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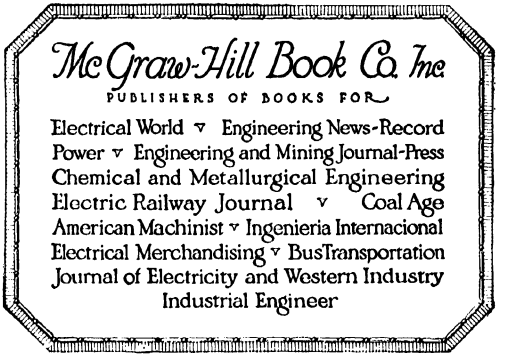
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# PRACTICAL ECONOMICS


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# PRACTICAL ECONOMICS

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# PREFACE

The rise and rapid spread of business education which has been such a prominent feature of our modern educational system has not only resulted in a call for courses dealing with particular fields of business activity, as accounting, banking and selling, but has considerably augmented the demand for a knowledge of the general theory of business as treated in the science of economics.

From long association with business men as well as from the teaching and discussion of economics with students drawn largely from the ranks of practical men of affairs, I have been impressed with the insistent demand for a simpler and more concrete statement of economic theory than is usually found in the standard works.

To satisfy this demand the present book has been prepared.

No attempt has been made to depart radically from standard economic theory. The aim has rather been to state in simple language and to explain as concisely as possible, the general laws and principles underlying and governing the production and distribution of wealth in the United States today, for the benefit of all who desire to gain a clearer understanding of the structure of our economic system and of the forces operating within it. In consideration of the increasingly important part played in modern affairs by business organization, more attention has been devoted to it than has been customary; and it is treated as a separate factor in production along with land, labor and capital.

While of course economics is concerned with the theory of business and its peculiar function is to set forth the operation of those broad and fundamental laws governing business as a whole, special pains have been taken to point out their practical consequences in everyday business life. In other words, the connection between theory and practice has been kept constantly in view and wherever possible the practical application of laws has been pointed out by illustrations drawn from modern business practice.

Furthermore, the human side of the subject has been emphasized

and frequent reference has been made to the bearing of economic laws on the personal interests of individuals whose welfare in the aggregate constitutes the national well-being.

The economic problems of today have assumed such proportions as to have completely outgrown adequate treatment in an elementary text and are now rightly and better dealt with in separate treatises. No attempt has been made, therefore, to crowd these in, but rather to state clearly the laws and principles on which they rest. Here again every opportunity has been taken to point out the relationship between the laws discussed and the questions of the day upon which they bear.

In writing on a subject which has so challenged the attention of thoughtful men for centuries and which already has such a rich literature one must naturally owe much to previous writers. On account of their number, I regret that I must limit myself to a general acknowledgment of my indebtedness. To my old colleague Dr. Wm. M. Deviny and to Dr. Wm. H. Walker, both of whom read a large part of the manuscript, I tender my thanks. During the five years the book was in progress, very able and courteous service was afforded me in research and statistical work by the staff of the reference department of the Carnegie Library of Pittsburgh.

HENRY P. SHEARMAN

PITTSBURGH, PA.
*September*, 1922

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# PRACTICAL ECONOMICS

## PART I

### EXPLANATORY AND INTRODUCTORY

# CHAPTER I

# ECONOMICS: ITS PURPOSE AND VALUE

## DEFINITION

In approaching a study, a definition serves somewhat the same purpose as a telescope in the hands of a passenger on an Atlantic liner; it enables him to locate and obtain a bird's-eye view of a distant port long before it is even visible to the naked eye. Although the view is of necessity compressed into a small compass, it at least affords him some idea of the location of the place toward which he is heading and of its main outlines. A long distance definition of economics, or political economy as it is sometimes termed, tells us it is that science which treats of man's efforts to provide himself with food, clothing, shelter, and whatever else he deems essential to his welfare. Drawing a little closer we see that it is concerned with business activities and institutions. Hence it is often spoken of as the science of business, and if the word business is used in its broadest sense to cover a nation's activities in the production, exchange and distribution of wealth such a definition is both practical and sound.

## POINT OF VIEW

The business activities of a modern nation like the United States comprise a miscellaneous mass of practices by means of which more than a hundred million people in competition and coöperation with each other satisfy their varied wants. Each individual engrossed in his own particular work and interested in his own private ends rarely understands the working of the whole system of which he and his affairs occupy but a fractional part. In consequence his views of certain sections of activity or of the system as a whole are apt to be warped by his own interests. It is precisely this deficiency that

economics seeks to correct by substituting for the viewpoint of the private individual, the broader one of society as a whole.

It is important to stress this feature of economics, for the angle from which a subject is studied makes an appreciable difference in one's understanding of it. The same institution or phenomenon observed from opposite sides may not only appear different in character but actually be different. Wages to the worker are his means of livelihood, to the employer they are costs; to the economist they constitute the share of the net product of industry paid to the worker for the part he has played in production. Profits to the individual business concern are the difference between costs and receipts; but from the viewpoint of society they are the amounts necessary to stimulate and insure business enterprise. A strike or a lockout in a given industry may appear to the combatants a perfectly justifiable method of settling a wage dispute, but to the community it may mean discomfort and even privation. An invention that throws a worker out of a job is a harmful thing in his eyes; to the inventor to whom it brings a fortune it appears in just the opposite light. To society it is an instrument of progress, hurtful perhaps to the individual worker for the time being, though beneficial to labor in the long run. The business corporation is to the stockholders a source of profit; to the economist it is the agency by means of which land, labor and capital are coördinated to supply the nations' needs. Economics studies business institutions and activities not solely in relation to individual or class interests but in their bearing on the interests of the nation at large. It stands as the champion of the economic welfare of the people as a whole.

## STUDIES BUSINESS AS A WHOLE

The aggregate of business institutions and practices of a nation at a given time is sometimes referred to as its economic system. But it is evident these do not constitute a separate system in the sense that a government is a system with a central controlling head. It is possible either by revolution such as we have witnessed in Russia or by the more peaceful path of evolution, that these may become merged into one unified organization operating under the control of a centralized man-

agement. Such is the dream of the Socialists. But in the world as it is, the economic activities of each nation are carried on by a host of separate though closely related individuals and organizations. This vast and varied mass of institutions and activities is the economic system by means of which the wealth of the nation is produced, exchanged and apportioned among its members. It is the object of economics as a science, to study these activities as a whole in a systematic way, to describe them, show the relationships of the various parts. and the laws and principles governing them.

## RELATION OF ECONOMICS TO SPECIALIZED ECONOMIC STUDIES

To explain the operation of all parts and branches of modern business; to describe all kinds of business organizations; to present the laws and principles governing manufacturing, transportation, commerce and finance; to solve the baffling problems arising in connection with the production, exchange and distribution of wealth, such as the tariff, monopoly control, government regulation of industry, the question of labor and capital and so on,—would be today a stupendous task for any one science. When economics was in its infancy in the time of Adam Smith, all the known laws and principles governing business might have been included in one general treatise. Since that time, especially during recent years as a result of inductive study of increased statistical investigation and research, an ever growing body of data covering separate fields has been gathered, new laws and principles have been formulated and many corollaries to the general laws have been added. To include these in one treatise is practically impossible. Since the first general treatise was written by Adam Smith in 1776, the present science has branched out. The leading universities in the United States and similar institutions in England, Germany and other countries, are now teaching intensive courses in many separate fields of business activity.

Of these separate subjects some, like salesmanship and industrial organization and management, are yet relatively undeveloped and to a certain extent lack the broad, social viewpoint.

Others like money and currency, foreign exchange, industrial combinations, labor organizations, etc., are in reality divisions of economics, being separate treatises the outcome of intensive study of special phases of economic activity looked at from the social viewpoint.

The relation between these separate economic studies and economics is evident. Each of the former is confined to a specific sphere of business activity and aims to explain its institutions and activities, to discover the laws and principles governing its operation, whether it be selling, management, finance, or tariff regulations. But economics covers the whole field in a general way and aims to display those broad general laws and principles that govern business as a whole. It carries out a survey of the entire field in order to give a bird's-eye view and enable the individual to obtain a perspective of that miscellaneous complex of activities constituting modern business, so that whatever particular branch he may study or practice later, he may by virtue of his broader vision sense his relation to other activities and his part in the whole. For this reason economics is sometimes spoken of as the *general* science of business.

## METHODS

There are two methods of building up a science, deduction and induction. In the older sciences such as astronomy and mathematics the former was chiefly used, in the more modern the latter method, sometimes termed the Baconian method on account of the emphasis placed on it by Francis Bacon, is largely employed. In deduction, the general conclusion or hypothesis is put forth first and then tested out by application to particular cases. In induction a study is made of a particular case, as a result of which a general conclusion is arrived at. But in deduction the *a priori* conclusion is itself the result of a certain amount of observation, while in induction the selection of specific instances is more or less aided by preconceived conclusions. Indeed, as someone has aptly remarked, in the building up of any science both deduction and induction are as essential as the right and left foot in walking.

In the early stages of economics, deduction played an

important part in formulating the general laws of the science but more recently the inductive method, especially in its statistical form, has been increasingly used. The growth of statistics has much enriched the science of economics both in the discovery of new laws and in the verification of the old. Whatever economics was in its infancy, it has taken on a very practical aspect of later years. Some of its early doctrines not standing the acid test of experience have been thrown aside; and with modern research and statistical investigation into actual business practices and facts laws and principles have resulted which are forged out of actual practice and tested by business experience.

