upset the life plans of many thousands of families. Import duties should therefore be removed only gradually, and workers should be helped to adjust themselves to the change. Nor should they be asked to bear the burden of it. It was not their fault that an uneconomic industry got

established and that they were drawn into it. It should be even more apparent, of course, that protecting an industry or increasing its protection should not be entered into lightly.

The first and most fundamental of all parts of international food and agricultural production-consumption adjustment, namely, getting the foods and fibers produced where they can be produced best, is therefore bound to proceed slowly. It is likely to make especially slow headway as long as the specter of another world war is before us.

The second point to make is that *the freer exchange of foods and fibers cannot usually be confined to foods and fibers only.* Many of the nations must pay for the foods and fibers that they import with manufactured goods or products of their mines or forests. The United States and other food-exporting and fiber-exporting nations must in effect accept these in exchange for their foods and fibers. No doubt by far the major portion of the products of the industries of the many countries now undertaking to industrialize will be bought within their own countries as their outputs per worker and incomes rise, but some of the products will need outlets in other countries. In fact, without such outlets industrialization will be greatly retarded. And we have seen how important industrialization is to the solution of the population problems of such countries.

The slightest suggestion of more imports of industrial goods sends many of the industrialists of the United States and similar countries into a panic. It should not do so. The imports of manufactured goods that the United States and other food-exporting countries will need to accept will be mostly of types that require an abundance of cheap labor, which the United States and similar countries do not have. They will be of types requiring much hand labor. Many of them will be made in small shops or even by rural handicrafts. To be able to buy handmade products cheaper than they can be made in this country will add to the content of living of our people. Many countries have not the coal and iron and other metals for heavy industries to compete with the heavy industries in which the United States leads the world. But as such countries industrialize and become more productive, they will be better markets for the types of industrial goods in which this country excels. They will also be able to buy more of the food products of the exporting nations. There will be more people in these countries to feed, each with more buying power for food.

The third main point to make in this chapter is that *the chances of freer exchange of foods and fibers will improve as the welfare of farmers improves in the different countries.* If a program like that outlined in Chap. XXI is adopted in one country after another in the next ten years, not only will the general

level of agricultural returns be raised, but depressed groups, like those suffering from chronic surpluses, will be especially helped and, more important still, agriculture in general will find itself supported effectively in periods of general economic depression, like that of 1929 to 1933. It is highly important to get such programs generally in operation before and if another such catastrophe breaks on the world. It was the depression of 1929 to 1933 that caused the last frantic rearing of tariff barriers and other trade restrictions around the world and especially in Europe. It will be an important achievement alone if enough countries adopt programs so that trade restrictions are raised no higher in another possible depression. From the point of view of the world at large, keeping real agricultural incomes from sagging at such times does much more to prevent depressions from becoming severe than it does in the United States, for agriculture is a much more important part of the world economy than it is of the United States economy.

In spite of all the possibilities along these three lines, we have no right to expect any rapid progress in realizing them. Indeed, we must conclude from the foregoing that international production-consumption adjustment must in the main and for some time work within a general structure of tariff barriers and other trade restrictions and only gradually develop under more favorable circumstances. The most important object of this chapter is therefore to explore the possibilities of *international production-consumption adjustment within a structure of trade restrictions*, taking advantage, however, of any relaxations that may be achieved from time to time.

Two possibilities exist under this head. The first is to do what can still be done in the way of production-consumption adjustment with the products not under too severe trade restrictions. The second is, in effect, to relax the restrictions on imports of foods or fibers needed for the health of the low-income groups of the population. Let us consider these in order.

The first requires making international plans and corresponding national plans to have the foods and fibers produced and distributed among nations needing them, insofar as trade restrictions will permit this, and then getting these plans executed. It is, of course, the responsibility of the FAO's World Food Council to see that these are done. The council's part will be to make an "annual program review" of the situation and the over-all plans. The FAO will then act as an intermediary in negotiating the arrangements between the countries under which the food and fibers are produced and delivered. The FAO is not itself, of course, an executive or action agency; its role is to arrange for the needed action by its member nations and by other agencies.

Let us take rice as an illustration. The FAO will have to collect the

best possible data of the current production of rice in the different nations, and of rice consumption, and then make analyses of rice needs and of the potentialities of expanding rice production and even of contracting it at times. It will turn these data and analyses over to the World Food Council, which will decide how much is needed, who should produce it, and the general form of the arrangements under which the exporting nations will make rice available to the importing ones. The FAO will then reduce these arrangements to definite terms and get them agreed to. Financing may also have to be arranged to obtain the rice produced in some of the countries. No doubt there will need to be a Rice Committee of the FAO and the World Food Council that will assume the particular responsibility for all this activity.

Will the foregoing require an "international commodity agreement"? This depends upon how such agreements are understood to be defined. It is doubtful that formal international agreements of the sort historically known as the international wheat or sugar agreements will be needed. The required agreements may be between several exporting and one importing nation, or one exporting and several importing, or simply between one of each. It will be the FAO's responsibility to see that these fit so far as possible into the over-all pattern worked out by the World Food Council.

Dairy products may serve to illustrate other aspects of the problem of international production-consumption adjustment. With dairy products, the emphasis must be upon the great need of some peoples for more of the important food values in whole milk, and, more particularly, skim milk. Many of the countries are not in a position to produce the needed supplies of these at home. They may be able, if suitable exchange arrangements can be worked out with the countries with large possibilities of expanding milk production, to buy some of them in their cheaper powdered or evaporated forms and distribute them to vulnerable groups in their populations.

Accompanying such international arrangements, there will commonly have to be some internal program adjustments within each nation. The FAO can help with these only by offering suggestions and technical aid.

The foregoing statements are not to be understood as meaning that conventional types of international commodity agreements will never be needed. Commodities that are heavily involved in import duties, quotas, export duties, and the like, as is true of wheat and sugar, may require some concessions from these before the necessary adjustments are possible. These will be in the nature of concessions that one nation can be expected to agree to only if the others meet it part way and hence will require that all the nations concerned enter into a common agreement.

In spite of the best possible international and national planning and implementation of these plans, however, there may in some years, because of favorable growing weather, be oversupplies of some foods or fibers in some countries and severe shortages in others. Planning of agricultural production always has a gamble in it at the best. It will be the FAO's responsibility to keep itself fully informed as to these situations and to be prepared to help in negotiating arrangements to secure the needed transfers of foods and fibers and of other goods in exchange for them or the required credits. Making such arrangements will be particularly important in famine years in particular countries.

Next comes the question as to whether it will be necessary to have international reserves, or *buffer stocks*, of any products so as to be able to meet the needs of some countries in some years. This depends upon whether world-wide shortages of particular foods, such as rice and wheat, are likely to occur and whether they can be more easily and effectively met by substituting other foods for them than by carrying reserves. Whether both rice and wheat are likely to be short in the same year is important in this connection.

Or it may be that such reserves are not necessary as insurance against food shortages but that the oversupplies of some products in some years or even a succession of two or three years can be advantageously put into international pools and then parceled out in succeeding years of smaller production. No doubt, situations of this sort will arise, especially in the several years following world wars. However, *they should be managed from the point of view of keeping these international reserves low by moving the stocks into consumption in countries needing them, rather than from the point of view of acquiring large stocks to hold over the market and thus regulate world prices.* The best way to hold prices of any product up to a reasonable level is to get it taken off the market by being consumed. The carrying costs of large stocks are very great. The same amount of money will usually be more effective if used in moving the product into consumption. The decision as to whether such international reserves are needed should therefore be based much more on leveling out consumption than upon leveling out prices.

Finally, and again, it should be pointed out that the need for such international stocks will be less if the nations will one after another adopt sound internal production-consumption adjustment programs such as outlined in Chap. XXI. Buffer stocks and similar devices should therefore be considered in the main as stopgap arrangements. The problems they are designed to handle need more fundamental solutions.

We now come to the second of the ways of getting international pro-

duction-consumption adjustments within a structure of trade restrictions, namely, *to relax the trade restrictions* when unusual transfers of particular foods and fibers are needed. The simplest of all the ways of doing this is for the country or countries needing one of these foods or fibers to let it come in without paying the import duties for the time being. This has already been done in times of famines and wars. Why not also in the case of foods needed for vulnerable groups or that are essential to correct serious malnourishment in parts of a country's population? It seems almost incredible that some countries are now actually imposing tariff duties on staple foods much needed by hungry millions of their people. But it is lamentably true. The least that can rationally be expected of such nations is that they will work out some form of supplementary food distribution which will get the essential foods to their underfed groups without their having to pay import duties. School feeding will be the form of distribution most appropriate in some countries. But, in not a few spots in the world, the starving and malnourished children have no schools to go to. And even when there are schools for them, they need food in their infant and preschool years.

Simply relaxing import duties or quotas on foods and fibers may not be enough on many occasions if a country is to fulfill its obligations to its peoples. Large numbers of them probably will not be able to buy the foods even with the import duties removed. The obvious way of meeting this situation is that employed by the United Kingdom during and since the war, that of buying the foods at whatever price is necessary to get them and then selling them to its people at prices they can afford. The United Kingdom chooses to do this for all its people. The reduced prices could be made available only to school-feeding and other forms of supplementary distribution. In fact, many countries would not be able to go further than this.

"Hot Springs Report of 1943" suggested that, in addition to the foregoing, the countries with the surplus foods make them available to underfed peoples of other countries at reduced prices and at least hinted that they might even plan to produce them for such a purpose. The idea was carried through all the discussions leading up to the organization of FAO and was strongly advanced in the 1946 FAO proposals for a World Food Board. It emerged finally in the "Report of the Preparatory Commission" on these proposals under the name "special-price sales." In the discussions, the term "concession prices" was frequently used. Others have used the term "Class II" prices. Before we consider the special-price proposal in detail, however, we should inform ourselves carefully concerning the proposals made to the Copenhagen Conference and ex-

actly what was done with these by the Preparatory Commission set up to review them and make recommendations.

The proposals made by Sir John Orr to the 1946 Copenhagen Conference for a World Food Board specified two objectives, first, stabilizing the prices of farm products and, second, improving nutrition and health. The Copenhagen Conference reversed the order of these in its instruction to the Preparatory Commission, surely not to Sir John Orr's displeasure.

The Preparatory Commission set up separate committees to deal with these two objectives. Chapter II of its report deals with the better provision of food, mostly in terms of expanding food production and "the provision of education and information." Chapter III stresses the importance of industrialization of the "undeveloped countries" mainly as a way of increasing the buying power for food in these countries. Nothing whatever is said as to the population aspects of industrialization. Chapter IV deals with the financing of the foregoing developments under the following heads: (1) industrial-development projects; (2) domestic construction; (3) importation of supplies for farm production; (4) measures for small-scale productive facilities; (5) measures for education, research, and welfare. Nothing is said at this point about financing any international movements of foods and fibers. Food warehousing and processing plants, however, are included.

The two succeeding chapters of the report deal with the price-stabilization objective, the first in general terms and the second in terms of specific commodities. The general analysis consists almost exclusively of a reproduction of Articles 46 and 47 of the suggested charter of the International Trade Organization, which deal with "intergovernmental commodity arrangements."[2] It begins with a strong statement of faith that "international agreements can contribute powerfully to the objective of price stabilization." It then states that

> The objective of price stabilization is to provide a foundation of confidence upon which producers can embark on programs of expanding production. This confidence is required whether the producers are further fortified by guarantees from their own governments or not; for governments will themselves look for some assurance that the cost of their price-support programs will not have to be immoderately increased.

The devices to be used in attaining this end are, of course, fixed prices or a fixed range in price, reserve stocks, quotas, and long-term contracts

[2] The personnel of the group that had developed this charter and of Committee 2 overlapped a good deal.

between countries. No one of these devices is to be included in all countries, not even fixed prices. Long-term contracts must be on much less exclusive terms than those of the United Kingdom during the war and must fit into multilateral trade policy.

The reserve stocks are of three kinds, "working stocks," to be kept in each country to meet domestic needs for reserves; "famine reserves"; and "price-stabilization reserves" (buffer stocks). These latter also are to be held in individual countries but are to be available, under arrangements to be worked out, to other countries when prices get out of line.

The report states that the commission devoted a long discussion to the implications of Sir John Orr's definition of desirable price levels as "fair to producers and consumers alike" but came forth with nothing more than a restatement of it in the same terms.

> In cases where a price or price range is negotiated between governments, the aim is a price which as far as possible is fair to the conditions of living of both producers and consumers. In the case of commodities where no intergovernmental price negotiations are undertaken, the other techniques of commodity policy discussed in this chapter may help to steady prices at levels which safeguard the legitimate interests of governments, producers and consumers.

The commission did not go to the extreme of meaningless verbosity of the following Caracas resolution on the definition of a fair price.[3]

> That the selling price of products be such that it will furnish those countries which are in a position to maintain efficient production a reasonable income in order to maintain the purchasing power of their people as importers and consumers, at an adequate level sufficient to meet the requirements of a decent living: which objective is attained principally on the basis of such working conditions as permit workers to be free from want and by furnishing farmers sufficient income to meet their needs and to maintain an even tempo of expanded production. Such price must make it possible, nevertheless, for the consumer countries to obtain under conditions of stability and regularity, the products which they have to import.

Particular note should be taken of the almost complete omission from this discussion of prices of any recognition of the distinction between world prices and prices within countries. The fixed prices, of course, apply only to world prices; the separate countries will operate at various levels above these depending upon their import duties, import quotas, and the like. France, Holland, and Italy, for example, are likely to keep on with their programs of holding domestic prices of wheat well above world wheat prices. Presumably they will begin selling out of their own national buffer stocks to their own consumers whenever world prices rise

[3] Third Inter-American Conference on Agriculture, Caracas, Venezuela, 1945.

above the price ceiling set in the international agreement and will begin buying from their own producers and perhaps from the buffer stocks of exporting countries whenever world prices sink below the price floor agreed upon. Their domestic wheat price may thus run $1 a bushel above the world price level. Still, their price will range up and down, theoretically, only as much as the world price ranges. Franker recognition that price stabilization will in the main take this form and that only gradually can the nations be expected to remove their domestic price supports would help greatly in understanding and evaluating the buffer-stock proposal.

It would seem from the foregoing that by all odds the most significant departure in this program of international commodity agreements is its inclusion in Section (*d*) of "special price sales for the improvement of nutrition." The commission recognizes that prices that are "fair" to consumers in commercial transactions "will in important instances be beyond the means of masses of low-income people in many countries. Therefore, the Commission makes . . . suggestions for intergovernmental arrangements by which surplus food should be made available at special prices for the purpose of raising nutritional levels of such low-income groups." The paragraph summarizing the Preparatory Commission's recommendations is as follows:

> We recommend that requests for special-price sales and offers of excess production be reviewed by FAO and the findings laid before the World Food Council, which would make recommendations to the commodity council concerned. The members of the commodity council would then agree on the form of the particular program, leaving details to the countries involved in the arrangement. We emphasize that such a far-reaching proposal would need to be developed gradually. Also we recognize that each group of countries—exporters, special recipients, and commercial importers—must have their various interests fully safeguarded if their cooperation is to be secured.

The phrase "offers of excess production" definitely implies that the exporting countries will offer in advance to plan to produce supplies of foods to be sold to others at special prices. This provides a clear basis for the widest possible planning of international production-consumption adjustments—not next year, but as fast as good working procedures can be developed.

The most important part of such an international arrangement will be the price at which the excess production will be exchanged. This needs to be thought about from the point of view of the prices at which the excess producers can afford to produce as well as the price which the buying countries can afford to pay. The best way of looking at it from the first angle is simply this: I am a producer of wheat. I can sell 5,000 bushels in the regular market at $1 per bushel, let us say. After paying for my

labor and other out-of-pocket costs and allowing for depreciation of machinery and land, I have $2,000 left as net income. If I could find a market for another 1,000 bushels, how cheaply could I afford to sell it? Suppose I could get only 60 cents a bushel for it, would the extra $600 of gross receipts leave me with any increase in my net income of $2,000? Would the $600 pay my extra labor costs and depreciation and leave me with a little for the extra trouble of managing the production of the extra 1,000 bushels? If it did, then I could afford to produce and sell at 60 cents a bushel. (Perhaps it needs to be restated that any depreciation of the land would need to be counted in.)

The decision in a matter of this kind must, of course, in large measure be a national one. But the method of analyzing it should be exactly as outlined for an individual farmer. A nation would want to know at what price its wheat growers, considered as a unit, could afford to produce and sell perhaps another 100 million bushels of wheat; or its rice growers another 50 million bushels of rice; or its cotton growers another million bales of cotton; or its dairymen another 100 million pounds of milk powder.

There would then be the problem of allocation of these national quotas among the producers in each country. The best procedure for this would simply be to ask for offers from the producers at the designated price and then figure out a way of distributing the total among them. The offer could be conditional upon obtaining normal yields or better. The class II wheat or cotton would be handled through the regular marketing channels, but the transactions, bills of sale, and the like, would be kept separate. There would be no difficulty of fitting this into the program outlined in Chap. XXI. Such production would be in excess of the national quotas and would not receive supplementary payments except under special circumstances.

These same procedures could also be used with surpluses that became available because of unusually good weather. The offers to sell would then be asked for *after the harvest.* Also, if international pools or reserves of any product were in existence, decisions could be made to sell out of these at reduced prices.

Unfortunately, not all the statements in the "Report of the Preparatory Commission" are fully in accord with the foregoing analysis. Note particularly the following paragraph:

> Such a far-reaching proposal we feel to be warranted having regard to the conditions which we have portrayed. Nevertheless, its qualifications must be recognized. First, the surplus-sales arrangements must be fitted into the agricultural production programs of the exporting countries. Second, the cost to the exporter of providing supplies at special prices must not be recovered by transferring any part of the burden to the price of commercial exports. Third,

since in total the sales at special prices are likely to be substantially smaller than the sales at commercial prices, which in turn constitute only a small part of the world's agricultural production, such disposal programs can make only a limited contribution to the nutrition of the less developed countries, even though production may be expanded in some countries for the purpose of making special-price sales.

The second of the qualifications stated was insisted upon by representatives of large importing countries. If taken literally, it virtually prevents any special-price sales. We have noted in analyzing domestic supplementary distribution measures that one of their objects is to raise prices. It is suggested in Chap. XIII, for example, that the 3-point rise in the index of United States food consumption which could be achieved by such measures would raise food prices by 10 per cent. Use of such measures internationally should raise world price levels in the same way. And they should be allowed to do so, for this is one of the effective and helpful means for bringing a price up to the floor set in an international agreement. Such supplementary distribution should not, of course, be employed to raise world prices *above* the ceilings set. But the floors and ceilings should in due time take account of supplementary demands for foods as well as the regular commercial demands. The big importing countries should adjust their thinking on this subject to these terms. They cannot consistently favor buffer-stock price stabilization and at the same time hope for the return of the cheap foods of the 1930's.