## AN INEXACT SCIENCE

One of the chief charms of economics and at the same time its weakness as a science lies in its very humanness. Unlike astronomy, physics or chemistry, it is not an *exact* science. By which it is meant that its laws and principles are not statements of relationship or movements of forces that act inevitably in a fixed manner and with an exactness capable of being measured to a fraction. The wages of labor, the upward and downward swings of prices, the movements of foreign exchange rates, the flow of gold, are governed by laws but not rigid laws like those that determine the movement of the stars or of inanimate matter in general. The astronomer is able to predict to a fraction of a second the appearance of a star that swings into his vision but once in a hundred years; the chemist knows with surety that whenever he mixes certain chemicals a given reaction will always result and he is able to measure the result quantitatively. But the economist because he treats largely of human forces and activities based on human relationships cannot predict results with the same sureness or measure causes and effects with the same exactness. He may know that the amount of a commodity that will be purchased will vary inversely with the price charged but he may not know exactly how much an increase of 25 per cent on the price will reduce its sale. The laws of economics, therefore, like those of its sister social sciences, ethics and politics, are not hard and fast statements of invariable facts

but rather statements of tendencies admitting of numerous exceptions.

The inexact and general nature of some economic laws by no means deprives them of their usefulness or invalidates economics as a science, though there is no doubt but that a lack of a proper understanding of this feature of the science has been a cause of its misjudgment. The fault lies partly with economists who have sometimes exaggerated the accuracy with which some of the more general laws operate in actual life. On the other hand, some of the criticism has been due to a misconception on the part of many practical business men as to what a science really is and failure to make allowance for the uncertain nature of the subject matter with which economics deals.

It is natural for hard-headed business men to want laws capable of specific and immediate application to given conditions. Many of the rules and principles of specialized economic studies are of this character but many of the laws of economics are general in nature and call for judgment in applying them to concrete cases; their action is often modified by other factors and forces which must be taken into consideration. Moreover some are what might be termed long distance laws, requiring considerable periods of time for their operation and often their immediate effects are quite opposite to their ultimate consequences as in the case of the effect of machinery on labor. But to lay the blame of this on economics is to lay it at the wrong door, for the remoteness and uncertainty of its laws are not due to the science but to the complexity of the activities it seeks to explain.

Much of the criticism launched against economics arises from the popular and ancient misconception of the relation between theory and fact which in the minds of some will always appear to be antagonistic. But theory in the only sense in which it finds a permanent place in a science must be in harmony with facts. In themselves, facts are valueless. What is needed is an understanding of facts, of their causes and effects. Such an understanding is gained by an explanation. Such an explanation is a theory. Of course, there are false theories but to condemn all theories because some are false would be equivalent to a refusal

to accept money because it is sometimes counterfeited. Yet there is usually some basis for popular beliefs and the origin of the popular suspicion of theory is no doubt due to this tendency of theory to depart sometimes from actual facts. In attempting to explain a given phenomenon, to find its cause a scientist will often start with a hypothesis or what the man in the street would call a guess. With this as a guide he will investigate just as a mechanic in trying to find what is wrong with his motor, after listening perhaps will conclude the trouble lies in the carburetor. He then tests his theory out. So also does the scientist, but so complicated are some of the problems of the scientist and so anxious is he to explain them, that he may neglect to test his theory sufficiently and proclaim that which is true in a few cases to be true universally. Or he may become so enamoured by his theory that he is carried away by it, fitting and adapting the facts to the theory instead of the theory to the facts. The antagonism of the man in the street to theory is thus a warning against fanciful theories and too hasty generalization. Economics like other sciences has doubtless been guilty in this respect but recently it has profited much by criticism and tends more and more to test out its conclusions and discard those which when weighed in the balance of experience are found wanting.

## VALUES

In former years a knowledge of economics was mostly confined to those engaged in the administration of public affairs. But while it is evident that those directly responsible for the welfare of the nation should be thoroughly conversant with the laws and principles on which national prosperity is founded, it is not desirable in this democratic age that such knowledge be restricted to the few in the seats of the mighty, especially in consideration of the fact that modern politicians themselves are none too well versed in the science. The majority of the leading questions of the day, upon which decisions directly affect the destinies of the nation and the happiness of the people, are economic. Their issues are often beclouded and warped by deep-rooted class or local prejudice. There is needed for their con-

sideration the broad social viewpoint and a clear knowledge of those fundamental laws governing not only domestic affairs but foreign trade. This knowledge should be in the possession of the people themselves. Any country with a large body of its citizens in ignorance of general economic truths on which national prosperity rests is in danger of having its masses influenced by false propaganda and its legislation warped by special interests. The need for an enlightened public opinion on economic subjects was never more acute than today.

Not only on grounds of public policy is a knowledge of economics desirable but for the sake of individual economic advancement. Personal experience will always be the basis of business ability but the influences that play upon a modern business extend far beyond any one man's individual experience. Less and less are business concerns influenced only by local conditions; more and more are they affected by world happenings. The narrow provincialism which has so often characterized American business men in the past is necessarily giving away to a more cosmopolitan outlook. The granting of credits by banks, the borrowing of funds by corporations, the purchasing of raw materials, the planning of selling campaigns, the extension of plants, the location of new factories,—all demand on the part of those responsible, not only a specialized knowledge of credits, plant management, selling, etc., but a familiarity with business conditions in general. The executive today needs to be master not merely of his particular field but of the broad fundamental laws governing business as a whole. The ability to interpret conditions, read the signs of the times, forecast depressions or booms, price rises or falls, the effect of a tariff, and other economic tendencies which might wreck or further his plans, enables him to adjust his affairs to outside conditions in such a manner as to avoid failure and achieve success. What the science of navigation and a knowledge of undercurrents and hidden rocks of the ocean are to the captain on the bridge of the Atlantic liner, the science of economics is to the executive at the helm of a business, enabling him to avoid the hidden shoals in the sea of business affairs.

It has been said that while economics is essential for execu-

tives or college men who later will assume positions of responsibility, it is wasted time teaching it to clerks or mechanics. There is an element of truth in this. A clerk does not require the same education as a banker. And providing the clerk intends to remain a clerk, a couple of courses in accounting will better fit his needs and bring him in the immediate remuneration which as a rule marks the limit of his mental horizon. Moreover, to attempt to load economic laws into the minds of this species of the clerical genus is akin to trying to put 44 caliber shells into a 22 rifle. Economics should, however, have a strong appeal to the 44 caliber man in clerical work ambitious to prepare himself for more important service in the future.

One danger facing the young man entering business life today is its narrow specialization. Where his father started in a small concern in which he was able to pick up by experience a working knowledge of the different branches of the business, the youth today pigeon-holed perhaps in one department of a big corporation finds sparse opportunity for securing that all-round training and broader viewpoint so necessary for executive work. While a study of economics alone cannot remedy this, it will materially help him to broaden out. His knowledge of economic laws and principles will give him an insight into the meaning of happenings in his own concern and the world around him which the man beside him will lack. He will be able to read with intelligence articles on economic subjects in the financial and business magazines which are unintelligible to the man in the street. In the office or club or on the platform, he will be better equipped to discuss the questions of the day. Truly, it will give him a deeper insight into life itself, for no study is more thoroughly enlightening regarding human affairs than that which treats of mankind's struggle to make a living.

## TEST QUESTIONS

1. What is "Economics"?
2. From what point of view are business activities studied in economics?
3. What is the relation of economics to the specialized business courses such as accounting, banking and selling?
4. What is meant by referring to economics as an inexact science?

5. What is theory? What kind of theory is referred to in the statement—"The eternal conflict between theory and fact"? How can theory and practice be reconciled?

6. Name some of the values to be derived from a study of economics.

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# PART II

# ANALYSIS OF THE BASIC FACTORS ON WHICH THE PRODUCTION OF ALL WEALTH DEPENDS

## CHAPTER II

## FACTORS OF PRODUCTION: NATURE

The primary factors in the production of wealth are nature and man. Nature supplies the material and forces out of which and by which wealth is produced. Man, the active agent, directs the processes of production by physical and mental effort. Capital, usually termed a secondary factor, because itself a product of nature and man, supplies the tools and goods which aid in further production. Organization appears as a fourth factor, the product of the first three, and the means by which they are coördinated for effective production. A clear understanding of each of these factors, of the part each one plays, of the causes affecting the efficiency of each, and of the relationship existing between them, will enable us to secure a comprehensive grasp of the principles governing modern production.

### THE PART PLAYED BY NATURE IN PRODUCTION

Nature or "Land" as this factor is often termed, not only provides in the surface of the earth a solid foundation for man's activities but in addition is the sole source of the raw materials and forces used in production. From the mines of the earth come the metals and minerals, iron, coal, copper or petroleum, from the rich productive soil spring crops of cotton or corn. The forests furnish lumber, the rivers and lakes water. In the fashioning of these raw materials into objects of wealth man is greatly aided by forces inherent in the materials themselves. Modern chemistry has shown that matter is not dead but dynamic with latent powers. In the laboratory the industrial chemist experimenting with these hidden forces induces reactions which result in dyes, alloys, gases, or fuels. Organic chemistry with the theory of valences has opened up a new world of natural forces which under the skillful manipulation of the chemist are

being used to produce products hitherto found only in a natural state or to create new ones better adapted to man's new needs. Furthermore man's own labor has been tremendously augmented by the employment of natural forces such as the expansive force of steam, the explosive force of gases and electricity. The revolution which industry has undergone in the last one hundred years is largely due to man's discovery and use of these powerful forces. The earth, the ocean and the atmosphere are the reservoirs of mother nature, from whose depths and heights come not only all the materials on which man depends for the support of life, but the physical, chemical and vital forces employed to work these into shape for the satisfaction of his wants.

## ALEXANDER HAMILTON AND THE ERROR OF THE PHYSIOCRATS

The practical value of a thorough grasp of the part played by nature in production as well as the danger of a half knowledge is illustrated in the stand taken by Alexander Hamilton against the famous "error" of the Physiocrats. The Physiocrats, a French school of economists of the eighteenth century, saw the influence of nature in agriculture but were blind to its connection with manufactures. This led them to exalt agriculture at the expense of manufacturing which they regarded as sterile. Agriculture they asserted was productive because assisted by nature in a special sense but manufactures not receiving this coöperation were unproductive. The farmer planting a seed into the soil reaped a hundred fold through the vital laws of growth and so enriched the nation, but the manufacturer who in their opinion merely changed the form of things added nothing to the existing wealth.

Their theories were reflected in France by the discouragement of manufactures through heavy taxation which was only thrown off by the French revolution. This same error crossing the Atlantic attempted to stunt the early development of manufactures in the States. At the adoption of the Constitution, this country with its abundance of fertile land was particularly adapted to agriculture. This natural adaptation was emphasized by the mercantile policy of Great Britain which encouraged the

exportation of raw materials from the States, in return for manufactured articles.

Many believed that the future interests of the nation would be best attained by keeping it an agricultual country, and they vehemently opposed the establishment of manufactures. In Alexander Hamilton's famous "Report on Manufactures" presented to the House of Representatives Dec. 5, 1791, in which he argued for the establishment of industries he said:

> There are still, nevertheless, respectable patrons of opinions unfriendly to the encouragement of manufactures. The following are substantially, the arguments by which these opinions are defended. "In every country," say those who entertain them, "agriculture is the most beneficial and productive object of human industry. This position, generally if not universally true, applies with peculiar emphasis to the United States on account of their immense tracts of fertile territory, uninhabited and unimproved. Nothing can afford so advantageous an employment for capital and labor as the conversion of this extensive wilderness into cultivated farms. Nothing equally with this can contribute to the population, strength and real riches of the country."
>
> It has been maintained that agriculture is not only the most productive but the only productive species of industry. The reality of this suggestion, in either respect, has, however, not been verified by any accurate detail of facts and calculations, and the general arguments which are adduced to prove it are rather subtle and paradoxical than solid or convincing.

It was well for the future of the nation that its destinies were guided in this formative period of its existence by so shrewd a thinker and practical a statesman as Alexander Hamilton, who saw through the error which distorted the vision of others. There is no doubt that industry would ultimately have forged ahead, but had it been exposed in its infancy to the frosts of external and the forces of internal opposition, its growth must have been retarded. The extraordinary rapidity which has marked the development of manufactures and the consequent rise of the United States to its present commanding position among the nations is due in no small measure to the farsighted economic policies of Alexander Hamilton. It is again imperative that the nation should see clearly the relationship of nature to her industries.

## THE IMPORTANCE OF A WISE CONSERVATION OF NATIONAL RESOURCES

It is a peculiar paradox of modern life, that while man's dependence on nature is increasing, through his ever increasing wants, his sense of dependence on nature is decreasing. Living in big cities, working day by day in manufacturing plants, far removed from the sources of the materials he is using, it is little wonder that he scarce gives a thought to their origin. So busily engaged is he in earning and consuming his share of the proceeds, that he seldom pauses to consider whether the original sources of supply are exhaustible or not. It is not a subject that appeals spontaneously to the average individual though it concerns him more closely than he imagines. The conservation of natural resources is essentially an economic question for the consideration of the whole nation. Each country inherits a certain limited stock of natural resources, which once gone can never be replaced. The nation which neglects to take stock of these resources is in the position of a man who inherits a bank account and in spending it fails to keep track of the balance. It is easy to overdraw. The significance of certain well attested facts regarding the rapid rate of consumption of some of the principle resources of the United States seems to call for a national stock-taking. It is high time to bring the subject of conservation to the foreground of national consciousness. A back-to-nature movement in economic thought would exert a wholesome influence on the nation. A deeper realization by the producers of the nation of their ultimate dependence on the natural resources of the country, would tend to check needless waste and to encourage a wise conservation of those resources. Its consideration requires a certain loftiness of purpose and farsightedness of vision, embracing as it does, not only the welfare of the millions of today, but of generations unborn.

## RENEWABLE AND NON-RENEWABLE RESOURCES

For the purposes of conservation, natural economic resources may be divided into renewable and non-renewable. The waters, the forests and the soil constitute the former. These may be

retained in their original quantities and even improved by wise use. A good farmer on retiring leaves his farm in better condition than when he began its cultivation. The non-renewable resources consist of the fuels, metals and chemicals; once taken from the ground they cannot be replaced. The purpose of conservation is to maintain the renewable resources in an undiminished state and to utilize the non-renewable resources with the greatest economy. It is outside the scope of the present chapter to make a complete survey of the resources of the United States. A brief presentation of the facts in reference to two or three of the principal resources will reveal their basic relationship to the industrial prosperity of the nation.

The custom of the United States from its inception until very recently has been to keep its gates wide open to the rest of the world, giving freely of its land and resources to all who sought citizenship. In times gone by it seemed that those resources were unlimited. Today, owing to the remarkable growth of its population from a paltry four million in 1790 to more than a hundred million, it finds itself in a very different situation.

## THE DEPLETION OF FORESTS IN THE UNITED STATES

The original forests covered not less than 100,000,000 acres containing 4,800,000,000,000 feet of merchantable timber. About half of these forests have gone. The number of feet cut rose from 18,000,000,000 in 1880 to 34,000,000,000 in 1905; doubling in twenty-five years. We take from the forests each year, not counting the loss by fire, three and a half times their annual growth. Other countries have been forced to conserve their supply. Germany spent $80,000,000 in one year on the preservation of her forests, and at the beginning of the war her annual growth was fast approaching the annual cut. China has paid no attention to her forest problem, with the result that her once extensive forests are practically gone. Japan has 59 per cent of her total area under forests. The United States forest service declares that under right management our forests will yield over four times as much as now. We shall suffer for timber to meet our needs until our forests have had time to grow again. But if

we act vigorously and at once we shall escape permanent timber scarcity.

## LOSSES BY SOIL EROSION AND SOIL EXHAUSTION

Uncle Sam no longer has a farm for every one. Unsettled land there still is, but little fitted for agriculture. The end of free land is in sight. The rapidly increasing population has practically absorbed the available spare land. It is now a question of maintaining the productive power of the soil in an undiminished state, that it may feed the ever-increasing population. The two causes of waste of land are erosion and soil exhaustion by wrong methods of cultivation. The former acts by washing away the fertile surface of the soil into the streams which sweep it onward to the seas. The annual estimated loss by erosion is 783,000,000 tons, or 610,000,000 cubic yards of surface soil. By deep tillage and surface protection through planting, much of this loss may be prevented.

The ruinous waste through soil exhaustion due to single cropping or insufficient fertilization which has characterized farming in this country in the past, has resulted in a lessening of the productive powers of large areas of land. James J. Hill in an address delivered at the White House conservation conference in 1908, said, after quoting statistics showing the decrease in the yield of wheat in the previous ten years in the states of New York, Kansas, and Minnesota:

> We perceive here the working of a uniform law independent of location, of soil or of climate. It is the law of diminishing return due to soil destruction. Apply this to the country at large, and it reduces agriculture to the condition of a bank whose depositors are steadily drawing out more money than they put in. What is true in this instance is true of our agriculture as a whole. In no other important country in the world except Russia, is the industry that must be the foundation of every state at so low an ebb as in our own.

## INTENSIVE CULTIVATION OF FARM LANDS

The history of all nations shows that in the early undeveloped period of national existence when land is plentiful wasteful methods prevail and are even economically advisable. It was so

in the early history of this country. The day has arrived for intensive methods of cultivation. Splendid work is being done toward this end by the Department of Agriculture, the various state agricultural departments, and colleges. Opposed to the law of diminishing returns due to soil exhaustion are the efforts of these bodies of scientific men. Better methods of cultivation, richer fertilizers, improvements in plants and grains, invention of labor-saving machinery, due to the application of science to industry, these with the education of the farmer to more careful and intelligent effort, will not only maintain but add to the productive power of the soil. Of all resources the soil is the most necessary. On it man depends for food and raiment, on the produce of the land all industry is based.

## THE FACTS IN REFERENCE TO THE COAL SUPPLY OF THE UNITED STATES

In the dense swamps of the carboniferous age millions of years ago, nature began the manufacture of fuel for man. Deep pressed between the strata of the earth it has been in process of formation for countless ages. The early settlers who cleared the primeval forests to make their homes and farms little dreamed of the fuels and metals beneath their feet which were to play such a vital part in building up the new world. At the adoption of the Constitution in 1789 anthracite coal was looked upon as so much useless black stone, and the vast stores of bituminous coal lying in nature's subterranean storehouse were unknown. Practically none of the supply was touched for the first quarter of a century. The total amount used up to 1845 was 27,700,000 tons.

## THE RAPID RATE OF INCREASE IN ITS CONSUMPTION

With the rise of the age of steam, and its insatiable hunger for coal, the figures tell a different tale. In 1846 5,000,000 tons were mined; in 1875 the tonnage had risen to 52,000,000; in 1900 to 270,000,000 and by 1907 it had reached 480,000,000. The startling fact brought out by these figures is not the amount consumed, but the extraordinary rate of increase of consumption. The increase of consumption alone of the year 1913 over the year 1910

was 130,000,000 tons; more than four times the whole production of coal up to 1845. It has been estimated that at the present rate of increase the production in 1927 will be 1,800,000,000 tons and in 1937 over 3,500,000,000 tons. The United States Geological Survey estimates the amount of coal within 3,000 feet of the surface to be 3,538,554,000,000 short tons. All estimates of the probable length of life of the coal supply are liable to error; better methods of mining, revolutionizing inventions may eke it out beyond expectation. M. R. Campbell of the United States Geological Survey, in discussing the probable life of the coal fields of the United States, estimates that if the production were to remain the same as in 1913 the total coal reserves would last 4,000 years, but if the rate of increase of the past few decades continues until coal is exhausted its life would be only one hundred years. In summing up, he says:

> Although by every reasonable estimate the ultimate exhaustion of the coal reserves of the United States appears to be an event so far in the future that it need concern this generation but slightly, the fact must be remembered that the bulk of coal being mined today is the best in the country and that before long, perhaps within fifty years much of the high rank coal will be exhausted.