The two following paragraphs from the report are fully in accord with sound principles of action:

> For a system of special disposal programs to operate, an essential requirement is that the commercial market be effectively separated from the special-price market . . . . It will also be necessary for the recipient countries to provide adequate assurances and safeguards that any special supplies should be directed to the people in need, should not be resold in the ordinary commercial market, and should not be reexported.
>
> The Commission is impressed by the fact that for certain nutritional programs receiving countries may need to be assured of supplies at special prices over a series of years. In such instances the arrangements between supplying and receiving countries would have to cover an agreed period of years as well as agreed quantities, the agreement being binding subject only to a waiver covering specified contingencies such as war or crop failure, and the first claim for commercial demand. Exporting countries, in addition to using their best endeavors to program the requisite output, should hold sufficient stocks to minimize the risk of recourse to the waiver.

The financial aspect of special-price sales is recognized only in its relation to the undertakings of the International Monetary Fund. All pro-

posals of this sort are to be cleared with the fund to make sure that its balance-of-payment arrangements are not upset. The use of international credit is not mentioned.

All developments along the foregoing lines may be hindered somewhat in the next several years by the long-term contracts that some European countries have made to ensure needed supplies of food and controlled use of limited foreign exchange. The long-term agreements of the United Kingdom with its dominions include Australia's exportable surplus of meat and dairy products to 1949 and sugar to 1950 and Canada's exportable surplus of bacon to 1948, cheese and evaporated milk to 1949, and eggs to 1949 and a substantial quantity of wheat to 1950, as well as New Zealand's exportable surplus of meat and dairy products to 1949. Other long-term contracts have been made, such as the Argentina–United Kingdom meat contract and the United Kingdom–Denmark agreement on pork. It is hoped that most of these will end when food becomes generally available again and that the remainder will be adapted as needed to accord with international action as defined in this chapter.

PART IV

EXECUTION OF PROGRAMS

XXIV. EXECUTION OF PROGRAMS—GENERAL

To outline a program is the mere beginning of a program. Not until the lines of action that it lays out are in full operation is the program a reality. Most discussions of policy and programs stop with the formulation of the programs. This discussion undertakes to deal with the execution phases as fully as the formulation phases. This chapter and the six following are devoted to execution.

In contrast to the analysis of policy and programs, the analysis of execution is restricted almost entirely to the United States. There are two reasons for this: first, the space required to deal with execution in other parts of the world and, second, the intimate knowledge of the people and institutions of other countries that would be necessary. What follows must therefore be considered as a case study in the execution of programs. Readers in other countries will need to adapt it to their peoples and institutions.

Much effort went into the preparation of this part of our study. It is, in effect, the work of a special committee of the National Planning Association, of which the senior author served as chairman and the junior author as secretary. This committee consisted, as indicated in the front of this book, of representatives of agriculture, business, and labor. What this committee formally subscribed to was published as *National Planning Pamphlet No.* 46, "A Food and Nutrition Program for the Nation" (May, 1945). In the process of preparing this pamphlet, no less than 40 persons associated with various undertakings or organizations relating to the production, processing, distribution, and consumption of food were asked to submit their ideas and opinions in writing on aspects of the problem in which they were especially interested. A much larger number reviewed series of preliminary statements on various aspects of execution of the program. These ideas and opinions are assembled and summarized in Chaps. XXV to XXX. By no means, of course, do they appear exactly in the form in which they were submitted. The authors performed a considerable task of integration and even a mild measure of reconciliation.

Drawing up a program like that of Chap. XXI in reality is an undertaking for the whole people of the United States. Such a program is not a *government* program. It is a people's program. Government merely furnishes direction to the different parts of the program to see that they

integrate properly and leadership to its individual citizens and their organizations in fitting their undertakings into the whole. In the six chapters following, the task of execution of this program is broken down into the parts to be performed by the producers on the farm and their institutions and organizations, by the consumers and their institutions and organizations, by the processors and distributors, by labor and its organizations, by the press and radio, and finally by government itself. These chapters bring into proper perspective the individual-action, the collective-action, and the public-action parts of such a program.

The individual-action parts are by all odds the most important. If more foods of the right kind are going to be produced in any country, it will be, even in Russia, because of actions of millions of individual farmers in these countries—in Russia the actual tiller of the soil merely exercises his control in another way. Likewise, if diets are improved, it will be the homemakers of the world who will finally accomplish most of this. Collective action, if it is effective, is an outgrowth of individual action, designed to make individual action more effective. Government, in the last analysis, especially in modern societies, is only a form of collective action. As societies have become more complex, more collective and public action have become necessary. No societies have ever been able to function without a large measure of unity of action. The tribe was a closely knit organization, and surely the medieval village. But the task of securing such essential unity has been much more difficult as civilization has advanced.

The term that social scientists have now come to use to designate the means by which unity of action is secured is *social control.* In a modern textbook on sociology, the following forms of social control are analyzed: custom and tradition; education and research; public information (press, radio, etc.); propaganda and public discussion; beliefs and conventions; moral codes and religion; courts, commissions, and public regulation; private contract and its enforcement; rules imposed on their subjects by public agencies such as the public schools, public-service agencies, public hospitals, departments of government, etc.; rules imposed *on their members* by all sorts of groups, such as trade associations, labor unions, corporations, and cooperatives; rules imposed by private firms, as those of employers over employees, merchants over customers, and hotels over guests. It will be noted that only a small fraction of these come under the head of public or governmental control. We shall not be able to discuss all of these in this and the following chapters. But we should keep them all in mind as part of the problem of securing unity of action in food and agricultural programs.

Also, it should be very apparent that we should not escape controls if

we merely abolished all forms of government control. What we should do instead would be to substitute other forms of control for these. The probabilities are that these other forms would magnify in strength and inclusiveness till they exercised fully as much restraint on individual freedom of action as the government controls for which they were substituted. Modern society is too complex to be able to function without rules, and these rules have to be made and enforced by some agency—if not one that represents the collective power of the state or of some association, then private agencies such as business firms of one description or another. Hence our practical choice is between governmental and other forms of control.

The truth of this last statement can be illustrated very simply by the following incident: Six or seven years ago, my banker informed me that hereafter I would be charged according to a certain schedule for all checks handled and other transactions. This could have been a rule imposed by *one* business firm. A little inquiry showed that it was a rule that had been voted by the local clearinghouse association and imposed, with some latitude for individual member action, on the patrons of all banks in the community. Possibly some agency of government could have intervened, countermanded this extragovernmental rule, and perhaps imposed another rule in its stead; but none did. When I went around to discuss the matter with my banker, he imparted to me a whole philosophy of the need of such agreements within business groups and told me how he and his fellow bankers had recently been obliged to refuse loans to several trucking companies until such time as they could get together and stop stealing business away from one another.

Government controls have, of course, always existed. The tribal chief was the government in his day; the king in his; the manor lord in feudal times. In some parts of the world and in certain periods, the governmental controls have been relatively mild. The United States from the time of the first presidency through the last century operated under about the least governmental control that the world has ever seen. The reasons for this are not always recognized. The main one was the abundance of natural resources to exploit. There was nearly enough for all, and thus not many were tremendously concerned over the exploitation of the many by the few.

The object of this chapter is not to analyze specific problems of control in the fields of food and agriculture. Rather it is to obtain a clear idea of how controls operate. First of all, we need to understand how private, collective, and public controls integrate with each other. This can best be accomplished in terms of specific examples. Let us take first the case of milk distribution in the United States. Once the point was reached

where families living in towns had to have or at least wanted a fresh milk supply, some means had to be developed for getting the milk from the farms to the towns. At first, a few individual farmers near the cities began bringing their milk to the towns and delivering it from house to house. This failed presently to give the growing cities enough milk, and some farmers began collecting milk and distributing it. The Hood and Whiting milk companies of Boston originated in this way in the years around 1850. These distributing companies grew as the cities grew and had to go farther for their milk and build up larger organizations. To protect their supplies of milk and particularly to improve its quality as became necessary, they began to impose controls. Being larger than the individual farmers, they were able to do this as single firms, but not always as effectively as required. Hence before long a certain amount of unity of action developed among them. This does not mean that they ceased competing with one another. They worked together in some things and competed in others.

In time, however, the milk producers in many markets became convinced that the big milk distributors in their markets were working together to keep down the producer price. Without doubt, in many markets the producers nearest to cities found themselves at a definite disadvantage in the pricing process once their alternative outlets had disappeared. The next step was the organization of group action in milk-producer cooperatives. The officers of some of these cooperatives, it will be remembered, were indicted during the First World War for conspiracy under the Sherman Antitrust Act. The Capper-Volstead Act passed soon afterward gave cooperatives immunity from such prosecution so long as they did not "unduly enhance "prices. Shortly afterward a Division of Cooperative Marketing was set up to provide aids and services to cooperatives. Many of the states passed new or revised cooperative-marketing acts that gave wider latitude of action to cooperatives, especially the right to organize nonstock cooperatives. Then, in 1929, the Agricultural Marketing Act made large amounts of credit available to facilitate the operation of "national farmer-owned and farmer-controlled cooperative-marketing systems." Thus was group, or collective, control fostered among farmers as a counter to private control. The government put its weight on the farmer-collective side of the balance. The milk producers were allowed to bargain as a group under this setup, but not the milk distributors.

In the third step, taken with the passage of the Agricultural Adjustment Act in 1933, the Federal government became a third party in price and related controls in whichever interstate milk markets elected to come under such controls, and the arrangements worked out were imposed upon all

distributors of milk in these markets. It took the courts and Congress 5 years to clarify all the relationships involved in this arrangement. In the form of control that finally evolved, the producer cooperatives were again in the protected position. For example, the officers of the cooperative are allowed to vote the votes of their members on price changes and other amendments to agreements. The system of control set up in these markets is involved, detailed, and thorough, with scarcely any way left open to escape its provisions. The markets are definitely "closed shops."

The third step of bringing in the government as a third party was taken in 1933 because the collective bargaining that had developed in the 1920's kept retail milk prices too high, particularly in relation to the price of milk in other uses, in the depression years 1930 to 1933, and all sorts of new and irregular operators appeared in the markets and undersold those that were in on dealer-producer combines. Henry A. Wallace, at that time Secretary of Agriculture, enraged the producer cooperatives in a Farmers' Week talk at Madison, Wis., by speaking of the unholy alliance that had come to exist between distributors and producer cooperatives. The general public, and no doubt most milk producers, failed to appreciate then, and probably still fail to do so, that in most bargaining agreements, as in competition, the two parties may differ widely on some issues but work together perfectly on others in which their interests are the same, at least in the short run, but in which the consumers and the general public may have a very different interest. The hearings held in various markets from 1935 on brought out many instances of such collaboration of dealer and producer cooperatives—so many in the Philadelphia market, for example, that the previously highly esteemed manager of the cooperative was forced to resign when they were brought to light. At one time, as a result of such collaboration, milk prices to producers were $1 higher on the Connecticut side of the state boundary than on the New York side, with consumer prices in proportion.

The role of the government in milk-marketing agreements is supposed to include protecting the public against possible adverse effects of such producer-dealer collaboration. How effective government is in this way, especially when state government adds its controls to those of the Federal government, is a matter over which judgments differ widely. The facts have not yet been explored. The $1 difference in the Connecticut case cited above came under pure state control. There is little doubt that prices are much more even as a result of this tripartite control, both to farmers and to consumers, and the milk marketing is more orderly and probably more efficient. More markets are being brought under such control.

It was not necessary that milk-marketing controls develop in the form

they did. They could instead have developed in the direction of enforcing freer competition. The senior author once outlined such a development.[1] He proposed that public auction markets be organized at which the producers offer for sale, once a month, contracts to deliver specified amounts of milk of certain grades, with rules for handling deficiencies in amount and quality, the government to inspect and grade the milk of each farmer and give it a rating. This would have involved considerable public expense, but probably little more than the present system. The role of government would have been that of helping competition to set the price as at present in the wheat and cotton and other exchanges.

Other aspects of the integration of private and public action are best illustrated in the field of agricultural credit. To present these, use needs to be made of the familiar distinction between public action, public services, education, and research. Under public action in this field are included the actual making and collecting of loans; under public services, helping farmers to borrow wisely and to meet their loan obligations; under education, the training of operating and prospective farmers to handle the financial parts of their farm businesses so that they will no longer need services from government and similar training of operatives in private and public loaning agencies; under research, the making of studies of farm financing that will supply the data and information that farmers need in order to plan their own financing operations and that private and public agencies need in order to help them do this. At present, the role of government in credit is proportionately greatest in action and least in education and research. Of course, all agricultural education contributes in some measure to a better use of agricultural credit—the education and research referred to here are much more specific than general agricultural education, being education and research pointed directly at farm financing and planning the use of credit.

The backwardness of education and research in this field is not the only reason, however, for the large amount of direct public lending in agriculture. A related reason is that private lending agencies have been slow in providing the kinds of credit and the terms of credit which agriculture has needed. Before the creation of the Federal Land Bank system, farm-mortgage credit was supplied in considerable volume through channels that had grown up over the years without government assistance. Commercial banks, life-insurance companies, and farm-mortgage corporations were doing a sizable business in making mortgage loans on farms. In addition, much credit was provided in the form of individual private loans. But the loans available through these channels were not satisfactory to farmers because of the short period for which borrowings could

[1] See "The Dairy Industry and the AAA," pp. 250–253.

be made, the lack of amortization provisions, and the high and uneven rates of interest charged. The loaning system exposed borrowers to excessive risks in times of depressions, did not provide adequately for orderly repayment, and was not a very efficient mechanism for transferring funds from surplus to deficit areas.

The lines of action that progress in agricultural credit should take from now on can be outlined under six heads. This progress can be either public or private. Which it is will depend largely upon the initiative of private enterprise in this field. Government will take over by default if private credit agencies do not rise to the occasion.

As the first line of progress, mortgages to enable farmers to buy farms *should ordinarily be made on an amortization basis and should include variable-payment provisions.* Second, such mortgage loans *should be freely available to enable farmers to get enough land to make an economic unit.* Third, farm-mortgage loans should be more freely available for improving or raising the productivity level of farms without increasing their acreage. Fourth, either in the form of mortgages secured by farm real estate or in the form of chattel mortgages, loans should be obtainable for equipment, livestock, minor land improvements, and the other intermediate-term purposes listed above. These should run for periods long enough to let the additions to plans and equipment pay for themselves, and schedules of advances and repayments should be adjusted to the earnings. Fifth, special consideration should be given to the financing of farm buildings in the next decade or two, including dwellings. Sixth, an uncertain amount of what was called "supervision" by the FSA can be provided to advantage by private agencies.

Public credit is now in general in a better position to take action along these six lines than is private credit and may make the most progress in these directions in the next decade or two. But in the end its contribution should largely be to discover the ways and means and point the way for private credit to follow.

Services in this field should take the form of aids to farmers in working out farm plans and farm credit plans that can be used as a basis for loans from private banks or from public agencies in case the private banks do not rise to the occasion. As events are now shaping up, such aid is most likely to be furnished through the Agricultural Extension Service and such Federal agencies as the FHA and the SCS; but the banks themselves should increasingly be in a position to furnish this same kind of aid to their clients.

Education in this field includes specifically the teaching of farmers how to make their own farm plans and programs. Education in this should be begun in the rural schools, expanded in vocational courses in agricul-

tural high schools, and developed fully in substantial courses in farm management in the last year or two of agricultural-college courses.

If budget and planning analysis of the kind described is to give dependable conclusions, the farmers must have good information. The research of the agricultural experiment stations should be more specifically directed toward supplying information that is needed in farm-planning analysis.

It follows from the foregoing that, when education and research have done their full duty to the future farmers of the United States, the need for servicing of credit by government, as well as by private agencies, will be very greatly reduced and private credit agencies will be able to furnish most of the servicing that is needed. The order of participation of government in credit will then have become the reverse of that now, education and research first, services second, and action last.

Another set of principles has to do with the order in which different measures are undertaken. Upon a wise decision as to what steps to take first, and the order of subsequent steps, will largely depend what progress is made. Two types of considerations are involved in such a decision, first, the results obtained in relation to the effort put in and, second, the state of mind or receptiveness of those affected.

These principles are effectively illustrated in the field of forestry. To exemplify the first consideration, a small expenditure of public funds on some program may yield large results, whereas devoted to another program, however essential to really good forestry in this country, it may pay for itself with only a small, and perhaps somewhat uncertain, margin after many years. Public acceptance and support will be forthcoming much more readily if the measures are taken up in the order of their output in relation to input. This is true of public money spent on promoting forestry; it is even more true of measures taken by timber owners on their own holdings.

As for the second consideration in the timing of measures, it is obvious that one of the major obstacles to better forestry in this country is lack of public concern and the indifference of woodland owners. This poses for the foresters a difficult program in social psychology. They must find something in the attitudes and reactions of people at large and of timberland owners that they can seize upon to draw these groups into their programs. They must find the good "handle holds." The measures to take first, unless other factors are more important, are those which have the best handle holds.

When the various types of measures now employed or proposed are reviewed from these two points of view, first priority is given to fire con-

trol. No major forest activity now conducted by public agencies rates higher either in acceptability or in economic return than fire protection. Second priority is given to marketing assistance to small timberland owners such as that provided in a very small way before the war under the Norris-Doxey Act and since then in an increasing number of timberland counties all over the country. This type of measure is given high priority because it strikes the owner just at the time when he has the keenest interest in his timber and the highest appreciation of its value and shows him a way of handling it that will increase its present and future value. Inescapably, at the same time, it lays the foundation for a program of forest management for the tract. The owner himself is given a powerful lesson in several major phases of woodland management. Third priority is given to helping woodland owners work out plans for developing their timberland holdings, including such improvement cuttings as are needed. Next in order is listed the provision of credit such as is needed to enable owners to improve their woodlands, and last is listed aid in area planning that will designate the land in a particular area unit that should be devoted to forestry and indicate for each subunit in the area the general type of forest management that will prove most advantageous.

These are all measures to promote better private forestry. However, in some of the forest areas of the United States, private interest is not likely to be strong enough to provide the kind of timberland management that the public interest requires, and nothing short of *public ownership* will suffice. Also, some *regulation* of cutting practices on private holdings seems likely to be necessary to prevent abuse of the land by the "bad actors" in society. The positive measures here outlined, however, will in the end make a larger contribution to good timberland management than either public ownership or regulation, provided that the measures are adopted according to the two principles of acceptability and economic return.

The final principle regarding execution of programs is simply that, if any particular form of public control works badly in operation, it had better be abandoned unless it can be improved. Not only is this principle simple, but it is so obvious that it seems almost silly to state it. But, as a matter of fact, most of the discussion of control in the last three years has centered around control per se. One is either against controls, like Hayek in his "Road to Serfdom," or one is for controls. Those who say they are against controls mean by this only that they are against public controls, which means in effect, as pointed out earlier, that they are for private controls instead, either individual or collective. In the case of labor leaders, they are clearly for collective controls. So, in fact, are most business leaders, although they do not always realize it, and no doubt,

also, some of the cooperative leaders. To take a position for or against public controls in general and as such is simply being unthinking or naïve. We should instead throw out any particular control that in practice works less well than the controls that preceded it or that promises to do so upon careful analysis.