Long before that time, however, the coal shortage will cast its shadow before it in the shape of higher prices. It has been estimated that because of the progressive exhaustion of American coal fields the consumer is paying 10 per cent to 15 per cent more than if the supply were unlimited.

## CONSERVING THE SUPPLY BY BETTER METHODS OF MINING

The right of the present generation to the use of a reasonable amount of coal is, of course, unassailable. It is the heritage of the nation and as such should be preserved for as many generations as its economical utilization will allow. Its conservation resolves itself into the elimination of waste. One of the most flagrant sources of waste has been in mining. The geological survey estimates that in mining practice about one ton of coal is

lost for every two tons mined. It has been stated that of the total quantity of coal produced for commercial purposes since mining began, amounting to over 5,000,000,000 tons, at least an equal amount has been left in abandoned mines and irretrievably lost. A further source of waste connected with mining is in the production of slack. At the pit mouth thousands of tons have been burned. These wastes are being reduced through better methods of mining and the invention of furnaces burning slack as fuel.

## CONSERVING THE SUPPLY BY INVENTIONS THAT ECONOMIZE ITS USE

Much of the loss in this direction is being retrieved by invention. The making of coke in bechive ovens is a reckless waste of coal. One authority has estimated that the waste due to beehive ovens in West Virginia alone in six months would amount to 10,000,000 tons. The replacement of these by the by-product coke ovens, which not only waste less coal, but also produce valuable by-products, is helping to conserve the coal supply. It is said that 8 per cent of the coal used in the production of power, light, and heat, or 20,000,000 tons, is going up the chimneys each year in smoke. To prevent this waste would be not only to save coal, but human lives. The pollution of the atmosphere by factory fumes in our big industrial centers is a contributory cause of lung disease. The gas engine is much superior in efficiency as a burner of coal to the steam engine. Wherever gas engines are used the consumption of coal is almost cut in half. In the making of electricity not much more than one per cent of the energy of coal is transformed into light. The substitution of water power for coal in the heating and lighting of cities has effected, and will effect, an enormous saving in coal. Over 30,000,000 horsepower are going to waste in our streams every day, most of which can, and will be utilized, replacing coal. The development of water transportation will also tend to conserve the coal supply. Enough has been said to point out the tremendous saving possible by the elimination of waste in the mining and use of coal, and to suggest the means by which that saving may be effected.

## THE IRON RESOURCES OF THE UNITED STATES

This has been called the age of iron. The structure of our modern civilization is built of iron. Our factories, buildings, machines, transportation systems, are all based on iron; our fabrics, clothes, and food could not be produced without it. Of all the metals iron is the most useful. Iron and coal are the material foundation of our national prosperity. During the last one hundred and fifty years, our industrial system has been forged out of iron with the use of coal.

## THE FIGURES FOR SEVENTY YEARS

The United States has been producing pig iron during the last few years at the rate of about 30,000,000 tons a year; in 1916 it produced 35,000,000 tons; more than two and a half times the amount produced by Great Britain and nearly half as much as the rest of the world put together. In 1775 little iron was used. The per capita production in 1850 was 50 pounds; in 1880, 313 pounds; in 1908, 600 pounds. Up to 1906 the total amount of iron ore mined in the United States doubled every seven years. It was less than 12,000,000 tons in 1893; over 24,000,000 tons in 1899; 47,000,000 tons in 1906 and 52,000,000 tons in 1907. In the decade ending 1909 more than half of all the ore ever mined in the United States was extracted. Here again the ominous thing is the rapid increase of consumption.

## AN EXPERT OPINION

The report of the national conservation commission, Senate Document 676, in discussing the probable life of the iron ores of the United States, sums up its conclusions in the following significant words:

If the average rate of increase by decades, 108.7 per cent should be continued it would require the production in the next three decades of 6,088,000,000 tons. But the ore supply now available in the United States is estimated at 4,788,000,000 tons which is only 78 per cent of the amount needed on this assumption. It is evident therefore that the present average rate of increase in production of high grade ores can not continue even for the next thirty years and that before 1940

the production must already have reached a maximum and begun to decline and a very large use must be made of low grade ores not now classed as available. The second condition with its consequent greatly increased cost of iron, is the only thing which can prevent a decline in the iron industry, measured by the amount of pig iron produced, within the next thirty years, unless there is in the meantime very greatly increased importation of foreign ores.

Thirty years is but a moment in the life of a nation. The bare possibility of an iron famine demands the strictest economy. This the big corporations, who own the ore deposits in the Lake Superior regions fully realize, and in consequence they are mining them with great care. New deposits will doubtless be discovered. Stone and cement will be substituted for iron wherever possible. Ores of lower content will come into use and the home supply will be eked out by imported ores from Brazil and Cuba. All that is possible to be done will be none too much, for though man can do many things he cannot make iron ore, and the nation's heritage of coal and iron though generous is far from unlimited. What is true of coal and iron is true of the minerals as a whole. The same waste in mining and use has marked the past; the same rapid increase in their production mark the present, the same limitation of supply looms up in the future.

## PRACTICAL CONCLUSIONS SUGGESTED BY THE FOREGOING STATISTICAL SURVEYS

Three striking facts stand out clear and sharp against the background of this great question:

First, the dependence of our industrial system on nature as its source of supplies.

Second, the sudden and unprecedented increase during the last fifty years in the rate of consumption of natural resources.

Third, the unmistakable appearance of the limited extent of the most essential of these resouces.

These facts cry out first and foremost for concerted action on the part of government and people for the elimination of all waste. As we measure the life of nations the United States is in its infancy. It is vital for the safety of its future prosperity that

the present generation of producers be trained to a wise economy in the use of the resources on which that prosperity depends.

### THE HOPE OF THE FUTURE LIES IN SCIENCE

There is, however, another side to this question which perhaps is not so obvious. While we bear in mind the limited extent of the resources on which our present economic prosperity depends, we should not forget that nature herself is unlimited. If the economic history of the last one hundred and fifty years has taught us anything, it is that the part that nature is willing to play in production is only limited by the ability of the scientist to discover her hidden powers and the genius of the inventor to apply them. What is really limited is human knowledge at any one time. Just as in traveling the horizon recedes as we advance, so does the apparent limit which nature imposes on the economic progress of any one age gradually move forward, revealing as it advances the wonders of the new age. As steam was the wonder of the last age, electricity is the marvel of this. In the last hundred years the discoveries of science and invention have succeeded each other in rapid succession, revolutionizing our entire social and industrial system. What new powers and properties of matter will be discovered in the next one hundred years are only to be conjectured. Nature is an unknown quantity in production. If coal and iron should eventually fail, our hope lies in the ability of science and invention to find in the mysterious realms of nature even more useful substitutes. A wise conservation of present resources, coupled with an active encouragement of industrial science and invention, will assure to the United States a continuation of that development which has almost overnight placed her in the forefront of the nations of the world.

### BRIEF SURVEY OF CHIEF RESOURCES OF THE UNITED STATES

The following chart presents a bird's-eye view of the relative position of the United States in respect to some of the most important mineral and agricultural products. The production of the United States in each case is compared to that of the country or countries producing the next largest amounts.

In 1920 the United States produced 89,100,000 tons of Pennsylvania anthracite and 556,563,000 tons of bituminous coal. The world's output of coal in 1920 was 1,300,000,000 metric tons, of which the United States produced 45.1 per cent, or 645,663,000 short tons. Germany came next with a production of 267,838,000 short tons. Great Britain mined 258,720,000 short tons. The

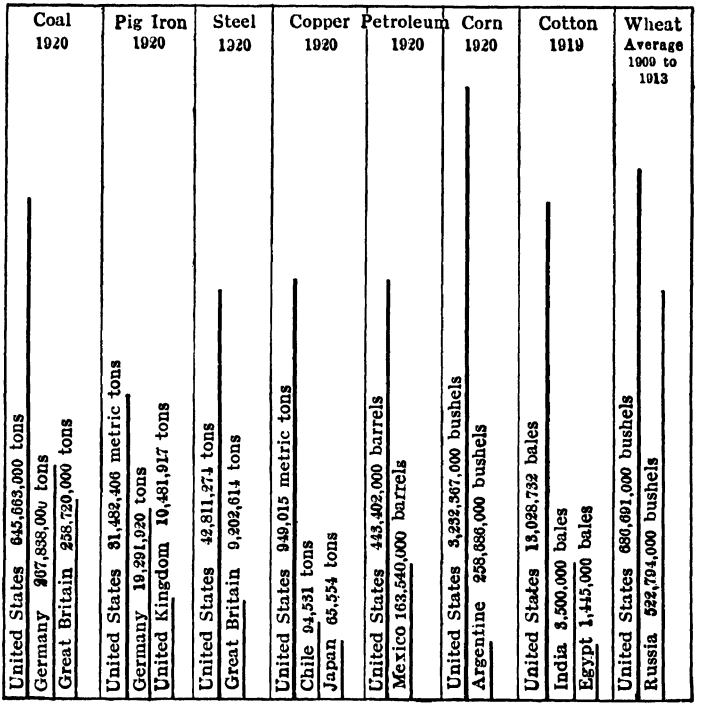



FIG. 1

consumption of coal in 1920 has been estimated at 490,000,000 long tons, an increase of 10,000,000 tons over that consumed in 1919. The United States exports of coal in 1920 amounted to 39,215,030 long tons.