Two considerations are involved in the success of any specific control. One is whether or not the control can be effectively imposed; the other is whether or not it will be managed so as to do more good than harm, or vice versa. This distinction can be simply illustrated by the example of tariff duties. Governments generally have been able to collect customs duties—smuggling is no longer a serious menace. But this does not prevent governments, under pressure of group interests, from devising schedules of tariff duties that may do serious injury to their peoples. The strongest argument that used to be offered against public price fixing was that the prices could not be successfully imposed. The government of the United States discovered as early as 1930, under the Federal Farm Board, that either of two procedures would accomplish this: (1) buying up all of a product that was offered at a certain price, for example, wheat at 72 cents a bushel; (2) advancing loans to growers at a given price. The CCC has definitely formalized and standardized this second procedure. At the start, the loan advances were at a low level—52 per cent of parity prices—and the effect was mainly to even out sales over the year, on the whole a desirable effect. Congress later raised the loan rate to 85 and 90 per cent of parity and made the CCC a price-fixing agency. The war saved it from the disaster that probably was impending.

Is CCC price control good or bad? It can be either, according to how well it is managed. How well it is managed is going to depend mainly upon the freedom of action Congress gives it and how much it has to submit to pressures from short-sighted group interests. If it is managed badly for either or both of these reasons, it had better be abandoned.

The AAA types of crop control are now widely condemned, and rightly so, as they were functioning before the war. But if they had been managed as originally conceived and designed to be managed, we should not now be condemning them. What Congress did with the original designs over the following seven years would defeat any well-conceived purpose. What the administrators did, under the pressure of group interests, was perhaps equally damaging. This does not mean that all the effects of the AAA program were bad. In particular, those measures which were tied in directly with soil improvement contributed to some very desirable results. But the end result by 1940 was probably one with more bad in it than good. Can the good be salvaged without scrapping the whole program? This is the major policy problem confronting us at this time.

Of all these influences, prices will be the most potent—hence the strong interest these days in controlling prices as a means of leveling out production. Again it is necessary to point out the differences between designing an effective procedure for attaining certain desired ends and getting that procedure employed as designed. If the emphasis is placed upon direct price controls, the pressures may be very strong. It may well be better instead to place the emphasis more largely upon getting populations the food that they need and on guiding production and distribution along lines that will, on the one hand, supply the foods needed and, on the other, reduce the output of surplus foods, with indirect but salutary effects on prices. The pressures then may be such as to support rather than obstruct good food management.

The foregoing analysis has revealed two other important differentiations. The first is that between *direct* and *indirect* controls. Price fixing, production quotas, import quotas, tariff duties, and regulations of all kinds are direct forms of action. The indirect forms are education, public information, propaganda, and public aids and services of all kinds, such as the aids provided for conservation by the SCS and the AAA and the credit aids furnished by the FCA and the former FSA, now the FHA. A related distinction is that between *negative* and *positive* controls, those which say "Thou shalt not" and those which say "If thou dost so and so, thou shalt reap more bountifully." Obviously the positive controls are to be preferred, but society will not be able to escape some use of the negative ones until such time as the Humanists have realized their utopias, with every man wearing a halo. Little argument is needed that the principal reliance in democratic states must be upon the indirect and positive forms of action and that the direct and negative forms should be reserved for handling (1) the bad actor in society, the person who will not collaborate with his fellowman in the good society, the one in twenty that J. S. Mill talked about; and (2) the emergency types of situations, like wars and major depressions.

XXV. EXECUTION—THE PRODUCERS

We are now in a position to consider ways and means of getting into operation the balanced program of Chap. XXI. It is evident that applying such a program will require the combined efforts of the producers, consumers, distributors, and workingmen and all their organizations, with government to lead and guide. This chapter will consider the part to be played by the primary producers of the foods and fibers.

The part to be played by the farmer is simple enough to state in broad terms. It is to produce the amounts, kinds, and qualities of foods needed for good and economical diets, with an economical use of resources. If the program that has been presented develops as outlined, he will achieve these objectives by planning his production so as to take the best possible advantage of the *total* prices—market plus supplementary—that are announced. This will mean producing the combined output and relative amounts of different products that will maximize his net farm earnings, counting in the supplementary payments at their value to him. It will also mean devoting his supplementary payments to the use that will contribute most to the continuing success of his farm business and the well-being of his family.

The program objectives sought may fail to be achieved in two major ways. First, the administrators of the program may fail to set the total price for products, and the rates of grant-in-aid on the different uses of the supplementary-payment reserves, in such a way as to encourage the production of the amounts, kinds, and qualities of foods and fibers that will achieve the best possible combination of these in the diets and living of the consumers. Second, the individual producers may fail to adjust their production so as to maximize their gains from the market and supplementary prices combined. If both tasks are performed exactly right, the highest possible well-being will be achieved for producers and consumers combined—production and consumption will be in perfect adjustment. One has no right to expect such perfect adjustment at any time, and certainly not at the outset. Progress is always in large part a matter of trial and error and further adjustments. If the procedures are right, however, the adjustments will always be farther in the direction sought.

The task of designating the total and supplementary prices and grants-in-aid has been referred to above as a task for the administrators. This is

accurate only if the term "administrators" is understood to include the whole national organization, from Washington down to the state, county, and local committees that must help set the schedules of prices and grants-in-aid. If the national organization is good, the schedules will be good. But organization must be good throughout.

The farmers of this country have already had considerable experience in adjusting their production to fit goals and preannounced prices. As explained in Chap. XVIII, they began doing this in the outlook program inaugurated in 1923. The prices in that case, however, were only prices forecast or conjectured for them by public servants in the Bureau of Agricultural Economics. A little later they were told in general terms the types of adjustments in their production that they had to make to attain the prices forecast. Under the AAA, they were compensated for making particular acreage adjustments and penalized in some cases for not doing so. Under the FSA, about 700,000 farmers, at one time or another, had local "supervisors" help them work out simple readjustment and credit programs as a basis for loans. The SCS has helped around 300,000 to work out complete farm plans designed to control erosion. The TVA has required a farm plan on all the unit-test-demonstration farms for which it has supplied phosphate. Finally, under the wartime production program, farmers in the whole United States had the experience of adjusting their production to take advantage of support prices.

The farmers in the United States have learned a great deal from this experience. Out of it they have laid a foundation upon which to build future progress. The lines that this progress should take are clear. They consist in a nation-wide program of planning production and related marketing and consumption adjustments and revising these plans from year to year. Some of the states have already made much progress along these lines. Missouri's "balanced-farming" program has already reached over 7,000 farmers, and the assistant county agents now in many of the counties are initiating additional farmers into the program at the rate of about 75 per county per year. The SCS, the TVA, and the FHA are continuing with their programs.

For a farm already fully organized, with its resources well developed and erosion under control, the plan needs to take the form of a balance sheet of receipts and expenses in a normal year with present prices. The next step is to substitute the prices and grants-in-aid that are announced for the future and see what effect they are likely to have on the net farm income. The next is to try various alternative production programs until the one is found that promises to maximize the net income with the set of prices and grants-in-aid offered for the future. This analysis cannot safely be in terms of one year only. Some of the possible changes will

yield their returns only over a period of years. This is especially true of shifts from crop to livestock production and to different forms of livestock products. Shifts of this latter sort may involve improving pastures and other land developments.

For farms not meeting the above description—and this includes most of them—a wide variety of additional changes must be analyzed in order to discover the full possibilities of the grants-in-aid. First, erosion may be a serious cause of losses on the farm, and a program of strip cropping, terracing, and meadow strips may promise much in the next five or ten years. Or clearing and developing pastures may promise to add much to farm income. Or sloping hillsides in the Southern Piedmont may be converted to kudzu plantations and make possible the keeping of twice as many dairy cows as before. There may be woodland to be treated to improvement cutting, wet lands to be drained, fields to enlarge by removing stone fences, and buildings to repair and enlarge to take care of more livestock.

For farms that are too small, any of the improvements just outlined may promise to add importantly to the resources of the farm and increase its output. But it may be necessary to acquire additional land in order to raise the farm income to a reasonable level. The alternatives with respect to this must be carefully analyzed and weighed, first, to see whether or not they are feasible and, second, to discover what program promises best.

If none of these proves to be adequate to the task of giving the farm family a reasonable income, even more drastic readjustments should be considered, such as selling the farm to a neighbor so as to increase his opportunities for a good income and seeking a better farming opportunity elsewhere or, more probably, finding another occupation, especially for the younger members of the family.

If the farmers of this country are to readjust their production in the foregoing ways, they will need much assistance in one form or another. They must be supplied with much information, which they do not now have, as to relations between inputs of fertilizer and feed and the resulting outputs, as to methods of applying fertilizer and improving pastures and woodland, and the like. The great rank and file of the farmers must be helped in planning the reorganizations of their farms, as a small fraction of them have already been helped. This is an undertaking for the whole country. We cannot expect that it will be accomplished all at once.

This planning program must be thought of as education; and we must think of education, not as something handed down by a publicly organized and maintained school system, but rather as a two-way process in which the participation of the learner is fully as important as that of the teacher. Farm planning is a form of adult education—a highly effective form

because it means learning by doing. To understand the full meaning of these last statements, let us picture a group of farmers gathered together in a country schoolroom to undertake the planning of their farms and farm businesses for the coming year. The extension leader appears before them with a map of a farm in their area and with mimeographed sheets upon which are presented the data about this farm which are needed in order to analyze its organization. Some of these data take the form of a budget of farm receipts and farm expenses in an ordinary year. He then proceeds to test the effect on the net income of this farm of various alternative organizations and plans until he arrives at the one that promises to maximize the net income of the farm. In this analysis he uses the total prices and supplementary grants-in-aid that are provided in the program and the information as to production goals that has been worked out for the coming year. The farmers will ask many questions and advance arguments for and against different plans for the farm. Some will say that the plan which maximizes the income may call for too much additional work, or for some additional expenditures which the farmer may not wish to make, or for expanding a line of production in which he may not be interested. All these points need to be threshed out carefully.

Now comes the second meeting. Each farmer will bring to it as complete information as he can about his farm and will himself set about working out a plan for it following closely the lines taken by the extension leader at the first meeting. Any data that he needs about input-output relations, and the like, will be supplied by the extension leader insofar as possible. At the end of this meeting, or perhaps at still another, each of the farmers should have worked out the plan for his farm that he will undertake to follow in the coming year. It is his own plan. Nobody has imposed it upon him. He has, however, discovered in the process of his figuring what it means to him to choose any one of the alternative plans in preference to another, as to income, outlays, working requirements, and the like.

The year following, only one meeting is ordinarily necessary for this group of farmers. They can bring in their own plans and any new data based on last year's experience, and the extension leader can bring in the new data on total prices, supplementary grants-in-aid, production goals, and the like. At the end of the meeting, each farmer will have a revised plan that he expects to follow during the year ahead.

How many farmers can work effectively in such groups? Probably not more than 8 to 10 the first year and twice that number the second year. In the third year the groups can be much larger. All that will be needed will be the presentation to the group of data on the new prices, grants-in-aid, and goals and plenty of time to discuss the effect of these on the farm

plans. From the third year on, the farmers should be able to revise their own plans once they have a clear understanding of the new developments in prices, and the like.

However, if education is to make its full contribution to agricultural-production adjustment, it must begin long before the learner reaches the stage of operating a farm. Few persons raise any question as to the need for vocational agricultural education in the schools at all levels from primary to postgraduate. The questions posed are rather how much of the curriculum should be given over to such vocational education and how much kept for general subjects that fit a youth for other occupations or professions as well as for agriculture. Obviously, a large fraction of the young men born on our farms must look for their opportunities outside of agriculture. If all the farmers' sons born in the generation centering on 1940 were to remain in agriculture and become farm operators, around 175,000 new farms would be needed each year.

The reasonable procedure is to make some agricultural education available at all levels of school education and let the pupils and parents choose how much of this to include, on the basis of the best information that can be made available to them as to the outlook for farming in the next fifty years. Some vocational training should be included even in the primary rural schools. This will be the last chance that many pupils will have to get any agricultural education. The high schools in rural areas, however, will have the major responsibility for vocational agricultural teaching in the next several decades. They will train a large fraction of the future farmers of this country, and comparable schools will do the same in many other countries. This is about the level of education that the nation should plan for the rank and file of the farm operators of the next generation. Agricultural education at this level therefore needs to be highly effective. It should provide a good foundation in the natural sciences, so that farmers can read the bulletins and circulars presenting the results of the newest agricultural research, and courses in elementary economics and farm management designed to enable them to read and use current economic information. The emphasis should be on how to apply principles and to use data, not on teaching rules of action. The farm-management courses should include training and practice in making farm plans and preparing annual budgets. This should be the final stage in high-school training for the operation of farms. The other courses should provide the basic principles and materials needed in preparing such plans and budgets. Other courses should prepare young farmers to deal similarly with the marketing and finance problems.

More and more farmers of the future will be college graduates. The agricultural colleges can expect that more of their graduates will become

farmers and a smaller fraction teachers, county agents, research workers, and the like. They should therefore provide a type of training that fits young men for actual farm operation. This means stronger emphasis on training for farm management as such. Agricultural-college graduates should look forward to operating farms with gross incomes of $5,000 or more; a large fraction of them, of $10,000 or more. At normal levels of prices for farm products in 1940, around 75,000 farms would have had gross incomes of $10,000 or more. Operators of farms of this size can derive great benefit from a properly balanced agricultural-college education or its equivalent. Many of these farmers will inherit their farms, although perhaps under a mortgage written to pay off the other heirs. Those who do not should still make their plans with a view to developing at least a $5,000 business. Gross incomes of $5,000, and upward to $20,000 in many instances, will mean net incomes that, counting in the use of the house and the living obtained from the farm, are on a level with those of college graduates in other lines of activity.

Training in the high schools and agricultural colleges also needs to be integrated. Boys expecting to enter agricultural college later should take less agricultural training in high school than those who are expecting to begin farming at once. If they take agricultural training at both levels, they will leave college with altogether too narrow a preparation.

If all farm operators were agricultural graduates, would adult education, or extension, be needed? The answer is "Yes." But it would be needed to a lesser degree, and its purposes would be different. It would be needed because knowledge about farming, both technical and economic knowledge, becomes out-of-date very quickly. Economic changes need to be studied constantly and analyzed, and even those who have graduated from college need to be kept informed as to the nature and meaning of these changes.

For those farmers who never get a high-school or college education *or its equivalent*, adult education is needed not only for the foregoing reasons but also to fill in the gaps in their basic knowledge and understanding of their farming problems. These gaps can be entirely filled if the young farmer has capacity for it and takes advantage of all the opportunities that can be afforded him by properly organized and oriented extension work. Helping such farmers to fill in these gaps is at present the responsibility of the Agricultural Extension Service. It is, in fact, about half the job of extension education. However, this type of education and helping farmers adapt themselves to change can be fitted together readily. The second can be used as a medium for the first. Educational method in this field would be greatly improved if much more education took the form of teaching farmers to plan and budget their farms and to adapt their plans

to changes in market demand, in numbers of livestock on farms, in weather and moisture conditions, and the like. Some of this needs to be a matter of individual instruction, but group farm planning can be highly effective if properly handled.

Agricultural research is commonly thought of as something for farmers done entirely by others. This is too narrow a conception. Although only a few large farmers can carry on actual research, many can participate in research in important ways. First of all, the findings in the laboratories and on the experimental plots should be tested on actual farms under actual conditions. It was with this purpose that the TVA set up its program of unit-test-demonstration farms, where the use of phosphate is tested under a wide range of conditions, beginning first in the Tennessee Valley states and now over a much wider territory.

There is a place, also, for what may be called pilot farms, on which major changes in farm organization and farm practices can be tested and revised as necessary to make successful operating units. The use of new types of farm machinery ordinarily should be tested in this way.

Economic types of research need especially to be conducted on actual farms. This is also true of research in work simplification. For example, the only practical way to study economy of use of labor on dairy farms is to make actual studies and tests of labor saving, as on chore work, under a variety of conditions. Farmers also can collaborate by supplying survey data and keeping accounts and records.

Whether a national program of the same general order as that outlined in Chap. XXI will have a chance of being undertaken is dependent mainly upon whether the organized farmers of the United States will take it into their council rooms and study it and adapt it to the needs of the national situation. And if it is to develop into a highly effective instrument for attaining a balanced agriculture, the organized farmers must guide and direct it and help it over the rough places. State and local units in these organizations must work along with state and local units in the Agricultural Extension Service, with state and local branches of national "action" agencies, and with state departments of agriculture, whenever national production quotas and accompanying total prices are set. One of the largest responsibilities of the state and local units of all these organizations and agencies will be to formulate a set of grants-in-aid that will fit the particular adjustment needs of each area unit and help it most along the ways it should go, to see how these grants-in-aid work in application, and to revise them from year to year. The local groups have already had considerable experience in working together on the agricul-

tural-conservation-payment (ACP) program of the AAA and have demonstrated that they can handle this kind of assignment well if given the proper setup.

The adjustments called for on farms may include not only shifts from one crop to another and from one kind of livestock to another but many other types of adaptations if the foods supplied are to furnish the basis for good diets for the people of the United States. We have already pointed out how the nutrient values of many foods are dependent upon the varieties grown and the conditions under which they are produced. The method of handling foods after they are produced has an important effect on their nutrient values when they reach the market. Butter made from milk from cows fed hay with an abundance of green leaves is much richer in vitamin A than butter from milk from cows fed a diet of grains and poor forage. Some winter-made butter is very low in vitamin A.

The producers of foods and fibers also have the obligation to lower their costs of production so that prices to consumers can be lowered and still leave a margin of returns sufficient for a good living for themselves. They must therefore be ready to adopt practices that will increase output per unit of input, such as a freer use of fertilizer and more liberal feeding of dairy cows. They must be ready to adopt new machines and substitute power for labor whenever this will reduce costs. They cannot, however, be expected to lower their costs merely as a way of helping consumers obtain their food for less money. During all the time since the Civil War, except for brief interludes from 1900 to the First World War and during the two world wars, they have been supplying the rest of the nation with foods at prices that have supported a poorer living for them than has been obtained by all but the lowest income groups in the cities. The lower costs that we are discussing here must be combined with prices in such a way as to increase the net incomes of the farmers as well as to lower prices to consumers. The program that has been outlined in Chap. XXI is designed in such a way as to realize this objective.

XXVI. EXECUTION—THE CONSUMERS

In this chapter will be considered what consumers can do, as individuals, as family units, and as organized groups, to improve their own nutrition. A few of those contributing their ideas to the making of this program have said that in due time consumers by themselves will do all the improving that is needed, that it is the nature of human beings to better themselves, and that all that is needed is to give them a chance. If some are not so activated, they are of no value to society in any case—nor are even their offspring, it is to be inferred. The position here taken is that progress along these lines is too slow and that consumers need to be helped in various ways.

One reason why consumers do not make good use of their food freedom is that they do not know all the necessary facts about the foods among which they must choose. Often, also, in one way or another, they have acquired mistaken ideas about foods. Another reason is that they often blindly adhere to certain food habits and practices whether good or bad; they let idle prejudices keep them from eating the foods most needed to correct the deficiencies in their diets. Habits and customs are highly useful instruments in human affairs; they save us from having to decide at every turn what to do and how to do it. If it were not for habits, we should spend all our time thinking about what to do next. But some present food habits were not good originally—they were forced upon them by the pressure of population on the food supply. Other habits once good no longer are, perhaps because of changes in the foods themselves. Rice when polished cannot safely make up most of the diet of Oriental people; nor can wheat bread, the staff of life of Western people, when made from refined, pure-white flour with none of its vitamins and minerals restored. Most processed fruits and vegetables are by no means the equivalent of the unprocessed or raw. A daily diet that habitually included 500 calories obtained from whole wheat and 400 calories from natural sweets needed to be greatly changed when the bread became pure white, and the sweets pure granulated sugar. It is highly important, therefore, that new habits be developed to replace old ones that are no longer suitable. Society must assume a role in effecting this change.

Consumers may also blindly imitate the good and bad food practices of others, perhaps of those having social prestige, perhaps of those following

some food fad. The disposition of humankind to imitate has great social usefulness but can also be quite harmful if the wrong things are imitated. Here, too, society has a role to play—it must try to see that the right things are imitated.

Nutritionists are often accused of appreciating no values in foods except calories, proteins, minerals, and vitamins, of failing to recognize the importance of flavors and palatability. In an effective food and nutrition program, these must be reckoned with at every stage. Preferences in flavors should be thought of in the main, however, as well-established habits. We like what has become habitual. If we like a new food, it is because it fits into an established pattern of taste habits. *Food habits, like all others, can be changed, but only with more than the usual slowness.* In the meantime, a high degree of emotional attachment to old taste preferences persists. Deny a person something he has been accustomed to, and he may call you a tyrant; deny him his accustomed foods, and he may go hungry in his indignation.

The conclusion from the foregoing is that the freedom of individuals to eat what they wish must be preserved but that a nation must concern itself with what foods people wish and direct them into wishing the foods that are good for them. This may be done by conscious guidance of the processes of habit and custom formation, by imitative suggestion, and by public information.

In the efforts to guide these processes, it must be borne in mind that the homemaker more than anyone else makes most of the food decisions for the family. In most homes she in large part determines, first, how the budget is divided between food, clothing, housing, education, recreation, and the like; second, the composition of the diet; and, third, the preparation and serving of meals. Although homemakers are creatures of habit, custom, imitation, and irrational choice, as are all individuals, their responsibility for the well-being of their families makes them take thought and weigh and consider much more often than if they were feeding only themselves. Because of the homemaker and her strategic position, the problem of improving nutrition is much easier.

If the homemakers of the country are going to render this service to their families in full, they must know roughly the food needs of the members of their families, the relative food values of different foods, the relative costs of food values in products currently available in the market, and also how to handle and prepare foods so as to preserve their nutritional value and how to produce appetizing meals. The task that the 35 million homemakers thus have laid out for them is a gigantic one. *It is by all odds the largest single undertaking within our food economy,* for each homemaker must do it separately for her household. The amount of help they need in this

undertaking represents a tremendous total, which the nation can provide in a generation or two only if it greatly enlarges the present scale of its efforts.

We shall therefore begin our analysis of the consumers' role in the execution of the food and agricultural program by talking about the education of consumers and especially of homemakers. In doing so, we shall have in mind, as in Chap. XXV, that education is a two-way process. Education in foods and nutrition is a mutual undertaking of the educational system and of the people, even more than education in food production. The people must feel the need for it and want it before it is worth while to offer it to them. As in Chap. XXV, we shall consider adult education first. The general outlines of an adult-education program in foods and nutrition for the United States should include the following:

1. Expanding the present progran of home-demonstration work among rural families and, above all, among urban families. Along with this, developing further some of the newer techniques in adult education, such as individual and group planning of family diets and food budgets, developing community leaders, and operation by block or neighborhood units.

2. Organizing such adult education for urban and rural families in connection with the extension services of the state or land-grant colleges and universities in each state, with the assistance of public-health officers, the Red Cross, and the like. Some of this should take the form of home-demonstration classes, public clinics, and like activities. The manner of integration of the agricultural-extension services and the university-extension services should be worked out according to the special circumstances in each state. Vocational-home-economics teachers in the public schools should be brought into this work to the extent that their time will permit.

3. Reviving and adapting to postwar conditions the state and local nutrition committees and the wartime Nutrition Programs Branch of the state and Federal governments. These committees should undertake to coordinate at state and local levels the work of all the local agencies and representatives of state and Federal agencies concerned with foods and nutrition—the schools, the agricultural- and university-extension services, the Smith-Hughes teachers, the parent-teacher associations, the public-health officials, the FHA, the public-welfare agencies concerned with foods and nutrition, the Red Cross, the medical associations, the nutritional committees of local chapters in labor unions, the local units in farm organizations, the employer groups, the merchants' associations, the local processors, and the cooperatives. These committees provide a general framework within which the different agencies and groups can work in a unified manner. The technicians on the staffs of the various public agencies can work effectively in collaboration with these committees.

These statements need amplification. One of the most widely developed forms of adult education in food and nutrition is home-demonstration work among rural families. Under the Cooperative Extension Service in Agriculture and Home Economics set up in 1914, the county home-demonstration agents have helped farm and other rural families in selection of foods, in production for family use, and in preservation and

efficient use of foods. More recently, guided by the State Extension Service nutrition specialists, they have cooperated with teachers and school officers in the promotion and support of lunch programs in rural schools. Through their contacts with community and county organizations of homemakers, they have helped in the development of community nutrition programs such as those of the nutrition committees of the Nutrition Programs Branch. Working with the home-demonstration clubs of farm and rural women, they have assisted with nutrition classes, community canning centers, school-lunch planning, child-care conferences, and health roundups for preschool children and similar projects emphasizing proper feeding of expectant mothers, infants, and preschool children. During the war, the extension service often arranged cooperative state, district, and county institutes on food-preservation methods and other timely subjects. Many of the 4-H club leaders have worked along nutrition and health lines with the young people of rural areas.

In spite of this fine array of forms of extension activity, adult education has reached only part of the farm families. The major problem is to induce the families to participate more fully. To interest women in nutrition education involves working out programs with them that will meet the special needs of their families and communities and that will hold their interest. Many of the better educated homemakers feel that they already know what they need in order to provide their families with good diets. These homemakers need to be taught to think of nutrition education as a part of an undertaking of the community, such as school feeding, community canning centers, or health clinics, and the more able among them induced to function as committee leaders for the families that need direct assistance.

These forms of adult education in food and nutrition, it is apparent from the foregoing, have been available to farm and rural families only. Those administering this extension work have insisted upon including nonfarm rural families along with farm families, but they have done very little for urban families. The same type of education should be carried into the cities. It should not, however, be organized solely as an expansion of the programs of the agricultural extension services. The full resources of urban communities should be drawn into it. Special legislation will be required for this in most situations. The adult education carried on in cities during the war, under the general guidance of the Nutrition Programs Branch, made a good beginning. How effective it was may be gauged somewhat from a survey made by the Division of Program Surveys of the Department of Agriculture in October, 1944, which showed that, even in the cities where the programs were most intensive, only two women out of five understood what is meant by a

balanced diet. An equal number had scattered and disorganized information about diets, and the remainder had no apparent understanding of nutrition whatever.

In extending nutrition education to urban groups, methods must be developed that are suited to urban conditions. These must make it possible for one extension worker to reach larger groups of people and to find community leaders who will do a large part of the actual work. These methods, nevertheless, must provide personal contact with the group leader. Giving out nutrition information by mass methods affects the conduct of only a small fraction of the families. Furthermore, at this game the press and radio can be more effective than extension teachers. Enough success was attained with neighborhood or block leaders during the war to demonstrate that, when the leaders are selected carefully and given adequate training, they can be effective in giving people facts which when understood will change attitudes and patterns of behavior. The people selected must be real leaders in the minds of the people with whom they work and therefore must be selected by them. Working with these leaders, the home-demonstration agents have been able to extend their personal influence to many more families.

As long as education in foods and nutrition has to wait until the adult years, it will never be highly effective. Mature men and women have too many other things to think about. Teaching on foods and nutrition has made much headway in the public schools in the last three decades, but it has a long distance still to go. Not until every child finishing the primary schools has received vital instruction in the choice of foods for balanced and economical diets has the public-school system done its full duty. It is almost preposterous that boys and girls are turned loose in the world at the end of the eighth grade able to do fairly involved problems in arithmetic and to talk about verbs and prepositions and not know how to feed themselves properly; that they should know thousands of facts about history and geography and not the elementary facts about their own bodies. The first concern of the schools should be education in how to live; this comes first, even before learning how to make a living. Nutrition and health education must go together all the way. High-school students should have additional instruction in foods, nutrition, and health, at a more advanced level than grade-school children.

Even in the elementary schools to some extent, and carefully in the high schools, boys and girls should be taught how to prepare budgets of personal and family expenditure and to keep records as needed for such budgeting. Preparation of food and planning of meals also should be taught to girls at both levels.

We could at this point assemble statistics of a sort as to the number of

hours of instruction in foods and nutrition in rural and urban elementary schools of this country, the number of girls taking subjects in home economics and nutrition in high schools, and the number of girls in colleges being taught to teach home economics, all these compared with the figures for two decades ago. But these statistics would have to be compared with those for arithmetic, history, and geography before they had any meaning. In general, very little about foods and nutrition is taught in the elementary schools, and the elementary schoolteachers are not trained to teach it. Home-economics courses in high schools always include nutrition, but only a fraction of the students take these courses. Guidance of students in home projects has been one of the most useful forms of nutrition education. In 1943–1944, more than 200,000 projects of this type were carried out by high-school students.

More than half the potential value of school feeding is in the education in food use and nutrition that can be built around it.

One of the important ways in which 15 to 20 million families in the United States can supply themselves better with a significant part of their needed foods is to produce them in their own gardens or backyards. Only if they produce them themselves do a large number of families have enough of many vegetables, fruits, eggs, and dairy products. They feel that they are too expensive if they must buy them, and often they are, for low-income families. The kinds of food it is feasible for any family to produce depend upon many circumstances. Many village and city families that cannot afford the space for sweet corn and Lima beans or small fruits ought to have small gardens furnishing a small assortment of high-vitamin vegetables. Only those families living in country villages or on the outskirts of smaller cities will find it feasible to keep poultry, and many of those who could will want to use their spare time in other ways. Only the full-fledged part-time farmer is likely to afford a cow.

It is not enough to say that farm families can buy certain products cheaper than they can produce them. There is the further question: *Will they buy them if they do not produce them?* Past experience indicates that very many of them will not. This is especially true in cash-crop areas and on highly specialized livestock farms. Farmers should in most situations undertake to grow enough for their families of the principal vegetables and fruits adapted to their areas, provided that the battle against insects and diseases is not too strenuous.

The two farm groups in this country that suffer most from lack of home-produced foods are the croppers and the married farm laborers. The contracts of such workers should provide them with such food or with a chance to produce them. Other measures are frequently needed, however, to ensure that good use is made of such privileges. Inducing their

croppers to produce food for their families is the despair of thousands of Southern landlords.

The report, "*A Study of Family Spending and Saving in Wartime*, 1942," shows that, although only half the calories consumed by farm families were furnished by the farm, three-fourths of the calcium, riboflavin, and vitamin A were provided by the farm, three-fifths of the protein, and most of the other vitamins. If the home-produced food had been priced at what it would have cost to buy it at retail, it would have sold at $7.75 per week; and $12.60 per week was the value of all the food consumed per farm family. The farm price of this same food would have been only $4.36, or 56 per cent of the retail price. Milk accounted for one-third of the value of the home-produced food; vegetables, fruit, meat, poultry, and fish each represented approximately one-fifth; fats and oils and eggs each about one-tenth.

There is an interesting relation between the provision of food for farm families and the surplus problem. The more of the productive resources of the farm that are devoted to producing foods for use of the farm family, the less that will be thrown upon the market. Producing for home use is therefore a means by which farm families can help themselves in two ways.

In the six or eight years before the war, several hundred thousand farm families expanded importantly their production for home use, as a result of the "cow, sow, and chicken" programs and the home-garden and home-canning programs that were conducted by the Agricultural Extension Service and the FSA. This program should be resumed vigorously in the postwar years. Farm- and home-planning work should stress production for home use.

The victory-garden program of the war years included 10 million or so of urban families. Surveys showed 20 million victory gardens in farms, villages, and cities in 1942 and about 19 million in 1944, compared with 14 million or so in 1941. Fourteen of the 20 million gardens in 1943 were not on farms. Although many of the new gardening recruits in the cities have returned to their golf and bridge parties, the net result has been an important gain. A number of social changes are inducing an expansion of such gardening: first, a shortening of the work week to 5 days of 8 hours; second, the spreading out of cities over larger areas and decentralization of industry, with accompanying improvements in transportation; third, the large increase in the number of persons who will have social-security allowances or pensions of one kind or another; fourth, a greater availability of electricity and other home facilities in suburban areas; fifth, new developments in equipment for small farms; sixth, new developments in home processing and refrigeration and storage; seventh,

new methods of insect control. Part-time farming as such was really increasing before the war. It can be expected to develop still faster as a result of these social changes.

The increase in family gardens under these circumstances is highly desirable. Many low-income families need the food that they can produce on small pieces of land as additions to their incomes. Many families whose employment is seasonal and uncertain can fit a limited amount of food production in with their uneven work loads. Also, they can expand their home production in periods of severe unemployment as in the 1930's. Extension education in family gardening should therefore take advantage of all of the new developments.

Let us now pass again from the individual to the group approach to our problem. It has been made clear earlier that consumers as individuals or families are not now in a position to handle many of the problems involved in attaining better nutrition. They do not have the understanding of nutrition or the knowledge of available foods to enable them to make wise selections. The information that they need is not within reach of a large fraction or is offered to them in words that they do not understand or in ways that confuse them so that they do not know what the truth is. Much information is presented to them in order to promote sales rather than to help them in making wise choices.

One possible way of meeting this difficulty is for consumers to organize into associations that will supply them with facts about nutrition and foods and about food production for home use in exactly the form they need it. These facts must be free from the influence of all other objectives, so that they can be absolutely trusted. The specifications for such organizations are that they shall (1) have a large membership, (2) operate for a modest membership fee, (3) supply very explicit information in simple language, and (4) not allow themselves to be used as instruments for any purpose other than their stated one. In 1939, perhaps 5 million persons in this country belonged to organizations with some kind of consumer label. But few of the organizations met the foregoing specifications. Many of them were organized for limited objectives or, like the National Consumers' League, mainly for other purposes. Many were largely paper organizations and ineffective. Some important ones have erred in the fourth particular. Organizations of consumers with mixed objectives may, of course, have useful functions to perform, but they should not conceal this under the guise of representing consumers as such.

Organizations with the sole object of supplying consumers with truthful information about nutrition and foods and similar information about

other consumers' goods can meet with no legitimate opposition. They will be condemned by some, it is true, but they will have the support of the nation, and all the better elements in the industries and trades supplying consumers will accept them and collaborate with them.

Consumers, of course, can also be thought of as a special-interest group. As such, they are the least well organized of any. At present, informal group action by consumers is more powerful than organized action. Its influence is exerted, however, more as a threat than as a reality. It can be stimulated by events such as a sharp rise in the price of butter or meat or by reports in the press of actions taken by producers or dealers. It becomes more forceful when leadership appears and may mature into organized action. It can, of course, be destructive as well as helpful. If formally organized, consumer groups could play an important part in the development of food and nutrition policy in local areas as well as nationally. They can be particularly important in influencing government activities. Women's organizations are probably the most effective among several types of organizations whose rather broad purposes may include helping their members as consumers as well as in other ways.

The major role in consumption adjustments of the general farm and labor organizations as such is in helping to work out national programs which provide an ample place for such adjustments and then seeing that these programs are adequately staffed and financed. But they also have opportunities to do educational work with their own members. Much of this, no doubt, is best handled in their women's auxiliaries. But there are important facts about foods and nutrition and adjustments needed at particular times that farm and labor organizations can present to their members more effectively than anybody else, for their members will know that nobody else's ax is being ground.

Lastly comes the question of consumer participation in supplementary food-distribution programs. If these are to accomplish their objectives, they must have the full support, not only of those who receive the foods, but also of other consumers. The attitude of the families receiving them will be highly important. They must think of themselves, not as charity patients, but as participating in great national and community programs to raise the level of health of the whole country.

In this connection, it is highly important to correct an attitude toward supplementary distribution programs that is found among social workers, who favor cash grants to consumers and commonly are opposed to grants that freeze a part of the consumer income for expenditures on one item in the budget, thus preventing "free consumer choice." A. J. Altmeyer of the Social Security Board, brought up in this tradition, feels so strongly

about this that he even testified against the Aiken bill, stating the position of the social workers and his government agency as follows:

1. The social-security program of the United States has aimed to provide the means for a minimum standard of living in money. This gives the individual a right to exercise freedom in choice. The stigma attached to the use of stamps or coupons is not in accord with the principles of good social security.
2. Aid to low-income families should include all the needs of the individual, not food alone. Many families need medical care and housing more than they need supplementary food.
3. The effects of the program will be to reduce home production of foods.
4. The food-stamp program has in practice resulted in the lowering of the cash payments for welfare and relief, regardless of regulations to the contrary.
5. Including school-feeding stamp plans, and the like, causes overlapping and conflicting of social-welfare programs at the Federal and state levels.

It is not sufficient to toss these arguments out of the window with the remark that they are merely the expression of a narrow-minded bureaucracy. The objections are all important. To most of them there is a sufficient answer. To the first, the answer is that social-security payments in the United States are totally inadequate to meet the needs of low-income families for food, medical care, and housing and never will be sufficient for these needs so long as payments are based on rates of earnings. A sizable fraction of the worker families in the United States are not successful enough to provide the means for adequate diets even in their most productive years, to say nothing of their declining years. If these groups are going to be fed adequately, they will need assistance in one form or another. Surely there is as much stigma attached to cash gratuities as to food coupons. Furthermore, the supplementary distribution of food can be handled as a matter of public health and nutrition and not as a relief or charity. It can be presented to the public in terms of the importance of having its people able-bodied and efficient and of giving the new generations a chance to be healthy. It has been found in public-relief administration that orders for food are more effective in providing a good diet than is cash relief, for orders insure that the expenditures will be for food.

Highly important also is the reaction of the general public to expenditure of public funds by the recipients of cash grants on items that the general public does not desire to subsidize. The public objects even to some of the foods that are made available to low-income families in stamp programs. One can imagine how it would object if whiskey and motion-picture tickets were included.

As to the argument that medical care and housing also need to be supplemented, the answer is simple enough, namely, that special programs

should be designed for these also. As a matter of fact, medical care as such is included in the proposed new social-security program for the United States, and this is an accepted arrangement in some other countries. Housing programs ordinarily are handled by themselves.

No country has dared to propose a general program of ladling out cash enough to provide all three of these—food, medical care, and housing—for its low-income families.

Instead, an attempt is made to devise a more efficient method of getting each of these for the low-income families, as the balanced food and agricultural program proposed in Chap. XXI does for food. This program undertakes to supply the particular foods that will make up the specific deficiencies in the diets of the families receiving them, out of the foods that are most readily available in the area or community and that will make up the deficiencies at least cost. This means that these families will form habits of eating which are fitted to their incomes and which they will be able to finance for themselves when their earning power improves somewhat.