The iron ore output of the United States in 1920 was 67,773,000 gross tons, 86 per cent of which was produced by the Lake Superior district. Exports of iron ore from the United States in 1920 amounted to 1,145,037 gross tons, imports equaled 1,268,536

gross tons. The world's supply of iron ore has been estimated [1] at 31,800,000,000 tons with an equivalent iron content of 14,310,000,000 tons, which on the basis of a pig iron production of 70,000,000 tons a year would be sufficient to last more than two hundred years. This is much a matter of conjecture. Important deposits have recently been found in South Africa, Australia, India, China, Korea, and Japan. The resources of the continents of Africa, Asia and Australia are not by any means known.

In 1920 the United States produced 37,520,495 metric tons of pig iron, almost half the output of the whole world. In the manufacture of steel the United States again leads the way with a production of 42,811,274 tons in 1920. Great Britain's output was 9,202,614 tons; no reliable figures are available for Germany. In 1913 the United States contributed [2] 46 per cent of the pig iron output of the five chief producing countries of the world. In 1919 its proportion rose to 64.4 per cent and to 66.8 per cent in 1920. In steel its percentage of the total in 1913 was 47.6, rising to 66.1 per cent in 1919 and to 66.6 per cent in 1920. The exports of steel from the United States in 1920 averaged 400,000 tons per month. Prior to the war Germany exported more steel than any other country. Her exports in 1913 averaged 47,900 tons per month, while the United Kingdom's exports were 411,000 tons and those of the United States 241,000 tons. In 1919 Germany's monthly average had declined to 10,300 tons, the United Kingdom's to 185,000 tons, while that of the United States had increased to 362,000 tons.

The world's production of copper in 1920 was 949,015 metric tons, 548,418 tons of which was produced by the United States. Chile and Japan come next with outputs, respectively, of 94,531 and 65,554 tons. The consumption of new refined copper in the United States during 1920 was 1,053,838,558 pounds, compared with 914,471,572 pounds in 1919. The United States exports of copper in 1920 were 553,070,086 pounds.

The world's marketed production of crude petroleum in 1920 totaled 694,790,251 barrels, of which 443,402,000 flowed from the soil of the United States. The second largest producer was Mexico, with an outflow of 163,540,000 barrels. The total domestic production plus imports amounted to 549,577,000 barrels.

[1] F. H. HATCH, *London Times Trade Supplement*, Nov. 1920.
[2] *Iron Age*, Jan. 6, 1921.

The United States consumption of petroleum was 531,186,000 barrels.

The foregoing brief summary suggests the relative richness of the United States among the nations of the world in the possession of the most important minerals of modern times. In respect to agricultural advantages she is also much to be envied, as the figures on the chart for corn, cotton, and wheat indicate. The following table, based on figures taken from "The Statistical Abstract of the United States," demonstrates the remarkable growth of this nation in the last fifty years in the development of her vast mineral and agricultural resources.

TABLE I.—RAPID GROWTH OF THE UNITED STATES IN THE DEVELOPMENT OF ITS MINERAL AND AGRICULTURAL RESOURCES IN THE LAST FIFTY YEARS

| Year | Farm Animals | Wheat | Corn | Cotton | Coal |
|---|---|---|---|---|---|
| | | *bushels* | *bushels* | *bales* | *long tons* |
| 1870 | 25,484,100 | 235,884,700 | 1,094,255,000 | 4,024,527 | 29,496,054 |
| 1880 | 33,258,000 | 498,549,868 | 1,717,434,543 | 6,356,998 | 63,822,830 |
| 1890 | 52,801,907 | 399,262,000 | 1,489,970,000 | 8,562,089 | 140,866,931 |
| 1900 | 43,902,414 | 522,229,505 | 2,105,102,516 | 10,123,027 | 240,789,310 |
| 1910 | 61,803,000 | 635,121,000 | 2,886,260,000 | 11,608,616 | 447,853,909 |
| 1920 | 63,369,000 | 787,128,000 | 3,232,367,000 | 12,987,000 | 576,431,250 |

| Iron Ore | Pig Iron | Copper | Petroleum | Total Minerals | Year |
|---|---|---|---|---|---|
| *long tons* | *tons* | *long tons* | *barrels* | *value in dollars* | |
| 3,031,891 | 1,665,179 | 12,600 | 220,951,290 | 218,598,994 | 1870 |
| 7,120,362 | 3,835,191 | 27,000 | 1,104,071,166 | 364,928,298 | 1880 |
| 16,036,043 | 9,202,703 | 115,966 | 1,924,590,024 | 606,476,380 | 1890 |
| 27,554,161 | 13,789,242 | 270,588 | 2,672,062,218 | 1,107,031,392 | 1900 |
| 56,889,734 | 27,303,567 | 482,214 | 8,801,404,416 | 1,991,216,220 | 1910 |
| 69,558,000 | 36,925,987 | 539,759 | 18,622,884,000 | 6,707,000,000 | 1920 |

## TEST QUESTIONS

1. Name the four factors responsible for the production of wealth.
2. What part does nature play in production?
3. What was the "error of the Physiocrats"?
4. In estimating the length of life of a natural product such as coal or iron, of what significance is the *increased rate* of consumption?
5. What is the relation between the national resources and national wealth?
6. What is the situation today in the United States in reference to her supplies of lumber, coal and iron for future use?
7. Why is a wise conservation of natural resources advisable as part of the economic policy of the United States?

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## CHAPTER III

# MAN AS A FACTOR IN PRODUCTION

Man is the alpha and omega of economic activity. By his labor he sets in motion and directs the processes of production which result in the creation of utilities in economic goods. By the satisfaction of his wants in consumption he destroys these utilities. We will now consider the part man's labor plays in creating these utilities.

### MAN THE ACTIVE AGENT IN THE PRODUCTION OF WEALTH

We have said that the industrial prosperity of the nation is based on natural resources. It is evident, however, that nature does not supply those resources in such manner as fully to satisfy man's wants. At favored localities in the tropics, nature may have furnished barbaric man with sufficient to satisfy his simple wants, in return for little labor. In colder regions it always required hard work on the part of man to provide food, clothing, and shelter; and in modern civilization the crude materials of nature fall far short of satisfying his varied and cultivated tastes.

Today the finished product is far removed from the raw material out of which it was made. A derby hat does not remind us of a rabbit any more than a plate glass window suggests sand; or steel, red ore dust. Materials gathered from widespread sources enter into their composition in the course of production and in the numerous processes through which they pass many kinds of labor coöperate to effect their final transformation. While nature lays the foundation for production, it remains for man to erect the building. She may furnish the iron ore and the sand, but he must find them, discover their uses, and invent ways of making them into steel and glass.

## THE FOUR PARTS PLAYED BY LABOR IN OUR INDUSTRIAL SYSTEM

When man obtained his supplies from wherever he happened to be and worked them up himself with the aid of a few rude tools, the part that labor played in the process, though all-important, was simple and direct. The relation of labor to modern production is not so simple. Some of the most vital questions of the day grow out of the relationship of labor to production, and their solution demands a clear understanding of the nature of the services performed by labor in our present complex industrial system. The product which was formerly completed by the labor of one man producing in small quantities for himself is now made in large quantities by the combined labor of many, each contributing only a small part of the labor necessary to the total production. With the money he receives for his labor, he buys products which represent the combined labors of numerous other men. Commodities are not produced by individuals working separately, but through organized effort. They are not produced directly by hand, but by machinery which must itself be made. This involves long-time, indirect processes, and a complicated system of exchanges. In this transformation of natural resources into finished products, under the present large-scale, organized capitalistic system of production the function of labor may be divided into four stages. There are four acts in the drama of production and in each, man assumes a different role.

## THE LABOR OF PURE SCIENCE—MAN AS A DISCOVERER OF NATURAL PRODUCTS AND FORCES

Production begins with the discovery of the forces and properties of matter and a knowledge of the laws which govern their use. The manufacture of stone implements by primitive man began when he found out the hardness and sharpness of broken stone. Later the discovery of fire and metals increased his productive power. The history of the industrial progress of the race is largely an account of man's discoveries of new natural forces and resources. The age of stone was followed by the age of bronze, which in turn gave place to the age of iron.

For thousands of years coal lay useless in the earth. Its discovery as a fuel, coupled with a knowledge of the power of steam, marked a new industrial era. Man's gradual mastery of the laws governing the action of these materials and forces has been the primary cause of his advancement in the arts of industry.

No doubt man's early discoveries were the results of chance and accident. By chance he found that certain stones when struck emitted a spark and so would produce fire at will. By accident he found new seeds and roots were edible and added to his food supply, as later Sir Walter Raleigh added to the menu of Europe when he introduced the potato from North America. By accident the native of Brazil found the juice which oozed from the India Rubber tree and used it to protect himself from tropic showers or to play ball with on the sands of the Amazon. The early knowledge of mankind was the result, for the most part, of random thinking or haphazard experiment.

Although in the most remote times he utilized chemical action in the extraction of metals and in the arts of tanning and dyeing, there is no evidence to show that there was any real knowledge of the nature of the processes involved. Up to the seventeenth century little was known about chemical forces. The old alchemists were absorbed in their search for the philosopher's stone, which they fondly believed would turn the basic metals to gold. With the discovery of the laws governing chemical combinations by John Dalton in 1808, and the theory of valences by Frankland and the work of Lavoisier and others, the basis of modern chemistry was laid. Haphazard thinking and experimentation gave place to scientific research, and man gained an insight into the forces and properties of matter which has opened up a new world for him. The services of the chemist to modern industry can scarcely be estimated. There is hardly any branch of industry which has not benefited by his labor; out of waste he brings profit; from coal tar he extracts dyes, drugs, oils, perfumes as a conjuror produces rabbits from a silk hat. If the natural supply of an article fails, the chemist makes it synthetically. The laboratory has become an invaluable department in the modern plant.

In the same way other sciences are exploring nature's powers

and are bringing to light new wonders. Over two thousand years ago men knew that amber and jet when rubbed possessed the power of attracting fragments of straw, leaves, and feathers. But it was not until Gilbert laid the foundation of modern electric and magnetic science on the true experimental and inductive basis, that production was furnished with a new source of power. The labors of Gilbert, Volta, Faraday, Clerk Maxwell, and other scientists, into the nature of that mysterious and versatile force we call electricity, have paved the way for the revolutionary changes which have been wrought in industry by its diversified application. The scientist plays the leading part in the first act of the drama of production. He it is who does the pioneer work, exploring the hidden recesses of nature for new materials and powers. With microscope and test tube he penetrates into the heart of things, analyzing, experimenting, measuring, recording, that those who follow him may be equipped with the accurate knowledge necessary for efficient production.

## THE LABOR OF INVENTION—MAN AS AN INVENTOR OF MACHINES AND PROCESSES FOR THE UTILIZATION OF NATURAL RESOURCES

The second stage of production consists in the application of the discoveries of science to the arts of industry, by the invention of machines and processes. Here the inventor plays the leading part. The scientist discovers the laws governing the action of steam, gases, and electricity; the inventor harnesses them to machines to perform the work of industry. After the Gilberts and the Voltas come the Bells and the Edisons, who carry a stage further the labor of the pioneers. The genius of the inventor devises the means whereby this versatile power transmits the human voice along the copper wire from continent to continent; heats our furnaces; lights our darkness; whisks us to the top of our tall buildings; drives the machinery in our plants; pulls our trains over the mountains; or cures our diseases. After Hertz ascertains that electric waves travel through the ether Marconi invents the wireless telegraph to transmit messages across the seas.

Not only does invention aid industry by furnishing the machinery to make effective the powers of nature, but by devising new processes and combinations of matter. The scientist discovers the existence of chemical affinity and the laws governing chemical compounds; the industrial chemist puts these to use, by inventing improved processes for the reduction of ores; for making steel, varnish, yeasts, gases, oils, fuels, and a thousand other things. If the manufacturer requires a metal of a certain lightness, hardness, toughness, conductivity, the metallurgist invents a new alloy. The application of the discoveries of pure chemistry to the practical problems of manufacturing is achieving wonderful results in the elimination of waste and in increasing commercial efficiency. In the realm of biology the laws governing evolution and heredity have been used by agriculturists to produce new varieties of plants and animals better suited to the needs of man. If the high winds on the Kansas plains destroy the farmers' wheat, the experts of the Department of Agriculture produce a new variety with a wiry stem able to withstand the storm. By improved agricultural processes and fertilizers the yield of some lands has been doubled and trebled and the average yield of the whole increased.

## THE COÖRDINATION OF SCIENCE AND INVENTION PROMOTES PROGRESS

Science and invention act and react on each other. Before the printing press the greater part of the knowledge of one generation was buried with its bones. The labor of Caxton provided the world with a means of recording its discoveries, so that now knowledge grows from age to age with cumulative force and each new generation is endowed with the wisdom of past ages and starts its labors where they left off. By the inventions of modern transportation and communication knowledge is flashed from one part of the world to another. This rapid interchange of ideas speeds up progress. The nation turns over its mental capital oftener. The results of scientific research quickly materialize into invention and invention is speedily utilized in industry. The different stages in the progress of production are being linked more closely together. The long intervals between the acts are

being shortened, advancement is more rapid. The industrial revolution of Great Britain is evidence of the remarkable acceleration of industry due to the rise of science and invention. Germany's rapid ascent from a second-rate to a first-rate power in the last fifty years was brought about by its thorough development of scientific research and invention and their close application to its industries. The progress made in the later stages of production is largely dependent on the foundation work performed by the scientist and inventor. This fact modern business is recognizing, with the result that the scientist and inventor are actively coöperating in our big plants in the production of commodities.

## THE LABOR OF ORGANIZATION AND MANAGEMENT—MAN AS AN ORGANIZER AND DIRECTOR OF INDUSTRY

The work of science and invention, though of fundamental importance, is but preliminary to the actual making of the product. It is one thing to invent, it is another successfully to manufacture and sell that invention or the product made by it. The production of any commodity today is a complex undertaking, requiring not only the knowledge of science and invention, but ability to organize and direct on a large scale all the factors of production. In order that the discoveries of science and invention may materialize into commodities or services, the organizing genius of the entrepreneur is necessary. When the craftsman worked in his own home, with simple tools, supplying his own small capital, producing for a local market, the part that organization and management played in production was comparatively small. Under our present large-scale system of production, with its intricate division of labor, involving an extensive labor force, expensive machinery, factory buildings, big capitalization, volume production for a world market, organization and management play an indispensable part.

This dual function of labor is sometimes performed by two separate individuals or groups, in which case one group of men perform the work of organization, after which others step in and carry on the work of direction. More often both functions are

performed by the same set of men, who first create the organization and then direct its operations. By their efforts the separate factors of production are coordinated into an effective working unit. They take the initiative, and as a result of their enterprise, the discoveries of science, the machine of the inventor, the money of the capitalist, and the labor of others are employed in producing commodities or services. They shoulder the responsibility, and on their labor the success or failure of the enterprise largely depends. They decide what products shall be manufactured, the amount of capital required, the location of the plant, its equipment with machinery, and the number and character of the labor force. They determine the policies of the company, and administer them through their appointed executives. They departmentalize the organization, select the department heads, and supervise the manufacture and sale of the product. They finally collect the money and disburse it as their judgment dictates. They are the generals and captains of industry, and their work demands a high order of ability.

The organization and management of any business requires not only a knowledge of that particular branch, but a comprehensive grasp of those broad principles which underlie business as a whole, and above all, a keen insight into human nature. These leaders range from the chief executives of huge corporations down to their most humble subordinates, and the heads of small individual businesses. Their influence on the industrial efficiency of the country is tremendous. The part that intellectual labor plays in organizing and directing the processes of production is of paramount importance.

## DIRECT LABOR—MAN AS A PERFORMER OF THE PHYSICAL AND MENTAL WORK OF PRODUCTION

In the last act of production the curtain rises on the workers, who, under the direction of the management, make and complete the product. These constitute the rank and file of the industrial army, its salesmen, clerks, mechanics, semi-skilled workers, and laborers.

It is evident that the great bulk of the detailed work of production is performed by this class of workmen. They manipulate

the tools, tend the machines, fashion the materials, or perform the services which result in production. They furnish the technical and mechanical skill as well as the manual labor. They not only tend the machines, but their labor helps to make those machines as well as the capital goods used in production. They are indispensable to production; if they did not play their part, there would be no wealth produced.

## SUMMARY

Man as a factor in production supplies the physical and mental effort necessary for creating the utilities in economic goods. In the transformation of natural resources into finished products he performs four main functions. First, he obtains a knowledge of the laws and properties of matter by scientific research. Second, he applies that knowledge to the arts of industry by inventing new machines, processes, or combinations of matter. Third, he organizes the factors of production and directs their work. Fourth, he performs the work of production under the direction of the management. In primitive times the labor of one man performed all four of these functions in an act of production. Today they are usually undertaken by four different sets of workers, who with the aid of capital and organization, coöperate to produce commodities or services.

## TEST QUESTIONS

1. State the four functions man's labor performs in modern production.
2. Why should a country for economic reasons recognize and encourage the labors of scientists and research workers?
3. Do you know what policy Germany pursued along this line previous to the war? Have you noticed a tendency in this direction in this country recently?
4. What is the relation of invention to industrial progress?
5. How do the people of the United States compare with those of other nations in reference to inventive genius?
6. Name six notable inventions produced in the United States within the last fifty years.
7. Why is it some inventors fail to derive any pecuniary reward from their inventions?
8. What further ability is required in order to render an invention of service to the nation at large?

9. What function of labor is performed by the great mass of men?
10. Show how these four classes of workers coöperate to produce wealth.

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## CHAPTER IV

# THE QUALITIES DETERMINING THE EFFICIENCY OF LABOR

The consideration of natural resources is only preliminary to the larger question of national economic efficiency. History has repeatedly shown that the wealth of nations is neither limited nor determined by the extent of their natural resources. Compare, for instance, Germany and Russia, Japan and China. The source of national, as of individual, wealth lies not in material possessions, but in mental forces. As we have seen, strip the productive process to the waist, and man remains as its final cause, as its primary dynamic agent. Not from its great cities, its fine buildings, its huge factories, its wonderful machinery, does the wealth of any nation originate, but from the men and women by whose united efforts all these came into being. Increase the efficiency of the men and women of the nation and you increase the production of wealth at its source. An ounce of effort here is magnified into a ton of result in the product. There is no question so vital to the general welfare of the nation as the economic efficiency of its people.