As to the conflicts between the programs, these can ordinarily be handled. Any income from social-security payments will appear on the reports of incomes that would be made in the administration of the Aiken plan. The coupons issued can take account of social security and of other payments and provide only what is necessary to supplement them. As for the effects on home production, it has already been pointed out that the coupons issued can be reduced by the amount of home production.

Though one cannot reasonably conclude from the foregoing that low-income families should receive all their help in the form of cash payments, still the aids provided should allow the consumers a large measure of freedom of choice. The stamp program as it operated before the war did allow such freedom, and the Aiken plan would allow even a freer choice unless part of the coupons were designated to apply only to certain foods. It is the judgment of the authors that they should be so designated and that there will still remain a sufficient freedom of choice. It is not enough to give consumers freedom of choice—they must be helped to use this freedom effectively or it is meaningless to them. Hence the great need for a program of education of consumers, not only direct education, but education associated with supplementary food-distribution programs. In fact, education in the form of learning by doing should be the controlling principle in such supplementary distribution. This nation decided long ago that families left to themselves would not provide their children with the education required for life under a modern democratic government. It may be that in the aggregate our people get more of their real education

from the press, the radio, books, and the theater than they do from the schools. Nevertheless, without our schools to lay the groundwork, we should be a nation of half illiterates. Adult public education is mostly a development of the last forty years. Its main object is to fill in gaps and make up for deficiencies in school education and in the information supplied by the press and radio.

This chapter, therefore, begins and ends on the same note—consumer education.

XXVII. EXECUTION—PROCESSORS AND DISTRIBUTORS

It was pointed out in Chap. XV that from 1935 to 1939 approximately 42 per cent of the total cost of supplying consumers with their purchased foods was incurred in the assembling, processing, and distributing of food, that in the past this percentage figure has declined in wartime and risen sharply afterward because prices at the farm have moved through a much wider range than retail prices, but that the general trend has been upward since 1910. Clearly, therefore, the food industries and trades must take a large part in any program to improve nutrition. The groups to be considered under this heading are the primary receivers of food, the processors, the wholesalers, the jobbers, the retailers, the operators of restaurants and hotels, and all other food brokers and dealers, the cooperatives as well as the private enterprisers.

In discussing the responsibilities and opportunities of private enterprisers in the food industry, one must keep in mind that business firms cannot be expected to take steps which are incompatible with their business objective of making profits, at least in the long run, and many of them think of profits only in the very short run. The food industries and trades will not, of course, be deaf to appeals based on advancing the general welfare, but the limitations on what they can do within the framework of the competitive economy as it now functions must be squarely faced. Any progress to be achieved in the improvement of nutrition by the food trades must come from activity that recognizes the normal business regimen.

The food industries and trades can mainly contribute to the improvement of nutrition in the following ways:

1. By improving the quality of the foods that they process and offer for sale.
2. By aiding consumers in their purchase and use of foods.
3. By lowering costs so that consumers can afford both more and better foods.
4. By cooperating in research and in local nutrition programs.

Improving the Nutritive Quality of the Food Supply.—Quality improvement in foods includes, first of all, increasing their nutritive values by processing and handling them in such a way as to preserve their natural vitamins and minerals. It is also highly important to preserve flavors and textures and to make essential foods palatable.

The processors' method of improving the quality of foods that comes closest to the farmer is that of demanding a better quality of raw materials. The processors and handlers need to develop more systematic methods of paying primary producers for raw materials according to condition, quality, and nutritive value and also a greater degree of collaboration with producers in introducing methods of production to yield better products. Too generally, individual farmers are not recompensed for superior quality in proportion to what final consumers are willing to pay and in many cases actually do pay. Returns to private enterprise and the general welfare should and can be reconciled in this matter. All the major farm products are, of course, now bought according to systems of grades, but these grades frequently do not reflect quality and nutritive values. Hogs, for example, are still being bought without any close correspondence with carcass value. The Danish cooperatives have solved this problem by not making final settlement with any producer until after his lot of hogs has been processed. Although potatoes are no longer mostly bought on a field-run basis, wide differences occur among those graded No. 1. The consumer has no present protection against buying fresh vegetables in areas whose soils have lost much of their store of minerals from leaching. This is a problem in the solution of which the processors and distributors can collaborate with the state agricultural colleges to good effect.

The major contribution that the processors can make, however, concerns developments in processing techniques that will improve the nutritive quality of foods, preserve more of their natural vitamins and minerals and flavors and texture, and increase the utilization of some food products not now widely used. The food industries have made progress along these lines, but the possibilities are almost limitless.

The outstanding examples of foods suffering great losses of nutrients in processing are white flour, polished rice, and degerminated corn meal and grits. In converting wheat into white flour, 86 to 90 per cent of the thiamine and 80 to 90 per cent of the niacin is removed. The chief mineral that is lost is iron. Current research seeks to develop a white flour to meet consumer preferences that will retain a larger proportion of the nutrients found in whole grain. No such product has been processed for the market, although the Canadians have made good headway toward this goal. It is to be hoped that the present program of enrichment of flour and bread will not stand in the way of such progress.

Much interest has centered in the preparation of rice because of its wide use as a staple cereal in the South and in the Orient. In the process of milling raw brown rice to white polished rice, 76 per cent of the thiamine, 57 per cent of the riboflavin, and 63 per cent of the niacin are removed and lost for human consumption. As a result, beriberi is com-

mon among populations existing chiefly on polished rice. The obvious method of retaining at least a portion of the nutrients is through reducing the amount of polishing, or undermilling. In this method the hulls and outer bran layers are removed, but the inner bran layers and a part of the germ remain, leaving in the finished product a substantial fraction of the vitamins and minerals contained in the bran coats of the grain. But the brown rice resulting is not readily substituted in the diets of those who have lived all their lives largely on white rice. Also, there are difficulties in controlling the degree of undermilling and in preventing deterioration in storage.

Another method of processing, a modern version of "parboiling," is meeting with more favor. Parboiled rice is used by the larger part of the rice-eating population of India. The grains are swollen by soaking in water and subsequently dried, usually in the sun. Often steaming follows the soaking. The hulls are thereby loosened so that they are removed more readily by pounding. The modern and commercial method of parboiling rice is called "rice conversion." Studies conducted by the National Research Council showed that 70 per cent of the thiamine, 50 per cent of the riboflavin, and 60 per cent of the niacin present in the rough rice are conserved in the converted rice. The method that has been developed for the artificial fortification of rice is to impregnate 1 or 2 per cent of the rice kernels with vitamins and/or minerals and coat these kernels with film-forming edible substances to prevent loss of the vitamins in the customary washing prior to cooking. The National Research Council has estimated that the cost of thiamine for fortification by this method is less than 1.6 cents per 100 pounds of rice.

Losses occur in the harvesting, preparation, and storage of the more perishable kinds of foods. Potatoes shortly after harvesting contain 15 to 20 milligrams of vitamin C per 100 grams but only 2 to 8 milligrams after they have been in storage for 4 to 6 months. Loss of vitamin C in green vegetables starts immediately after harvesting. Sometimes the loss is greater between the time the food is harvested and the processing than during all the remaining procedures. The main losses in canning are of vitamin A and vitamin C during blanching and of water-soluble factors such as thiamine, riboflavin, and niacin. From 95 to 97 per cent of the ascorbic acid in citrus products is retained in canning. Further losses in nutrients occur in storage. With quick freezing, the losses after the original blanching are much reduced if the storage is not too long and is at proper temperatures. The steady improvement and growth in use of this type of processing in recent years may prove to have been the most important contribution to improvement in the food supply during the war.

If sulfur dioxide is used in drying fruit, the vitamins A and C are retained but the thiamine is lost. Thiamine and riboflavin are lost in the sun drying of raisins. In general, the loss of minerals is small. Further losses may occur in storage, especially at high temperatures, of vitamin C and thiamine. Many dehydrated vegetables lose vitamin A at a rapid rate, especially if the product is finely divided.

Raw peanuts are an excellent source of thiamine and niacin. But 70 to 90 per cent of the thiamine is lost in the average commercial production of peanut butter or roasted peanuts. The loss of niacin may run as high as 30 per cent. The losses probably could be reduced by more careful control of roasting temperatures.

How much the method of processing may affect nutritive value is well illustrated by canned tomatoes, on which many people tend to rely for a large fraction of their vitamin C needs. Among 30 samples of tomato juice tested for their vitamin C content, only 3 contained an amount equal to what may be regarded as average for fresh tomatoes, and 6 samples contained 60 per cent or less of what should be expected in tomatoes. Industry can do much toward ensuring that foods contain at least the minimum quantities of the several nutrients that consumers can reasonably expect.

As an example of developing uses for formerly unused food, a few years ago no one knew how to get a popular low-cost food product from the Pacific coast pilchard. Now, as "sardine fillets," in a variety of packs, it ranks second only to salmon in tonnage of canned pack. However, as yet only a small proportion of the annual catch is used for food. Its cost, served at the table, is extremely low by contrast with other popular sources of animal proteins and of the oil-borne vitamins in which this fish is rich. This new sea food is wholly a net contribution to nutrition.

As an example of processing that makes food more available and hence more widely used, there may be mentioned what has been done with dry beans, peas, and lentils. The long cooking that they require discourages their use, especially in modern kitchens and in households where the housewife has outside employment. Soybean foods are even more difficult to manage at home. Canned baked beans were the first great contribution of processors from this source. Use of preprocessed dried peas is now growing. Frozen baked beans and precooked dehydrated beans have found household welcome. A few soya products show promise. Wartime dehydrated soups with a pea-soya base may become a peacetime staple. But, in most of these, both the manufacturing formulas and the household recipes are in their infancy.

One of the outstanding contributions of the industry can be made through promoting the use of dried skim milk. Before the war, about

30 billion pounds of skim milk was produced in the United States as a by-product of the butter industry. Much of this was retained on farms for feeding to livestock; most of the remainder was dried and also used largely as animal feed. Some was used for human food, chiefly as an ingredient of bread. During the war, production increased from 298 million pounds in 1935 to 602 million pounds in 1944, as a result of wartime requirements. If domestic uses could be found for the higher volume of production, it would be of great nutritional advantage. Dried skim milk contains practically all the essential nutrients of milk except vitamin A and fat, and large sections of the population, particularly in the South, do not obtain sufficient of the nutrients readily available in milk.

Aiding Consumers in Their Purchase and Use of Foods.—How much processors and distributors can or will aid consumers in improving their diets by choosing foods more wisely is uncertain. They could assist homemakers and others in improving the diets of those for whom they are responsible by disseminating sound information about food needs and the properties of different foods. Advertising, selling, and education become powerful allies when properly combined. A processor or distributor who has a product that consumers would buy if they knew the true facts about it will have no difficulty in advertising it in a way that will help the homemaker select foods wisely and plan better meals. It is doubtful whether much of the advertising and selling that confuses and misleads the homemaker is profitable except in the very short run. Still, whether the advertising and selling efforts will, in practice, develop along lines really helpful to consumers remains to be seen. Contrast the following two statements, the first from a food trade journal, the second by a professor of marketing in a school of business:

> Advertising by food processors, wholesalers and retailers will be a powerful influence toward maintaining maximum sales to consumers, provided this advertising is fully centered on promoting appetite appeal, more diversified meals and nutritive values of individual foods . . . . The best way to cut costs of food distribution is through each food processor, wholesaler and retailer keeping his own operating costs as low as practical, being satisfied with reasonable margins; and conducting merchandising efforts to increase public food buying so that overhead expenses will come down. Really effective trade advertising, emphasizing appetite appeal, will be the most effective force in shifting housewives toward larger spending for foods, which is important to farmers, but even greater direct value to food trades through promoting much larger dollar sales during after-war prosperity.
>
> Chains, supermarkets and neighborhood retailers will be able to do that type of advertising in their stores while housewives are selecting their daily foods. Prices will attract shoppers, but really profitable demands will be developed only by

offering many appetizing appealing foods which will induce women to make larger purchases than they intended when they started daily shopping.[1]

Probably the most important factor likely to frustrate cooperation among processors in the dissemination of reliable information would be that food products have intrinsic differences in nutritive value despite everything that can be done to raise their respective values individually. And manufacturers of food products which are less important nutritionally would hardly care to join wholeheartedly in any program which served to point out the inadequacies of such products as compared to other food products. It might be fairly easy to enlist the manufacturers of food products with high nutritional value, and the advertising benefit which they derived from contributing to the program might be substantial in relation to its cost. But there does not seem to be any practical way in which the manufacturers of food products with low nutritional value could be forced or persuaded to present to the consuming public accurate information about the nutritional value of their products. Nevertheless, the net effect of what food manufacturers do in disseminating reliable information may be of greater value, since the efforts of the manufacturers of products of high nutritional value would call attention to and stimulate the buying of their products even more strongly in the absence of similar advertising of manufacturers of products of lower nutritional value.[2]

Consider in this connection the numerous examples of advertising that unduly emphasize the importance of a particular food product without due reference to its place in a balanced diet. An obvious example of this is the advertising of the National Confectioners' Association and the educational material circulated by the American Bottlers of Carbonated Beverages. Then set over against these examples are those of the Cereal Institute and of the National Dairy Council. But these latter are promoting the use of foods whose place in diets is not easily misstated.

If one could judge from the recent wartime experience in this country, one might feel very hopeful on the point at issue. A large part of the educational activity sponsored by the Nutrition Programs Branch of the Department of Agriculture during the war was carried on by the food industries. They assisted in the nation-wide promotion program, which had as its main objective the popularizing of the subject of nutrition by translating the Recommended Dietary Allowances developed by the National Research Council into language that the general public could understand. The first educational material developed consisted of a chart listing eight food groups, which together provided the required vitamins, proteins, and minerals that should be eaten every day for health. Around 35,000,000 posters, 35,000,000 fliers, and 500,000 kitchen charts

[1] *Weekly Digest, Food Markets*, American Institute of Food Distribution, Inc., Sept. 2, 1944, pp. 2, 12.

[2] Communication from Edward C. Bursk, Harvard Graduate School of Business Administration, to John D. Black, Jan. 25, 1945.

were printed and distributed. The Food Industry Advisory Committee was helpful in getting the important food industries behind this program and carrying it to the places where housewives did their shopping. Eighty-five of the largest food advertisers promoted the campaign through magazines and newspapers, over the radio, and through motion pictures and other mediums. Later the charts were revised with the cooperation of the War Advertising Council, a group representing large national advertisers, and new charts were distributed with the cooperation of the industry. Only those industries whose food products were included in the official food groups were permitted to use either the food charts or the symbol and slogan in their brand advertising, and they were requested to submit their advertising copy to the Nutrition Programs Branch for review with respect to nutritional claims for their products.

Lowering the Costs of Food Processing and Handling.—The food trades have a wide field for introducing further economies and efficiencies in the processing and handling of foods between the primary producer on the farm and the final consumer. As pointed out in Chap. XV, the gains since 1900 in efficiency in food distribution, even after allowing for the increases in real services, do not compare at all favorably with those in manufacturing in general during the same period. Most forms that competition in selling has thus far taken have not been so conducive to lowering costs as has competition in production. Whether or not these differences are fundamental and cannot be altered to advantage is a subject of great importance to society. The food industries and food trades can afford to devote considerable attention to the economy and efficiency of their operations and to support research directed to this problem, either research of their own or that of other agencies. A further detail of the behavior of the Department of Agriculture's index of food-marketing charges is interesting in this connection. This index fell off slightly after the depression in 1933 in spite of a substantial rise in the hourly rate of earnings in factories, trade, and transportation. A part of the reduction may have been the result of gains in efficiency within individual processing or distributing units and within the general system of distribution.

Distribution costs are of particular relevance to programs of subsidizing the food consumption of low-income groups. Subsidies to consumers at the retail level, with no accompanying control over the size of the margin between the farmer and retailer, may result in a substantial part of the subsidy being reflected in the incomes of distributors rather than in the incomes of farmers and the purchasing power of consumers and may end mainly in an increase in the number of retail outlets maintained.

Cooperation in Research.—The present public aid to research in food production, processing, preparation, and distribution conducted by experiment stations and research divisions in the government should be continued. Every new advance made reveals new gaps in our knowledge of foods and nutrition. It is to be hoped that much more group support of research on foods and nutrition will develop. The food industries and trades themselves can rightly be expected to support the kinds of research that contribute directly to improving their products and furnishing a sound basis for their advertising and selling. They can even afford to support research whose results do not seem to be of immediate application. Still, some of the research needed is not of a type likely to be undertaken by private or group enterprise. Very few farms are in a position to do the basic research needed to advance agricultural science. Hundreds of thousands of small processing and retailing units are in no better position to do the research required for improving foods and reducing the costs of handling them. Basic studies are needed of the social factors conditioning changes in food habits.

The principles upon which sound cooperative research effort by industry must be based have been very clearly stated by Charles Glen King, director of the Nutrition Foundation.

> A large proportion of the world's exploratory or fundamental research has been, and will probably continue to be, carried out in university research centers. Direct support of specific projects planned by the best men in these centers is probably the most economical way to foster pure research. Such work should be planned and published without regard to the special interests of an individual firm or of any agency that could bring a bias into the picture. . . . By joint action, the representatives of an industry can accomplish a number of things that would scarcely be possible otherwise. They can give a research program a degree of objectiveness and independence that a single firm could scarcely provide.

The Nutrition Foundation itself illustrates the application of these principles. Fifteen manufacturers of the food industry organized the foundation in December, 1941. Today it is supported by 22 founder members, 21 sustaining members, and 7 donors. Contributions from the members and donors total $1,577,000. The purpose of the foundation is the development of a comprehensive program of fundamental research providing basic information in the science of nutrition. To ensure protection of the public interest, distinguished representatives of the public serve as members of the board of trustees. The specific direction of the research is in the hands of the scientific director and the Scientific Advisory Committee, made up of 15 outstanding men, most of whom hold university positions.

A Food Industries Advisory Committee, composed largely of research directors of member companies, serves as an advisory group and as a means of interpreting the foundation's program and findings to the technical staffs of the member firms. Grants are made only to universities or similar research institutions in the United States and Canada, and they cover studies concerning (1) human requirements of specific nutrients, (2) the origins and functions of individual nutrients, (3) maternal and infant nutrition, and (4) public-health problems in nutrition.

In the development of its educational program, the foundation has acted on the belief that the first channel for public education is through professional groups. The results of the research that it has financed are published through the usual mediums for professional research and summarized, along with the results of other nutrition research, in *Nutrition Reviews*, which serves as a means of bringing the findings of research before a wider public.

Public Eating Places.—It has been estimated that, in 1943, 16 per cent of the marketed food was sold through food-service establishments (including those doing industrial feeding). The percentage had increased from 9 per cent in 1939. With shifts in population from farms to urban areas, the percentage of food eaten away from home tends to increase. This serves to illustrate the importance in total food consumption of the kinds and quality of foods served in public eating places. Many of those who eat away from home are unmarried persons, without the homemaker's experience in selecting balanced meals. Those who do attempt to balance their diets may experience difficulty in obtaining a good selection and good quality in their meals. For those who take only the midday meal away from home, failure to obtain the normal portion of good foods at noon makes it more difficult to balance the diet for the day.