## THE MEANING OF HUMAN EFFICIENCY

Efficiency is a ratio between equipment and work done. A 70-horsepower machine developing only 35 horsepower is 50 per cent efficient; developing 70 horsepower, it is 100 per cent efficient. To attempt to get 80 horsepower would endanger the machine. Efficiency aims to get 100 per cent from every machine, no more, no less. The object of economic efficiency is to develop 100 per cent efficiency in the national production machine. This requires that each individual worker should develop 100 per cent efficiency, no more, no less. There is as much difference in the capacities of men as of machines. Some men are born with a

35 horsepower, other with a 100 horsepower equipment. Harm is done to the man who is forced, or who forces himself by an inordinate ambition to work his machinery beyond its capacity; but on the other hand, the man who is only getting 40 horsepower from a 100 horsepower machine is clearly losing the greater part of what he might be making every day of his life. The problem before the nation in developing its labor power to maximum efficiency involves finding out the present efficiency of the individual worker, his potential capacity, and the principles and means through which his latent powers may be developed to 100 per cent.

## MEASURING HUMAN ABILITY

This is a problem of no mean order, for although we have borrowed the terminology of engineering, the task of the human engineer is infinitely more complicated. A few years ago it would have been impracticable. The recent experimental work of applied psychology has brought it, however, well within the realm of accomplishment. It is primarily a mental problem. The part that human labor plays in production is increasingly mental. Man is more and more relegating to machinery physical labor, he himself performing only the slighter physical effort necessary to control the machine. It is the trained mind that counts in modern production. The practical trend of twentieth century psychology is fast dispelling the mists which have for ages shrouded the human mind and its operations. The coöperative research work at present being conducted by psychologists and business men, who together are searching for the mental factors responsible for success and failure in selling, clerical work, management and other lines, is resulting in a very much clearer analysis of the elements of native ability. Rapid strides have been made in applying this knowledge to the testing and training of men for various lines of work. Business men everywhere are eager for this information. The psychologist is rendering signal service to industry; and he bids fair to contribute in the near future data of even greater importance. Mental measurement is one of the latest developments of applied psychology. Psychological tests have been

prepared for the purpose of determining and measuring the mental powers of men. While these tests are yet in an experimental stage, enough good has resulted to establish their value. Several corporations are using them in hiring salesmen and bookkeepers, and in adjusting their labor force to the best advantage. Similar tests have been used by the United States Army to assist in finding out what lines of work different men are fitted for.

## GREAT POSSIBILITIES FOR THE DEVELOPMENT OF LATENT MENTAL POWERS

The results of these tests, reinforced by the observations of psychologists and efficiency men, indicate that the average man is about 40 per cent efficient. The consensus of expert opinion certainly points to the fact that the great mass of men are working up to only a small part of their capacity. This opens up, then, a vast mine of latent power to be developed for productive purposes. What it means to the wealth of the nation is incalculable. It means very much more than increasing the present annual production 60 per cent. An increase of 60 per cent in the mental efficiency of a worker may double or treble his product or, if applied to invention and improvement in organization, may indirectly magnify the productivity of thousands of others. We are dealing now with productive efficiency at the source. The next question is, What are the factors on which the efficiency of labor depends, under our present system of production?

## DISCOVERING THE BASIC QUALITIES DETERMINING SUCCESS

It may seem at first flush that any general discussion of this question has little value, owing to the fact that the qualities that make for productivity in one line of work may not insure success in another; that an accountant requires a different order of ability than an advertising man. The difference is more apparent than real. There are certain fundamental requisites for success in all callings. Each line of work may emphasize a par-

ticular quality or set of qualities; one may lay special stress on memory, another constructive imagination, so that the exact proportion of each of these, fitting a man for a particular task may vary. Imagination is just as necessary for the head of a big business as for an inventor. Ability to analyze is important equally to banker and sales manager. But both use these powers in a very different way. Success in all lines of business activity is based on a few certain well-defined personal factors. Any man of average ability, genuinely desirous of becoming proficient by developing and training himself in the exercise of these, in whatever line of work he takes up, will achieve success just as surely as the sun rises.

## PHYSICAL VIGOR FIRST

The basic factor is physical health and vigor. Not mainly for its direct application to manual labor, as in olden times, but for its influence on the mental faculties and its generation of energy, the motive power of the mind. The machinery of the mind depends on power, just as all other machinery. Independent of the mental equipment of a man, the amount and quality of the work he will do depends on mental energy, which in turn is based on physical health and vigor. Not only as a source of mental energy is health important, but also for its physiological effects through the nervous system on all the mental processes, including the emotions, which are of great importance. The way one feels has a great deal to do with the way one works; good health with its accompanying exuberance of spirits is worthwhile if only for its influence on one's disposition.

Ill health, itself an expense to the individual and the nation, is, of course, directly disastrous to industrial efficiency. The yearly loss to the nation in industrial efficiency due to ill health alone is estimated at approximately $750,000,000. Yet the more important aspect of this factor is not the negative, but the positive, the great potential increase in productive power which would be realized by an increase in the physical health and vigor of the nation, and the resultant quickening of the mental activity on which modern productivity mainly depends. The unanimous testimony of the great captains of industry such as Gary and

Schwab, who place health first on their lists of the qualities underlying industrial efficiency, backs up with insurmountable empirical evidence the causal relation between good health and national economic efficiency.

For the individual worker, in whatever part of the economic system he is working, good health, abundant health, should be everlastingly sought. The keen strain of modern competition, the high speed of industrial processes, the insistent and continuous demands of progress for improvement and change, all result in driving the worker to intense effort during his working hours. To compete successfully in this struggle, the individual needs all the vigor and reserve power he can muster. A strong body, splendidly healthy, will best equip him for action. Not to be merely well, but to be superbly healthy should be the constant aim of each individual worker.

## THE DRIVING FORCE OF THE MIND

The second factor in economic efficiency is mental energy, about which we have already spoken, in its relation to health. Mental energy, however, is not dependent on the physical alone, but is a product of both the mind and the body. Desire, purpose and will all have a hand in generating and liberating energy. A perfectly healthy man may be disgracefully unenergetic through lack of ambition. Once fired with a purpose, he becomes a veritable dynamo. All creative work, whether in art, literature, advertising, or selling, consumes large quantities of this life force. Deficient energy is the direct cause of more unfinished tasks than perhaps any other one thing. The life of a mentally anemic man is strewn with the wrecks of abandoned jobs which have miserably perished for lack of the energy to complete them. This energy is the driving force of the mind, the source of intense and long-sustained effort. Yet the average man uses but a fraction of his possible power. He runs on third speed. In most men there are reserves of power, never drawn on, never dreamed of. The extent of this latent power in a nation opens up an interesting field for economic speculation. Of what this lost power amounts to in the tremendous reservoir of the national mind, no adequate conception can be formed. But one thing is

certain—that in its development lies a mine of wealth for the individual and the nation alike.

## THE INTELLECTUAL PROCESSES—OBSERVATION—MEMORY—IMAGINATION

Given a sound body, vibrant with health, generating ample power, the productive efficiency of the individual next depends on the intellectual faculties or processes by means of which the mind gathers the materials for its thinking, stores them up, organizes them into conclusions, and, in general, performs its varied tasks. These are the working factors underlying mental ability. The first in order of activity is observation, the searchlight of the mind. Accurate observation forms the first step in all good thinking. It is of direct practical value in all lines of work. Shoddy reasoning and faulty conclusions are frequently due to defective observation. To the scientist in his collection of data, to the salesman in interviewing prospects, to the accountant in systematizing and recording; in fact, to all men in whatever they are engaged, the power to observe carefully and accurately is of primary importance. Psychological tests seem to indicate that the average man is not more than 40 per cent efficient in observational power. While the exact percentage cannot be determined, the fact that the great mass of men are bringing to bear on their tasks only a small part of their possible powers in this respect is undoubtedly true.

The next factor is memory, whose function it is to retain and recall when required the facts observed. Memory is the storekeeper of the intellect, who, receiving the raw materials and supplies from the purchasing agent, stores them up and gives them out on requisition for the use of the other departments such as imagination and reason. A poor memory means a constant loss of valuable stock. Knowledge means power in modern business. The man whose acquisitions stick, he who is able to recall at will apt and convincing data, is well equipped for effective service. Yet the learning of new facts is, with a great many men, like filling a bucket with a hole in it. Memory is a basic factor in productive efficiency and any improvement in indi-

vidual memory will result in a marked increase in national efficiency.

If observation and memory supply the mind with the raw materials of thought, it is the function of imagination to work them up into new products. Imagination takes the ideas stored in the mind by memory, and recombines them into new wholes. It is the originator of new ideas. Long recognized as responsible for the creative work in art and literature, its economic value has only recently been emphasized. All constructive work, all invention, all organization involves the use of the mental process we call imagination. A man lacking it may be a good routine worker, but he will never become a leader. Business leadership requires the power to originate new plans, to devise new processes, to foresee and anticipate coming events. Ideas are at a premium in modern business. In advertising, selling and the organizing and managerial end of production, men with ideas are in urgent demand. Ideas are the very seed of business progress. Every great corporation of today once existed as an idea in the mind of some man, just as every new step in its progress was first projected on the mental drawing board of those engaged in its upbuilding. This power of mental projection, called imagination, is a fundamental requisite for productive efficiency in the modern worker. Though not as much is known about the nature of this faculty, as memory, for instance, it is capable of development, and practical methods have been devised by psychologists for its cultivation.