Operators of public eating places, therefore, have somewhat the same opportunity as homemakers for contributing to improved nutrition and the formulation of better eating habits. They can make this contribution by offering their patrons good, balanced diets, preparing food properly, and assisting their patrons in choosing good meals. They can also, by good management, reduce costs and provide food at lower prices.

Accepting responsibilities along these lines need not be inconsistent with increasing profits. This is not to say that the operators should emphasize the "healthfulness" of their foods greatly. Restaurant operators have found that the development of a "hospital atmosphere" is not good business. But the indirect approach of presenting attractive menus of balanced, nutritious meals can be accompanied by any degree of "entertainment" emphasis that the operator desires. Probably one of the most important contributions most restaurants could make would be to offer

good, inexpensive fruits and vegetables that have been prepared with a minimum of nutrient loss.

Of the 180,000 restaurants in the country, a very large percentage are operated by homemakers who have simply extended their kitchens to meet a local need and to produce incomes for themselves. As such, they reflect the habits, knowledge, and techniques of the homemakers, which may not have been adequate from the nutrition angle or applicable for cooking on a larger scale. The older commercial operations, on the other hand, are in many respects the relics of a period when eating out was a luxury and "fancy tastes" received the special attention of caterers.

Large-scale cooking and serving of foods tend to be especially destructive to food values other than calories.[8] They also tend to destroy the natural flavors of the essential green, leafy, and yellow vegetables, with the result that people do not eat enough of them. On the other hand, skillful seasoning may make foods appetizing when nutritional values have been seriously impaired. Considerable progress has been made in recent years in the mass preparation of foods, and modern techniques for meal planning and the purchasing and preparation of foods have been developed. These should be utilized more widely. Operators can also exert considerable influence on handlers to use methods by which the value of the foods are better preserved. This is particularly true of the larger restaurants and chains.

The leaders of the industry have taken positive steps through their trade organization, the National Restaurant Association, to raise the standards throughout the industry through education of their members. They have sponsored a course in restaurant management at the University of Chicago and cooperated with the Department of Commerce in developing a manual for proprietors of eating establishments that recognizes nutritional principles.

Group Measures.—Although relatively large scale processing and distributing firms, such as milling, canning, and meat-packing companies and chain-store organizations, can do by themselves many of the things outlined under the foregoing five heads, hundreds of small firms in the country cannot. They must act collectively, if at all, or get help from public agencies. Many of these small firms belong to trade associations which can serve them in these ways. Some of these associations would take a new lease on life if they had a vital part to play in a national food and nutrition movement. The first steps in this might be educating their members in the simple facts about nutrition and food values. The associ-

[8] Goodhart found that some of the usual food preparation and serving practices of cafeterias in industrial plants may be associated with a loss of as much as 92 per cent of the thiamine and 82 per cent of the ascorbic acid content of the meals served.

ations could also help their members in selecting lines of food to carry and supply them with dependable information to use in advertising and selling.

The larger firms and, especially, the medium-size ones will also find it advantageous to combine their efforts in some lines. The Nutrition Foundation shows how this can be done in research. It would be a serious mistake for the Nutrition Foundation also to take on the function of furnishing leadership to processors and distributors in their efforts to educate the public in good nutrition. But special agencies created to function in this way would have an important field of useful effort. That such agencies are in danger of drifting into propaganda in behalf of particular products rather than to education in good nutrition has already become evident. To have rival "foundations" or "institutes," each loudly proclaiming to consumers the nutritional importance of particular groups of foods, is not effective even from the standpoint of the groups supporting these efforts. Perhaps the kind of board that is suggested in the next paragraph could deal with this problem also. Possibly the food industries and trades could set up an over-all educational agency that would undertake to provide sound information in the use of all foods. Surely not all the leadership in such education should be furnished by public agencies.

A difficult problem confronting business firms is how to keep unscrupulous firms—of which usually there are enough to do much harm to the group as a whole—from making misstatements about their foods in advertisements. Regulation ordinarily holds such misdemeanors within only rather wide bounds. Sometimes the truth on such matters is a subject of dispute within the industry. Questions of this sort might be referred to a board of scientists, in whom the general public had confidence, that the food industries and trade might create. This board might include limited representation of scientific divisions in appropriate departments of the national and state governments and be semipublic in status. Getting unscrupulous competitors to abide by the decisions of such a board or even to have anything to do with group efforts to prevent such misbehavior would, however, prove difficult in many cases. Policing by the groups themselves is likely to be vulnerable; the firms being disciplined will claim that they are fighting a monopoly. It would appear that some form of collaboration between group organizations and public authorities is needed.

The food industries and trades, as well as other businesses and business organizations, can also cooperate in the local and national food and nutrition programs. The cooperation of wholesalers and retailers in the

food-stamp program is a case in point. Industries providing improved facilities for in-plant feeding and cooperating with labor in in-plant-feeding programs can also do much for the nutrition program. Some firms may find it possible to promote workmen's garden lots in their area. Businesses such as public utilities and home-equipment manufacturers have also found it profitable to invest in nutrition education.

Cooperatives.—Nothing has been said in the above specifically about cooperative processing and distribution of foods. The main problems and opportunities are much the same as in private enterprise. Their major advantage at the buying end can be adapting the types and qualities of goods and services to the needs and wants of their members. These advantages have been most nearly realized by the cooperatives that have done buying of farm supplies and some household goods and equipment. Buying cooperatives that have not served their members in this way have had little reason for existence and commonly have failed. The major advantage of cooperatives at the selling end lies in their opportunities to secure the collaboration of their members in adapting their production to the market and in reducing distribution costs.

The method of operation of all cooperatives is to perform a service at cost. Some deduct the costs when they make the sale for the member (or add the costs when they buy for him). Others make a nominal charge and distribute any balances as a patronage dividend. Taxes are not paid on the patronage dividends of bona fide cooperatives—they are interpreted as balances on payments or advances. Reserves may be treated as undistributed patronage dividends. This is a reasonable interpretation so long as the cooperative operates definitely on a cost-of-service basis. Not all of them do. Also, some cooperatives have become somewhat monopolistic in their methods. Cooperatives should be given a free chance to develop and should have the same services from government as other enterprises, adapted, of course, to their needs. They will in only a few instances supplant more than half of the proprietorship type of operation for a given product. But they should be subject to the same controls as proprietorship enterprises. Present Federal and state laws, if they are properly enforced, are in general sufficiently stringent to prevent reprehensible forms of unified action by cooperatives.

Cooperative buying by consumers has not developed extensively in this country; the private chain-store type of organization is doing part of what the consumer cooperatives of Europe undertake. Cooperative supply buying by farmers is much further developed, and cooperative selling of farm products still more so. In agriculture, cooperation has made important contributions in helping farmers to get the types of sup-

plies needed, in standardizing and improving the quality of products, in developing better channels for movement of products from producer to consumer, and in reducing costs through increased volume. When it has failed to accomplish these or other important gains, it has seldom made a place for itself. The cooperatives serving city consumers that have followed the pattern of the farmers' supply-buying cooperatives have also proved successful in most cases. This is the line that consumer cooperatives should take.

XXVIII. EXECUTION—LABOR

LABOR'S part in the carrying out of a food and nutrition program includes the following:

1. The families of workingmen can participate as consumers in all the undertakings outlined in Chap. XXVI.
2. The union organizations, especially their women's auxiliaries, can take a hand in making these undertakings especially effective in the families of their members.
3. The employees in plants can take an active part in the organization and administration of in-plant-feeding services.
4. Workers in food-processing plants can concern themselves with sanitary conditions in such plants and protecting the quality of the product.
5. Labor organizations can take a vigorous part in the shaping of national food and agricultural policy and programs.

The major obstacle to progress along the first two lines at present is that wives of workingmen do not attend nutrition classes in large numbers and do not generally participate in nutrition activities conducted by the community, though they are the ones who have the most to gain from them. Many of these women can be brought into these activities if the labor unions will take an active part in them. In many situations, the unions could organize the programs particularly for their members' families. They are in an unusually favorable position to do this because their motives in so doing will not be doubted. While, in many instances, attempts on the part of management to give nutrition information to employees have met with suspicion and skepticism, no such reaction arises in a campaign for good food sponsored by a union. Where education affecting deeply rooted food habits is concerned, it is found that better reception is given to material from unions than from other sources. If the unions take an active interest in nutrition programs, they will be able to guide them and to sponsor those phases which best fit their organizational programs. Workers' families will be exposed to a large amount of nutritional education and propaganda in the years ahead. Labor unions can let the situation take its confusing course or supplement it in helpful ways.

Since their inception, labor unions have taken an interest in the education of their members.[1] Their effort has usually taken the form of

[1] The information on pp. 312 to 314 was furnished largely by Dr. Mark Graubard, formerly of Labor's Committee on Food and Nutrition.

lectures on economics, labor history, parliamentary procedure, current political issues, public speaking, and union organization. In recent years, talks on health have been added to the curriculum. But, with the spread of the recognition of labor's rights to bargain collectively and with the rise in power and prestige of labor organizations and the current increase in the standard of living of American labor, organized as well as unorganized educational efforts have tended to die off in recent decades in the majority of unions. Outstanding exceptions are the International Ladies Garment Workers' Union [American Federation of Labor (AFL)] and the Amalgamated Clothing Workers of America [Congress of Industrial Organizations (CIO)], which have effective educational programs of long standing.

With the war, interest in educational materials and civic programs revived. With the introduction of rationing, food became a subject of major concern. Workers found it difficult to get meals at overcrowded plants and in the new war industries. Labor thus became prepared for greater participation in the nutrition movement. A Committee on Food and Nutrition was formed to represent labor in the development of the national wartime nutrition program. This committee consisted of representatives of the AFL, the CIO, the Railroad Brotherhoods, the United Mine Workers, their respective women's auxiliaries, and advisers from government agencies. The AFL held discussion panels at various union conferences on the subject of food and nutrition. The United Mine Workers tried local demonstrations to show the effect of poor dietary habits on health.

The labor committee is still active; but since the end of the war, the unions have tended to focus more attention on wage and cost-of-living problems and less on educational programs of this type. Each union still has, however, at least on paper, an educational committee that is frequently only too glad to find a subject of practical value to the individual members. The majority of unions have newspapers issued either monthly or weekly. Some of these rank high in journalistic skill. Subscription is automatic, so that each union member is reached by the labor press. These papers welcome useful educational material of service and interest to their readers.

As for unorganized labor, it greatly needs to be made a part of the national and community programs. The unorganized groups are in more need of better nutrition than the organized groups. Leaders in these programs must see to it that they reach these groups in the cities. It is for these groups that the extension to urban areas of adult-education services such as those available to rural populations is most needed if nutrition is going to be greatly improved in this country. Stamp pro-

grams, and the like, can half fail merely because these groups do not receive the education needed to go with them.

Labor has taken an increasing part in recent years in the formulation of public policy on nutrition. It is significant that the International Labor Office was one of the three sources from which sprang the international food and nutrition movement culminating in the FAO. That labor is prepared to take an active part in policy formulation in the future is illustrated by the resolution passed by the AFL at its annual convention in Florida in the winter of 1943, to the effect that all postwar food activities of the government should have labor representation in their administrating. Labor's position on foods and nutrition during the war was well stated in the following:

> Labor's program on the food front is very simple. We believe in increased farm production of food at the expense of nonessential items. We want the small farmer to have a chance to make his contribution and improve his status so that he can continue to contribute to the nation's larder. We want equitable and adequate allocation and distribution of food so that we have no unnecessary and chaotic local shortages. We believe in adequate price control in food so that when the worker pays for the war, and he is willing to pay for his proportionate share of the cost, it must not come out of that which is necessary for the health and welfare of himself and his family.
>
> We believe that now, in wartime, is the right time for the complete eradication of malnutrition in America. It will require organized effort in food production and distribution for civilian needs just as it has for our armed services and Lend-Lease requirements. We believe that chronic regional shortages of indispensable food items must be immediately eliminated. We believe in immediate attention to the problem of industrial feeding, especially in the newly arisen overcrowded defense industries where this situation is at its worst. We believe in an intensive educational drive among the people and a unified government agency for effective nutrition education in which the people will participate democratically and effectively. We believe in greater representation and participation on the part of labor and other consumer groups in the policies of the food administration.[2]

Labor's Committee on Food and Nutrition has regarded itself as a clearinghouse for labor's ideas on food problems and farm policies and on national and international issues as well as local issues. It has also as its objective the development of better relations between labor and the farmer. The committee makes recommendations on current issues to the respective national organizations and through them to the local unions.

Something more specific should be said about local labor-organization participation in local programs. Since the children from workers' families constitute the great majority of pupils in most city schools, worker

[2] Ornburn, I. M., Statement on Labor and Nutrition, in "Labor's Conference on Food and Nutrition and Exhibit on Food in War and Peace."

groups ought to take the lead in securing school-lunch programs in their communities. Frequently the parent-teacher association is the most effective agency through which they can work to this end. Getting such feeding programs started is not enough. They must be watched to ensure that the right kind of eating habits are fostered. For the same reasons, labor should be expected to be particularly interested in health and nutrition programs for pregnant and nursing women, infants and preschool children, and working mothers and especially in the foods provided at child day-care centers.

In some areas, local labor groups improve the food supply by taking an active interest in retail food distribution. In certain mining towns, for example, the retail store (frequently a company store) has a monopoly on food and may charge excessive prices or provide a restricted food supply. In other small communities, the retailer may be at the mercy of wholesalers so far as types and qualities of foods are concerned. In such situations, a retail food cooperative may be the only practical solution. One of the primary values of cooperatives lies in their use as a practical solution of particular problems.

In-plant feeding, although a problem for employers as well as employees, has been reserved for discussion in this chapter on labor. One of the outstanding ways in which labor can contribute to the nutrition program is by cooperation with management in the provision of in-plant-feeding services. Until the beginning of the war, little attention was given to the provision of nutritious and well-balanced meals to workers in industry. Industrial health practices had been restricted almost entirely to the study, cure, and prevention of occupational diseases and accidents. Very infrequently was it recognized that poor nutrition can be an important contributor to minor illnesses resulting in absenteeism and considerable loss in labor time. The war brought the situation to a head in this and other countries. The existing restaurants and food-shopping facilities did not serve adequately the workers in the expanding industrial plants, and many of the new plants were so located as to require wholly new facilities. The influx of women into war industries made food planning and preparation more difficult for many families. Longer working hours, irregular shifts, and changes in occupation imposed special strains on employees and made it necessary to take measures to guard their health.

During the summer of 1941 a representative of the National Research Council visited 33 large industrial concerns, investigating the food services and meals of workers. Even in places where food facilities were provided, he found that nutritional needs were not commonly being met by the food served. Breakfasts in some plants consisted of coffee and doughnuts or pastry and mid-shift snacks mainly of soft drinks and candy.

Where good food choices were provided, the majority of the workers chose poorly balanced meals, the women tending to choose poor meals more often than men. A common situation was a plant with no food facilities other than a vacant room in the plant or on the grounds in which to eat home-packed lunches.

Great Britain met the situation by requiring factories, docks and construction concerns employing more than 250 workers and operating under government contract to provide canteens if eating facilities were not otherwise adequate. These canteens became a means of giving additional food to workers with special needs without resorting to differential rationing. Through them and the British restaurants, limited food supplies were distributed at low cost and in a form that resulted in a better balanced diet for England's working population. The United States met the situation by establishing a voluntary industrial-feeding program in the summer of 1941. The government activities were centered in the Industrial Feeding Division of the U.S. Department of Agriculture, which provided assistance in setting up facilities and obtaining equipment, advice on operations, and educational materials such as posters and columns for union papers. Eighteen industrial-food specialists were made available throughout the country for consultation.

How effective the United States program was may be judged by the reports of the last survey made in 1945. Of the 2,426 manufacturing plants employing more than 500 workers, 78 per cent had some type of food service—90 per cent of these employing 2,500 or more, and only 28 per cent employing less than 250 workers. The plants having food services employed 85 per cent of the workers, but only 54 per cent of the workers in these plants used them. The others brought home-packed lunches or patronized near-by commercial eating places. In many of the plants, some of the workers had to do this or else stand in line. Also, in many of the plants, the foods served were poor. Nearly a third of them had only lunch counters, canteens, or mobile units, many of which served only drinks, packaged food, and candy. Of the larger plants, however, 75 per cent had cafeteria service. Only about a third of the plants served mid-shift meals.

Along with the great progress made in actual in-plant feeding has come great progress in developing and learning its techniques. Standards have been set up for space and equipment to meet in the most efficient way the needs for serving different numbers of people by different types of service. Cooking methods have been developed to minimize the losses in food values that result from the usual practices in mass preparation of foods. The American Dietetic Association and the American Home Economics Association have furthered training programs for institutional-food

managers. College courses for food-service managers, dieticians, and assistants for industry have been expanded, and students have been placed in factories for internships in industrial feeding. A standard called the "basic menu pattern" has been set as to the make-up of meals to be served. This is a list of types of foods that should be provided in each meal; it allows the maximum of variety in foods but ensures the essential nutritive foods. Each meal is designed to provide at least one-third of the daily nutrient allowances as recommended by the National Research Council.

Perhaps as important as the meals have been the educational values associated with them. Providing a meal that is good nutritionally and that at the same time tastes good has been an effective method of educating adults in nutrition, as has also the practice of having a "lunch special," which encourages better health habits through daily repetition of a good food pattern. The advantage of nutritional education in connection with on-the-job meals is that the information is received at the time when the food choice is made. The stimulus is simple and direct, and it is accompanied by social suggestion.

The responsibility for providing in-plant facilities has thus far rested largely with management. Most of the food services are operated by management or by industrial-feeding contractors. It has been found to be effective to have a food committee of workers meet with representatives of the management, the dietitian, the food-service manager, and the company physician and nurse to discuss the food service from time to time. A majority of the 5,000 labor-management committees in war plants have subcommittees working to improve food facilities in this way.

In-plant feeding is usually most satisfactory when operated on a non-profit basis. If it is put on a profit-making basis, the tendency is to emphasize the sale of such items as candy, soft drinks, and certain packaged foods.

Though data are not available to show developments since the end of the war, there are indications that in-plant-feeding facilities are continuing to expand, though at a much slower rate than during the war. About 3 million more workers in industry still needed such service at the wartime peak, but some of these workers have left industry since. Practically no steps have been taken to furnish similar services to the ½ million men in the construction and mining industries, and many types of trade and other service employment need in-plant-feeding service.

The situation with respect to in-plant feeding in the United States can be summarized as follows: In-plant-feeding programs increased during the war because of the need for furnishing war workers with places to eat. They have proved their value both to management and labor in

terms of physical well-being, higher morale, reduced absenteeism, and greater efficiency. Some of the initiative which came from government agencies during the war, as from the War Department as a result of its direct interest in delivery of war goods, is gone. A service unit in government is still needed to give technical advice and furnish leadership and direction. But much of the initiative in promoting feeding programs and the accompanying nutritional education should come from labor.

The major unions were represented on the labor Advisory Committee on Food for Workers, which made suggestions for the government nutrition-in-industry programs and kept unions informed concerning it. The national organizations must continue to encourage in-plant feeding and to urge their locals to initiate programs.

Something like 600,000 workers were employed in food-processing establishments in the United States in 1940, another 950,000 in wholesale and retail establishments handling food, and 270,000 more in eating and drinking places. These figures do not include the proprietors. Maintaining adequate sanitary facilities and good working conditions in these establishments and protecting the food from contamination and spoilage constitute a responsibility of the workers as well as of the management. Some unions in the processing industries have concerned themselves with national food-production and consumption policies. The United Cannery, Agricultural, Packing, and Allied Workers of America (UCAPAWA) has made recommendations concerning maximum food production and the living conditions of workers. The United Packinghouse Workers of America has recommended a program that emphasizes the interrelated interests of farmers, the meat-packing industry (including the employees), and the consuming public.

One of the largely unorganized labor groups in this country whose nutrition problem needs attention is the agricultural laborer.[3] These workers and their families are dependent in unusual measure upon their employers for the quality of their diets. Foodstuffs produced and used on the farm carry no costs for transportation, packaging, storage, and merchandising. Usually they can be fresh and high in quality. Yet a large number of farmers fail to provide food or give it a high priority in their arrangements with hired labor.

A few simple background facts throw the problem of food for farm workers and their families in striking perspective. During the whole 30-year period from 1910 to 1939, hired farm workers in the United States received on the average $270 in cash wages and $97 in food, lodging, and other perquisites per 12 months of employment. From

[3] M. R. Benedict of the University of California helped greatly with pp. 317 to 319 of this chapter.

1940 to 1943, the annual wage income of hired farm workers averaged $468 in cash and $102 in perquisites. By 1946, the money wage had risen to $720. In terms of real wages, the income of hired laborers remained relatively constant during most of the years from 1910 to 1942, except for a slump during the depression of the early thirties. In general, the trend in the last 34 years has been to let perquisites make up a progressively smaller proportion of the total wages of hired labor. Perquisites comprised 30 per cent of the total annual wages per hired worker from 1910 to 1914, only 22 per cent from 1935 to 1939, and 18 per cent from 1940 to 1943. The practice of furnishing meals or board has become less common in the last few decades as agriculture has become more commercialized and as rural-urban conditions have been less sharply differentiated.

The several major classes of farm employees are (1) the hired men who live and eat with the farm family, (2) the resident married hired workers who live in separate quarters, (3) the self-feeding migrant workers, (4) the employees who eat in a mess hall, (5) the sharecroppers. For the first of these, the problem is the same as that of the farm families.

The problem for the resident married hired workers is partly one of their maintaining an adequate and well-diversified garden and partly one of the employer's supplying them adequately with staple foods such as potatoes, milk, and much of their meat, directly from the farm, and adjusting the wages to the amounts of these furnished. Ordinarily, the more of the wages paid in this way, the better for both employer and worker. On farms in some parts of the country, the women and children in the workers' families also work to earn additional wages, and this has interfered with their working in their gardens. It is to be hoped that postwar farm-wage levels will help this part of the problem.

The self-feeding migrant workers are a very sizeable group in the states around the coastal fringe of the country. Here the procedures described for the year-round resident worker cannot be used, and there is need for more study of the techniques suited to these special conditions. They may include provision of supplies at low prices and of better arrangements for storing, handling, and cooking foods. Every effort should be made to provide all the more important foods, especially milk and vegetables, at low prices. It is seldom good practice for the employer to sell food at prices higher than those prevailing in near-by stores, even though the costs may be higher. Many of the employer-employee frictions on large farms can be traced in part to this practice, especially where there is any semblance of compulsion to buy at the employer's own store or one that he has leased to a retailer. If enough of the employees reside on the place through the year to make it practical, an employee advisory commit-

tee can be allowed to see what it costs to provide services of this kind and to make suggestions on operating the facilities, on the kinds of goods to handle, and the like. It is possible to encourage improvement in the eating habits of the workers in this way. Many migrant workers come from social groups with deeply rooted national food habits that are difficult to change but that can be supplemented to advantage.

In farming operations that require mess-hall facilities, the problems are very similar to those in in-plant feeding. The difficulties are likely to be fewer, for three meals a day must be provided rather than one. At present, the quality of the food provided in such establishments varies greatly from farm to farm. On many it is quite good. In any event, the control of the food situation under this arrangement is completely in the hands of the employer. Efforts at improvement of quality and the introduction of economies must center largely in him. Usually it is to his interest to "set a fairly good table." There is need, however, for some collaboration between him and the home economists in the study of his particular problems, both nutritional and economic.

The sharecropper groups, consisting of some 500,000 to 600,000 families, have for the most part a low economic status, a low level of diet, and poor opportunities for learning how to better these conditions. Underlying this, of course, as in many types of farm-labor situations, is the problem of low incomes and limited opportunities for increasing them. There is good indication, however, supported by the observations of the more progressive planters, that intelligent and concerted efforts to raise the dietary levels of cotton croppers pays big dividends both to society and to the planters using labor of this type.

XXIX. EXECUTION—OTHER GROUPS

MANY other groups in the nation have a part to play in the development and execution of a food and agricultural program such as that outlined in Chap. XXI. Space is reserved in this chapter for brief reference to the roles of several of these, more or less by way of illustration.

Take, for example, the professional group of physicians, dentists, and oculists. A national nutrition program should be related to the national health program; therefore the medical profession must take a major role in a nutrition program. From the beginning of the science of nutrition, family physicians have been applying it to their care of pregnant women and infants and, in recent years, increasingly to their care of others. It may be difficult for busy physicians to keep abreast of developments in nutritional science, but they must attempt to do so if they are to perform their duty to their patients. Dentists and oculists also have a good opportunity to discover cases of malnutrition and cooperate in removing the conditions that cause them.

Perhaps the following statement by Walter Wilkins of the Florida State Department of Health puts the case more effectively:

> Only a generation or two ago the doctor's role was to keep the patient from dying. He was called only as a last resort. He dealt primarily with the very sick patients, with some one major causative factor predominating. Today many of the doctor's problems are different. He often sees patients who are not "sick," in the older sense of the word, but who have minor functional disturbances of various kinds. Such patients require more comprehensive study. Often little is revealed by the ordinary physical examination, and frequently it is impossible to pin the diagnosis down to any one thing. Nutritional disorders of various kinds are prominent among the factors contributing to such conditions. . . . In the field of nutrition, we have an opportunity to carry the concept of preventive medicine a step further than has been done in the prevention of clear-cut disease. We must strive toward the higher health levels which are possible of attainment.

Group action by the various medical associations is also important, not only at the local level, but in state and national organizations. Such organizations can assist in keeping members informed of new developments in the science of nutrition, take action in obtaining other forms of assistance needed by families to correct nutritional deficiencies, and collaborate

with the public schools and other public agencies in school-, infant- and maternal-feeding programs; and they may find themselves an essential link in the expansion of stamp programs to families not on relief.

The American Medical Association has made particularly valuable contributions to the cause of nutrition. Its Council of Foods and Nutrition has tested foods, reviewed, when requested, the advertising of firms, and developed its program of the accepted-foods seal.

A group of scientists mainly from the fields of medicine, food, chemistry, nutrition, and related fields are affiliated on the Food and Nutrition Board of the National Research Council. The National Research Council is a semipublic agency whose membership includes leading scientists in the various fields in which it operates. Its Food and Nutrition Board was set up in 1940. The board served in an advisory capacity on public matters relating to food and nutrition during the war and is continuing its peacetime activities under the leadership of the following committees and their chairmen:

Committee on Cereals, R. R. Williams.
Committee on Dental Health, Philip G. Jeans, Children's Hospital, Iowa City, Iowa.
Committee on the Diagnosis and Pathology of Nutritional Deficiencies, H. D. Kruse, Milbank Memorial Fund.
Committee on Dietary Allowances, H. C. Sherman, Department of Chemistry, Columbia University.
Committee on Fats, H. E. Longenecker, Graduate School, University of Pittsburgh.
Committee on Food Composition, C. A. Elvehjem, Department of Biochemistry, University of Wisconsin.
Committee on Food Economics, John D. Black, Harvard University.
Committee on Institutional Feeding, Philip C. Jeans, Children's Hospital, Iowa City, Iowa.
Committee on Maternal and Child Feeding, Icie Macy Hoobler, Research Laboratory, Children's Fund of Michigan.
Committee on Milk, W. E. Krauss, Dairy Industry Department, Agricultural Experiment Station, Wooster, Ohio.
Committee on Nutrition Surveys, C. G. King, The Nutrition Foundation, Inc.
Committee on the Nutrition of Industrial Workers, Robert S. Goodhart, National Vitamin Foundation.
Committee on Emergency Food Problems, R. M. Wilder, Mayo Clinic, Rochester, Minn.

The contribution this board has already made to the development of the science of nutrition and its application to the practical health problems of the population is of the first order of importance and has shown that coordination of scientific work in this field can be of great assistance. The service of the board during the war consisted in preparing standards and scientific recommendations for the War and Navy Departments on food-supply problems, for government agencies responsible for foreign-

relief feeding, and for the Food and Drug Administration on the development of standards and regulations. Not the least of these standards is the Recommended Dietary Allowances so frequently cited in this book. The board also provided general coordination in scientific research and food analysis in the many laboratories of the nation. Its highly valuable services should be continued and expanded under a larger food program. The organization charged with the development of a national food and nutrition program will need to have an organization such as the board as its technical adviser. Such an organization is necessary to sponsor basic research in food and nutrition and might become a part of the government-supported National Research Foundation recommended in Vannevar Bush's report "Science, the Endless Frontier."

Aside from their function in education, discussed earlier (page 288), professional dieticians and home economists working on health and nutrition have important services to perform in the food industry and in hospitals, schools, restaurants, and other institutions and agencies feeding large numbers of people. Their professional organizations, the American Home Economics Association and the American Dietetics Association, have been of outstanding value to the public in promoting better food practices and more adequate appreciation of the importance of good nutrition in relation to health. The nutritionists in the American Public Health Association are carrying out a similar program.

The success of such a national program as is here outlined, it is apparent, is in large measure dependent, both in its evolution and in its execution, on how large a part the press, the radio, and other mediums of public information and discussion are willing to take in it. First of all, the press, especially the weeklies and monthlies, can assist in the development and support of programs at all levels and in keeping the public informed as to their operations and current problems. The advertising carried by the press is mainly a responsibility of the firms paying for it, but the press is not without ability to exert an influence on it. Moreover, advertisers tend to relate their copy to the contents of the papers and journals in which they advertise. The radio's two principal opportunities are to take part in drives and to influence those who buy advertising time.

Although studies of informational mediums have indicated that the most effective adult educational channels are the press and the radio, such education is usually subordinate and incidental, and the housewives' reaction more or less accidental. The rather haphazard contacts that many women have with nutrition information from such sources give no assurance that they will take active steps to apply what they have heard or read. Perhaps a more serious result is that many women fail to achieve the first stage in an understanding of nutrition, that is, an understanding

of the concept of a balanced diet. The value of particular foods or of particular food practices tends to be fixed in their minds, not the place of the foods in the diet. The information furnished them could be much more helpful if it were closely related to the planning of balanced meals. There is also great need for more accuracy in the nutritional information given out by the press and radio. In fact, much misleading, if not actually incorrect, information stems from these sources.

Even more important is the help that the press can give in the day-to-day and month-to-month conduct of a nutrition program. The easiest and most effective way in which to convey to most individual consumers and homemakers information about nutrition and foods—as to how best to fit consumption into current food supplies, and how to combine available foods into good meals and diets—is through the local dailies and weeklies. These are equally effective in informing home gardeners. The efforts of the press along these lines during the war were highly successful and a splendid contribution to the war effort. They should be continued in the future. Perhaps more of the newspapers could advantageously add writers to their staffs who are especially equipped to deal with these subjects. Most of the newspapers handling this subject have gained support and clientele by it and will continue to do so in the future. One of the unique features of a newspaper is that it is in a position to create an interest in a subject and satisfy this interest at the same time.

Other ways in which the press and radio can serve are illustrated by their contributions during the war. Representatives of local newspapers and local radio stations in many areas served as members of local committees and were made responsible for the dissemination of nutrition information by these mediums. Editors of women's pages were particularly generous in devoting space to recipes, material on the proper preparation of food, and general nutrition education, basing the articles and "features" on the official food charts of the National Nutrition Program. Directors of women's radio programs also gave considerable time to nutrition subjects.

A type of service that could be offered to the smaller papers and the small radio stations is authoritative current information on foods and nutrition that is applicable to the area and fits in with the food preferences of the people of the area. A beginning of such a service was made in the Nutrition Programs Branch during the war, but it is difficult to plan a service in Washington that will suit the whole country because of the variation in seasons, food habits, prices, and other factors. This is a task for the educational institutions in each state.

XXX. EXECUTION—GOVERNMENT

We began our discussion of the execution of the program outlined in Chap. XXI with a general analysis of the interplay of individual, collective, and public action. In Chaps. XXV to XXIX we analyzed the individual and collective action of producers, consumers, processors and distributors, labor, and other groups in the execution of that program. There remains to analyze in this chapter the forms of public action that will be needed. These will now be tested and examined in logical order. Some of these will be analyzed in terms of specific problems chosen as illustrations.

Enabling Legislation.—Obviously the first step in translating into reality a program such as that outlined in Chap. XXI is to draft a bill embodying as much of it as possible, or as seems possible at the time, and to get this bill passed. The drafting of the bill will be a difficult task; many details of the program will have to be thought through more completely than in this book. The most important of these details will be the form of organization to provide. Surely one over-all administrator is needed, who should be the Secretary of Agriculture. But the Secretary should have a very able assistant administrator who will handle a large part of the job. The administrator should be given sufficient authority to be able to make the different agencies participating in the program carry out instructions. He must be able to secure the cooperation of all these agencies. These agencies may or may not all be in the Department of Agriculture. If not, the parts of their activities included in this program must be made subject to the administrator. All orders or instructions issued by the administrator should be reviewed and approved first by the Food and Agricultural Program Board discussed in Chap. XXI or in accordance with rules which it prescribes. The board will be the final referee on all issues relating to the program that arise between any agency and the administrator or between agencies.

No new agencies other than the Food and Agriculture Program Board will be needed. But some existing agencies will have enlarged responsibilities. This will certainly be true of the branches of government now handling agricultural credit and of the Federal office of the Agricultural Extension Service, with its large role to perform in connection with the farm and home planning that will be required. The Federal

Office of Education will also have a large program of nutrition education for urban consumers to direct. If the Nutrition Program Branch is continued, it should be a joint arm of these two educational branches of the government but should also serve as a program board in education. There will have to be an expansion of government activity in the field of forestry as applied to farm woodlands, especially as relates to woodland planning, credit for woodland improvements, and the marketing of woodland products. Other branches of government that will be drawn into this program to some extent are those of public health, commerce (marketing adjustments at the retail level especially), and labor (aid in transfer of surplus farm population to other occupations). The Food and Agriculture Program Board should include representation of whatever unit is finally set up in the United States to handle relations with the FAO. Probably it should establish relations with the National Research Council, which can serve as a council for it on scientific questions concerning nutrition and related subjects.

Any act passed should indicate how the existing agencies are to work together in this program, what part they will have to play in it, and what funds they shall administer.

This act will need also to describe the organization and the functioning of the state and county units in the organization; but do this in such a way that these units can fit into the special government setup in each state. The Federal board will need to approve the state setups, and the state boards the county setups; and the superior board in each case should lay down the general rules within which the inferior boards will operate, and similarly for the operating restrictions from time to time.

As indicated in Chap. XXI, the act should lay down some general rules as to how the total funds are distributed between grants-in-aid to production and other adjustments in farms and supplementary food-distribution aids. Of course, it will have to establish on what basis total prices are determined, and among the several other sets of alternatives defined in Chap. XXI. A policy question in all legislation of this type is how much an act should spell out details and how much it should leave them to administrative discretion. At the start especially, the policy should incline toward the latter. The process of trial and error must operate before many things about such a program can be safely decided.

A final question is whether the program must be adopted as a whole at the outset. The answer is that considerable parts can be left out at the start, but not the essential parts. Nor must restrictions be imposed upon it that will counteract its good intentions.

Setting up the Organization.—This includes working out the details of organization that are left to administrative decision and staffing the organ-

ization. These are tasks to be performed at all three levels of administration. Considerable adaptation of existing agency setups and arrangements will be needed in some cases, and collaborative arrangements will have to be worked out with other departments of government. All that needs to be said on the subject of staffing is that several types of men are needed in any operating organization of this type, including (1) men who have had experience in administration, preferably public, and in dealing with other men and agencies, (2) men who have good knowledge and understanding of the subjects dealt with, and (3) functional specialists, like fiscal experts and lawyers. Also, at the lower levels especially, the agencies and organizations collaborating in the program should be consulted in making appointments. The program boards will be able to make valuable suggestions. Arrangements for having some of the state and county board members elected will be desirable after the initial setup has been made.

Laying Out of Operating Procedures and Formulation of Operating Rules.—The organization contemplated will have to work out a definite system for processing all its varied operations—for allocating its funds to different uses, for handling requests for help in making farm plans and reviewing and approving these plans, for approving applications for grants-in-aid and credit plans, for checking performance under the grants, for making payments under grants, for receiving and reviewing requests for aid in school-feeding and other supplementary food-distribution plans, for certifying counties or municipalities for operating under stamp programs, for certifying families as proper recipients of supplementary foods, for approving expenditures upon such programs, and the like. Systems for such processing will already be in use in some of the existing agencies, but they may need considerable adaptation. At any rate, the system and the accompanying operating rules can largely be based on past experience with similar operations. Needless to say, these systems and rules must not be too rigid, and they must allow for adaptation by state and local administrators to special institutional arrangements in different states and different conditions in different areas.

Planning the First Year's Production, Prices, Distribution, and Consumption.—With the foregoing worked out, the program is now ready to go into operation. The initial step in this is to make the plan for the first year's operation. This process differs only in detail and in objectives from that followed by the War Food Administration of the United States during the war and by parallel organizations in other countries. More attention will have to be given to utilization of the foods and fibers and to what foods can be moved through different channels, and the total prices designated will have to be set in some relation to this. Also, account should

be taken of the needed adjustments and the supplementary funds required to finance them. Moreover, although this is a plan for only the first year's operations, it must allow for longer run objectives and must be capable of being adapted to these. Consequently, some initial long-run planning should be done the very first year. It is highly probable, whatever basis for setting total prices is chosen, that the price conference provided for in Chap. XXI will have to be called to make the final adjustments. Other issues will have to be threshed out at a national level with the Agricultural Program Board.

Needless to state, the technical staff of the Department of Agriculture, in the service of the board, will have a highly important function in assembling the pertinent data upon which the plans are based and analyzing these from a program point of view. The large amount of postwar-planning analysis already done by the Bureau of Agricultural Economics will be highly useful in this connection. Upon how well this kind of information is marshaled and presented will largely depend the degree to which the program is kept from going astray under pressure from ill-informed or short-sighted special-interest groups. The program boards are set up, however, in such a way as to give these groups a chance to present all their points of view freely and all their supporting evidence.

The working up of these plans should be a two-way process as between the Federal, state, and local boards. The local boards and the workers on local units of the various agencies will know best the nature of the adjustments needed on the farms and in the consumer groups in cities, and they must convey their knowledge and understanding up to the state and Federal levels. Those operating at the Federal level will have the best understanding of the international and over-all factors that must be taken into account as affecting the whole picture, in all its details all the way down to the last farm and household. The state units have a position of great importance in this process. They must translate the national factors into state and local terms and the local and state factors into national terms and assume the major responsibility in deciding upon the particular form the grants-in-aid, loans, and supplementary food distribution should take in their state or parts of their state.

Review of Operations and Revisions of Plans.—At best, the plans for the first year will be somewhat tentative. They will have to be watched in operation, and their records analyzed to see how well they worked. In the meantime, more careful long-run plans can be developed county by county and state by state and nationally. The second-year plans can therefore improve much on those of the first year, if such improvement proves to be needed. The revisions in plans in later years will be mainly adaptations to changing conditions, as in business activity and employ-

ment, export demands, planting and yields of crops, production cycles, carry-overs, and technical developments.

Education.—In Chaps. XXIV to XXVIII, education was described as a mutual undertaking, in which the receiver participant is as important to its success as the teacher participant. The presentation in those chapters was mainly from the standpoint of the receiver. We shall consider education from the standpoint of government, for education, after all, is one of the most extensive, and expensive, forms of public activity in which government engages. So far as public-school education is concerned, all that is called for by the program of Chap. XXI and following is that some instruction in farm and home planning and in foods and nutrition be substituted for a part of the education now offered that is not so important to human and social well-being. Guidance in this direction could properly be offered at the national and state level, and perhaps some financial aid given in low-income areas.

Much more is proposed in the way of adult education—in fact, nothing less than a complete coverage of the whole population with a type of nutrition education paralleling that now provided in most farm and rural areas by home-demonstration agents and the like. That this has not been provided before is a reflection on urban leadership in this country. The people must demand such education and vote local support for it. Public servants conduct it, but only with a great deal of help from the communities. As explained in Chap. XXVI, local leaders will need to bear more of the burden of it in cities than they have in rural areas. Federal aid will be highly necessary, especially in its early years. Senator Thomas of Utah introduced a bill to enable state universities to provide adult education in 1944, and a bipartisan bill with similar purpose was introduced in both houses in 1947.

Research.—That a large part of the research for a food and agricultural program must be conducted by public laboratories and experiment stations is commonly recognized. About the only questions remaining are how much research there shall be and what lines it will follow. The ways of getting research done on subjects vital to farming have already been well established in the United States. More research is always needed than there are funds to provide for, but the procedures are understood. The conduct of research in human nutrition as such is also pretty well understood, but the amount should be greatly expanded. The most serious deficiencies in the research needed as a basis for a food and agriculture program in the United States are in respect to research directed specifically at farm and home planning and supplying the information needed for it. Also, although considerable research has been done on marketing of farm products, not much of it is very useful in the kind of

marketing adjustments discussed in Chaps. XV and XXI. The new program authorized by the Research and Marketing Act of 1946 may correct this.

Services.—The many services rendered by Federal and state agencies to producers, distributors, and consumers of food and other agricultural products are highly important. If almost any one of them is discontinued for a month at a critical period in the production or marketing of a crop or a livestock item, a great clamor arises for its return. Some may have to be somewhat redirected to fit into the program here outlined. The principal line in which they need generally to expand is in providing consumers much fuller information about foods offered for sale in retail stores.

Regulation and Enforcement.—All the existing body of regulation by the U.S. Department of Agriculture, the state departments of agriculture and markets, municipalities, the Food and Drug Administration, and the Federal Trade Commission will continue to be needed in its present form. It provides the necessary conditions for as close an approach to free and equal competition as we have thus far been able to attain. The least to be hoped is that we can hold our own in the constant struggle to maintain such competition. The particular provisions of the act setting up the proposed program may need some special enforcement that existing regulatory agencies may not be able to furnish.

Financing.—There is nothing surer about any program for improving agriculture and nutrition or anything else than that government will have to pay for it. Occasionally some program discovers a way of financing itself. The original Agricultural Adjustment Act did this—out of processing taxes. But the courts promptly declared this an unconstitutional use of the taxing power. Hence the financial support usually has to come from the general treasury, which means, in effect, that the taxable wealth and income of the country are enough increased by the program so that its people can well afford to support it. It may not pay for itself immediately, however. The proposed program should increase the productivity and the income of agriculture and supply the great body of consumers with more and better food. Some classes of the population may find themselves paying relatively a little more for their food for a while than they were paying before the war. But prewar food prices surely cannot be taken as a standard.

APPENDIX A. FISHERIES

All that will be undertaken here is to point out a few general facts about fisheries and fish products that affect the application to them of the principles and procedures outlined in the thirty chapters of this book. Nothing more should be needed. The reader surely has understood that, every time agriculture has been named, fisheries as another source of food has been included by implication and that all the analysis of food distribution has similarly included sea foods along with land foods.

The first fact to be considered is that, although fish production does not bulk large in world food totals, it is highly important in the economy of some countries. The per-capita fish production prewar was 6,200 pounds in Iceland, 1,525 in Newfoundland, 680 in Norway, 110 in Japan and Canada, 100 in Korea, and 35 in the United States including Alaska. The food and agricultural programs for some countries must therefore make large provision for their fisheries industries.

Second, fisheries and fish products bulk much larger internationally than in terms of total output. The section of the Preparatory Commission's report on fish summarizes the facts with respect to this as follows:

> The annual aggregate catch of fish has been estimated at approximately 40,000 million pounds, two-thirds of which is utilized for food. This amount yields 10,500 million pounds of food products as consumed. More than 20 per cent of this world aggregate enters into international trade, including such products as salted fish, canned fish, fish meal, fish oils, and vitamin products, frozen fish assuming a lesser position but one of growing importance.
>
> Fish as a nutritive protein is of great importance. It is basic in the diet of certain peoples, and constitutes an important part of the food intake of others. Ninety-eight per cent of the recorded catch is yielded by the Northern Hemisphere, while much of it is consumed in the Southern Hemisphere.
>
> Of the products entering into international trade one of the most troublesome is salted fish, particularly salted cod and related species. Salted fish is a low-priced concentrated protein food containing sodium chloride, and is suitable and necessary to the diet of people who live in hot countries. Its consumption forms part of a long-established dietary pattern and it is unlikely that its place will be taken by alternative foodstuffs. Examples of such countries will be found in the Caribbean area, in South America, and in South Africa. Other types of cured fish find wide acceptance in countries of temperate climate such as France, the

Iberian Peninsula, the Mediterranean, and to a lesser extent, the United States of America. There are certain other countries where considerable potential demand exists because salted fish furnishes a cheap source of high-class protein.

When fish products are considered from the standpoint of food supply, several sets of facts stand out. One is that, in many parts of the world, fish is about the only source of flesh protein. This is largely true of Japan and in parts of China and India. The amounts consumed per person are small, but highly critical in the diets. In other areas, it is the cheapest source of such protein. This statement applies especially to the tropical countries like Puerto Rico that import salt fish; and in many of these the small amounts consumed per capita are equally critical.

The second set of facts pertains to possibilities of expansion of fisheries as a source of food. Even though the Northern Hemisphere fisheries were intensively exploited before the war, it is believed that the yields from the fisheries on the Grand Banks of Newfoundland, off the Pacific coast of North America, and the codfisheries off Siberia and Kamchatka can be increased. Specialists in the Fish and Wildlife Service have estimated that the yields of all fisheries in the United States and Alaska could have been increased by 50 per cent between 1940 and 1947.

Then there are large undeveloped sources. Some of the unexploited areas are near peoples whose diets are deficient in animal protein. These areas are off Mexico, Panama, the Galápagos, and parts of Central America and possibly along the west coast of South America. The "Technical Reports" prepared for the FAO develop this theme as follows:

> A considerable expansion seems possible along the west coast of South America, especially off Peru and Chile. These countries can supply salted, dried, and canned tuna and bonito, and other market species; shark-liver and other fish-liver oils; fish meal from anchovies; and industrial oils. Off the Bahamas, Cuba, and Venezuela, there seems possible a somewhat increased production of fish which could very profitably be used to supply the needs of the Caribbean area. The marine fishery resources of Brazil are underdeveloped . . . . The broad continental shelf running southeast off Uruguay and Argentina can produce enlarged yields for the same purposes. Northwest Africa could probably make greater use of its sardine and tuna fisheries in canning and salting.

The fishery resources off West Africa, Australia, New Zealand, the South Pacific Islands, and the East Indies are also considerable and capable of further development.

Considerable progress has been made in pond culture. In the United States the annual yield of bass and sunfish has been estimated at 150 pounds per acre, and if artificially fertilized the yield is close to 400 pounds per acre. This compares favorably with the average yield of beef

of 46 pounds (retail weight) per acre.[1] Pond culture is practiced extensively in China, central Europe and the Balkans, and many islands of the Pacific. In connection with the SCS program in the United States, more than 23,000 farm ponds have been constructed and stocked with food fish.

Improvements in processing, storage, and transportation are also an important part of the problem of utilization of fish resources. Refrigeration will gradually break down the prejudices against local fish in tropical countries and make possible the transport of increasing supplies inland from the sea.

Finally, with modern methods of fishing, many types of fish are produced very cheaply. For example, in the modern trawler operations in North American waters, one man-year of labor is producing 65,000 pounds of edible fish compared with the 6,500 pounds of beef produced per man-year on the farms of the United States. Not only is fish a very economical form of protein food, but it is one of our most important sources of oils containing vitamins A and D. Fisheries also make an important contribution to the world's fats-and-oils supply through whaling operations. From 1934 to 1938, oil production from whaling was 1 million pounds, one-tenth of the total fats and oils moving in intercontinental trade.

The FAO committees dealing with fisheries have been much concerned with problems of overfishing and low prices. The Preparatory Commission reports on this subject as follows:

> Since 1920, the price for salted fish declined steadily until the outbreak of World War II and the decline showed no recovery from the depression year of 1932. This was particularly serious for such countries as Newfoundland, Norway, Iceland, and the Faeroes, since the economy of these countries was largely tied up with salted fish. The decline was not accompanied by a diminution of total production; in some areas there was a tendency toward an increase in production in order to keep up income. The low prices failed to support the primary producer and it became necessary for the governments of most of the producing countries to support their fishermen by subsidies.
>
> The history of salted-fish marketing during the interwar period was marked by strong competition and rivalry between producing countries. There existed many barriers to the free flow of trade in the form of quota restrictions, prohibitive tariffs, and other devices. To a large extent trade depended upon bilateral agreements, many of which would be prohibited under the ITO Draft Charter, unless they were provided for under an international commodity arrangement. In the absence of such an agreement it is probable that chaotic marketing conditions would prevail.

[1] Including land for feed and assuming pasture yields equivalent to average yields of tame hay.

The report then recommends that a study group be created to . . .

consider, on the basis of the reports, whether a commodity agreement with respect to salted fish is desirable or feasible and, if so, what provisions are appropriate with a view to bringing about an expansion of production and consumption with more orderly trading at prices which are satisfactory to both producers and consumers, including the possibility of adding salted fish to any world famine reserves and of programs for disposal of surpluses for approved nutritional projects.

This discussion may well conclude with the following paragraphs from the report of the Committee on Fisheries to the Copenhagen Conference:

In conclusion the Committee would like to submit some general observations on the subject of fisheries. There can be no doubt whatever as to the vital importance of the fisheries of the world and of the high nutritive value of fish as a cheap food, but these matters tend to be overlooked. For example, in the "World Food Survey" made by FAO, mention is made of fish as a substitute for meat and emphasis is laid on the fact that there is a great shortage of animal protein and that 7 to 10 years may elapse before the herds in Europe attain their prewar numbers. Yet no figures are given for fish in that survey. This omission should be remedied since it leaves the impression that the importance of fish products as food is not yet fully appreciated. The world's catch of fish prior to the World War II was calculated at 17 million metric tons, producing about 7 million tons of edible fish flesh; according to the FAO World Food Survey this was 25 per cent of the combined consumption of meat, fish and eggs in the United States of America, the United Kingdom, China, India, southeastern Europe and South America. Moreover, a large portion of the fish catch has always been used for industrial and agricultural purposes by conversion to fish oil and meal.

It is clear that some countries are already moving toward a surplus position. Improvements are being constantly made in processing methods, and new products (e.g., artificially dried fish and fish flour) are being created, all of which may help to eliminate some of the world's shortage of animal protein.

The fishing grounds of the world are teeming with fish of all kinds. Fisheries are an international resource. The harvest awaits the reaper, especially in underdeveloped areas.

APPENDIX B. FIBERS

All statements concerning the production and distribution of agricultural products in the foregoing chapters have included cotton, wool, and other fibers along with food products. There has been no discussion, however, of the consumption of fibers, except to point out in Chap. IX that mill consumption of cotton—and this statement could have included wool, jute, and linen—is much more responsive than food consumption to changes in business activity. Space will not be taken here to present the factual materials relating to fiber consumption or to analyze fiber needs and possibly set up targets of fiber consumption as has been done for foods. Many of the same types of maladjustments and imbalances prevailed before the war, especially with cotton, as for food products; and the same general need exists for production-consumption adjustments both nationally and internationally.

The Preparatory Commission summarizes the situation with respect to cotton as follows:

> Until the 1930's, there was little government intervention in cotton production and trade. Cotton consumption was much reduced during the depression and the growing world surplus was left largely in the hands of the United States of America. Government intervention in cotton production and trade, which developed in the 1930's, was carried further during the war and still continues. Direct or indirect production control exists in most countries. Price-support measures are in force in the United States of America, Egypt, India, Mexico, Argentina, and Brazil. Probably as much as two-thirds of all the cotton moving in international trade in 1946–1947 was imported by government agencies in the recipient countries, and the remaining third taken by countries exercising some sort of control over quantity, source, or price.

The report then goes on to state that world stocks accumulated to 28 million bales during the war but that by July, 1947, these were expected to be reduced to 17 million bales, partly because of a decline in production in 1946 and 1947 and partly because of a revival of textile production. . A restoration of textile-manufacturing capacity in Europe and Asia and expansion in a few countries, to meet deferred demand for textiles, would provide an outlet for most of these stocks. "On the other hand, under less favorable general economic conditions, it might happen that a

continuation of price-support policies and a series of large harvests, combined with competition from synthetic fibers, would again bring about a burdensome surplus of raw cotton."

The report therefore suggests the need for further meetings of the International Cotton Advisory Committee, first set up in 1940, and urges that this committee "bear in mind the recommendations (with respect to foods) set out in this report (as well as those contained in the ITO Draft Charter) and consider how far they may be applicable to raw cotton."

Twenty-six countries were represented at the fifth meeting of the International Cotton Advisory Committee in May, 1946. An executive committee of six importing and six exporting countries was created and charged with

1. Establishing practical cooperation with the FAO and with other organizations concerned with the world cotton situation.
2. Providing a medium for exchange of views in regard to current developments in the international cotton situation.
3. Further developing the work on an instrument of international collaboration to deal with the world cotton situation.

The problems of postwar wool were discussed at a conference held in London in November, 1946, at which 14 countries were represented. This conference accepted the British Joint Organization as a *fait accompli* and agreed on the desirability of establishing an international study group for further intergovernmental review of the wool situation. There was also general agreement on the need for avoiding excessive price fluctuations and for expanding wool consumption.

The Preparatory Commission recommended as follows:

We recommend that FAO be invited to take part in the work of the Wool Study Group and that close cooperation should be established between FAO and existing organizations in the wool field. In particular, we stress the need for studies of the interrelationship in demand, and competition in use, of wool and other textile raw materials.

We have not considered how far the general principles set out in our report may be applicable to wool, but we note that the plan adopted for disposal of surplus stocks, particularly the maintenance of a price range by regulatory sales and purchases by the Joint Organization, bears some features in common with the operation of an international buffer-stock agency. We think that experience of the working of the plan may prove useful in future studies of buffer stock proposals.

No one following the course of events in the United States will miss the connection of the foregoing with the efforts under way in Congress as this paragraph was being written to raise the level of wool prices in the

United States above that set in the world's wool auctions by more than the prewar tariffs. The United States will have to make up its mind some day how large a domestic wool-producing industry it intends to subsidize. But such a decision is no different from the ones it will have to make about much manufacturing production that it is now subsidizing.

APPENDIX C. TIMBER

The close connection between use of land in timber production and in food and fiber production has been strongly indicated in all the preceding discussion of farm and land-use planning adjustment. Timber also very much needs to be considered from a consumption standpoint. The problem is paramountly one of shortages rather than of surpluses. Timber deficits have delayed reconstruction of devastated areas in Europe and postwar housing developments in the United States. The gap between import needs and export supplies of lumber is likely to increase as reconstruction gains momentum. Improvements in trade relations, extension of credit to provide facilities and transport, and technical aid in utilization would help this situation considerably in the next ten years. But at the best it will still be necessary to overcut and to open up hitherto undeveloped forest resources with the utmost speed if the timber crisis is to be solved.

The long-run prospect is better only in the sense that time is available to prepare for it. Even in the United States, present growth of saw timber is at the rate of only 35,000 million board feet per year, whereas the timber drain, including 4,000 million lost by fire, wind, disease, and insects, is 56,000 million per year. If this unbalance is not adjusted, the timber reserves of this country will all be exhausted in eighty years. The European overdrafts are larger than in the United States, particularly because of the heavy drain of the war years. Additional exports are therefore needed from new sources, and these call for considerable long-time investments in new plants and roads and other transport facilities.

Basically what the world needs, of course, is the application of good forestry management to large areas in the United States, Canada, and other new countries that have been exploiting virgin or second-growth stands and the conversion to timber of considerable areas of sloping and hilly lands, in the Old World as well as the New, both as a soil-conservation measure and to provide needed timber. Little progress along the second line will be possible in many parts of the world until populations are brought into better balance with natural resources.

The Division of Forestry and Forest Products of the FAO has been giving attention to both the long-run and the short-run aspect of the timber problem. It submitted a world survey of the forestry situation to

the Copenhagen Conference. It has initiated a program of periodical statistics and market reports with regard to forest products and has started informal discussions between a number of governments with regard to necessary action. It was also making plans for an international timber conference to discuss specific arrangements that would facilitate European reconstruction programs.

Such a conference [said the Preparatory Commission] if well attended by government representatives from European timber-exporting and importing countries as well as from North America, can mark an important beginning in intergovernmental consultation. It should be the starting point for continuous coordination of government programs and activities with regard to forestry and forest products, and should be followed by other regional conferences which should ultimately result in the establishment of a real world forest policy. We understand that special consideration will be given to a long-term forestry program for yet undeveloped forest resources, especially those of Latin America and the Far East. A comparative survey of the existing forestry practices in tropical regions should be a valuable guide in determining forest policy for these areas.

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