## LOGICAL USE OF THE INTELLECTUAL PROCESSES

Reasoning is a complex process involving the use of the preceding factors. By means of it we arrive at our judgments and conclusions. Sound judgment is an essential part of executive skill. The power to reason out a problem in marketing, management, or financing constitutes the high-water mark of business ability. The most vital element in reasoning is the ability to analyze out of a thing its essential characteristics. "A genius," says Carlyle, "is he who sees the essentials of a thing and leaves the rest as surplusage." The reasoner searches into events for cause, and connecting cause with effect, formulates the principles

which insure success in the work he is doing. Business activities are governed by law. There are always reasons for a man's rise in business life, just as there are always reasons for his failure. The successful conduct of business today demands a knowledge of underlying principles. While some of these are already known, others remain to be reasoned out. Never in the world's history has there been such an imperative demand for trained thinkers as today. Drastic internal changes are taking place and probably still more radical changes will take place in our economic system as a result of post-war conditions. Old customs are going by the board. New methods will spring up over night. Unprecedented situations and problems will arise, the peaceful solution of which will demand a keen analysis of facts and the wise application of fundamental economic principles.

## INTELLECTUAL CONTROL

The last of the purely intellectual factors is concentration; the essence of which is fixation of attention. Power of concentration consists in one's ability to focus all one's faculties on one thing to the exclusion of all else. The habit of the immediate direction of our powers to one problem, with its complement of immediate relaxation when that task is finished, is invaluable in all lines of work. More will be accomplished in twenty minutes of concentrated effort than in two hours of ordinary work. Concentration is a habit that can be acquired through practice.

## PERSONAL CHARACTER TRAITS MAKING FOR ECONOMIC EFFICIENCY

In addition to the foregoing intellectual factors, there are certain well-defined character factors, having a definite bearing on economic efficiency. A man may be clever intellectually, but if deficient in "stick-to-itiveness" he will accomplish little. While a worker of mediocre ability, gifted with uncommon perseverance, will outdistance the man of spasmodic brilliancy as the tortoise did the hare in the old fable. Keeping everlastingly at it brings success in business as certainly as it does in all other spheres of activity. Honesty is another essential. The coöperative character of present-day production necessitates inter-

dependence. There is no depending on dishonest men. Confidence and faith are at the basis of modern business and are distinct assets to the individual as well as to the nation. The coöperative nature of production demands also that each individual possess the ability to get along with others. Just as on a football team, so in the business game, star players are not so desirable as those who will work hand in glove with the others. It is team work that counts in coöperative production. He who cannot obtain the good will of his work mates, whether he be employee or manager, is inefficient. For he will get less work out of others, while handicapping himself. Inter-departmental cooperation, so necessary to the success of the large corporation, is impossible if men do not work together in harmony, and many an otherwise good department head has lost his seat in the saddle for lack of ability in this direction. Initiative, the power of original thought and action, is a quality necessary for those holding positions of authority or to those aiming to reach the managerial end of business. He who does not need to be watched or ordered to do every little thing, but who is capable of thinking ahead and acting on his own initiative, is an asset in any organization. Courage and self-confidence go hand in hand. For all our standardization and system, there is an element of risk, varying in degree, in different lines of business. The purchasing agent, the sales manager, or the organizer stakes his success on his judgment. It requires nerve to authorize an advertising appropriation running into half a million dollars or to sink a million dollars into fixed capital. Successfully to assume responsibilities necessitates self-confidence. Competition for position is keen. The nature of the work required is often difficult and in many cases the ability of a man to accomplish that work will depend on his belief in himself. Last, but not least, is ambition, the most dynamic factor of all—the accelerator of the human machine. Without it a man is but a hulk on the business seas. We have seen that most men have reservoirs of hidden energy, seldom, if ever, utilized. The driving power of ambition uncovers these hidden wells, revealing latent powers of which they had never dreamed. Men hate to apply the spur, to energize at their maximum. In nine cases out ten, love of ease, laziness, indifference,

mediocre effort, are due to lack of ambition. It takes a deep-seated purpose to get the best out of a man, and the productive efficiency of men is more dependent on ambition than on any other one factor.

## THE WELL-INFORMED MIND

In addition to the factors already discussed is knowledge. Knowledge is to personal ability as the shot in the shell is to the powder. The effectiveness of the shell depends on a proper combination of both, just as the efficiency of a man as a producer depends on his knowledge plus his ability to apply that knowledge. Roughly speaking, we can divide knowledge into two kinds: First, that general knowledge which goes to make a well-informed, broad-minded man. Second, the technical or specialized knowledge which equips him for his particular work. The extent, character, and availability of knowledge in any nation have, therefore, an intimate bearing on its economic efficiency.

## SUMMARY

The factors determining the productivity of the labor power of the nation may be grouped under five heads: (1) Health and vigor; (2) Mental energy; (3) Intellectual processes; (4) Character traits; (5) Knowledge. The problem of labor efficiency is largely mental. Psychology has rendered valuable assistance to the economist in supplying a clear analysis of the mental processes underlying productive ability and in inventing the means of approximate measurement of these factors. In the light of this knowledge it is manifest that there lies dormant in the individuals, constituting the working population of the nation a rich mine of productive power capable of development.

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## CHAPTER V

# THE DIVISION OF LABOR: ITS ADVANTAGES AND DISADVANTAGES

The productivity of labor depends not only on the inherent efficiency of the laborer, but on the degree to which that labor is specialized. One of the distinguishing features of our modern industrial system is its minute division of labor. Indeed, in no other particular is it more strikingly differentiated from previous systems of industry than by the extreme degree to which it has carried specialization. Under the handicraft system of medieval times, the village shoemaker completed a pair of shoes. Today in a Brockton shoe factory the making of shoes is often divided into one hundred and thirty distinct operations, each performed by a separate class of workmen. The radical change which has taken place in the making of shoes is typical of the manufacture of other products. The old-fashioned watchmaker has been replaced in one of our high-grade watch factories by a thousand men, each engaged on one operation of the many necessary to complete the watch. The place of the old-time shoemaker, watchmaker, or tailor is taken by a host of different workmen, each performing but a single operation on the product.

In the professions specialization is equally marked. The early "engineer" has been succeeded by the mechanical, civil, electric, hydraulic, gas, chemical, or other engineering specialist, just as the old-fashioned medical practitioner has given way to the eye, ear, nose, heart, or other medical specialist. Throughout our whole economic system specialization is the order of the day.

## IN THE EVOLUTION OF INDUSTRY NO TENDENCY MORE MARKED AND PERSISTENT THAN LABOR SPECIALIZATION

The history of industry is largely a record of the division of tasks. From what was probably the earliest separation of tasks,

that between man and woman, down through the medieval trades and handicrafts, to the present numerous and varied branches of industry, each with its own subdivision of employments, this tendency toward division of tasks has been continuously operative. The United States Census report on occupations, 1910, in speaking of the difficulty of classifying employments, states:

> Formerly under the guild system, to a large degree, each workman had a definite occupation or trade as cooper, tailor, shoemaker, etc., but with the transition to the factory system, and the great division of labor which accompanies it, the tendency has been for each of these old handicraft trades, to give place to a number of specific processes in the manufacture of the same article. The transition is still in progress, so that to-day a workman may make the whole of an article, or perform several of the processes in its manufacture or perform only one of them.

The latest manifestation of this tendency is seen in "scientific management," which carries out the principle of division of labor in a systematic manner. The task of the workman after accurate observation by an expert is split up into simple movements; unnecessary motions are eliminated and the remainder arranged into convenient groups, each group constituting a separate task. The workmen are then taught to perform this task in the manner which the experts have determined by scientific study to be the most efficient. Scientific management introduces a new, or at least a greater, degree of specialization into the work of the management itself; a specialization based on functions, on account of which Frederick W. Taylor termed his new system of management "functional management," which he defines as,

> so dividing the work of management that each man from the assistant superintendent down shall have as few functions to perform as possible. If practicable the work of each man in the management should be confined to the performance of a single leading function.

In carrying out this principle he first divides the work of shop management into two main divisions—planning and executing. The work of planning is concentrated in a planning department consisting of four men, the "order of work clerk," "instruction

card man," "time and cost clerk," and "disciplinarian." The work of execution is performed by four others: The "gang boss," "speed boss," "inspector," and "repair boss," who see that the work is carried out by the workmen exactly as it has been planned. The gang boss shows the men how to set up the work in their machines, and sees that there is a new job ready for a man as he finishes his old one. The speed boss sees that the proper cutting tools, with the speeds, feeds, and depths of the cut which the instruction card directs are used. The inspector is responsible for the quality of the work. The repair boss sees that the machines are kept oiled, cleaned and in first-rate working condition. Each of these men is ready not only to advise but to pitch in and show how the work should be done. Under this system the old-fashioned foreman has been replaced by eight specialists, called functional foremen, each of whom performs but one of the eight duties previously the work of one man.

## DIVISION OF LABOR BASED ON A UNIVERSAL LAW OF ORGANIC DEVELOPMENT

Division of labor may be defined as the dividing up of what was previously one economic task into several parts, each constituting a new task to be performed by a separate individual. This principle we have seen to be in operation ever since "Adam delved and Eve span." It is by no means limited to economic activities, but is a universal principle, operating in every sphere of life. In evolution it is termed "differentiation," or "division of functons," and is a process observed in the development of all forms of organic life. In the progress of organisms from simple to complex forms, from the lower to the higher; with the development of special organs, comes a corresponding increase of functions or division of tasks. As a new organ develops it takes over a special task, either to supply a new need of the organism or one previously undertaken by other organs. In the simplest form of organism consisting of a single cell the one cell performs all of the simple functions of life—seeing, eating, digesting, locomotion, and reproduction. Higher up in the scale of life we find animals endowed with separate organs for the performance of these special functions, an eye to see with, a stomach for digest-

ing food, feet for locomotion. The higher in the scale of life the organism, the greater the degree of specialization.

The same law is observed in the progress of economic societies and in the organizations within them; there is a development from simple to complex forms accompanied with an increasing division of labor. A high degree of division of labor would be impossible in a primitive state of industrial society. The extent to which this principle has been carried today in the United States has been made possible by the development of its systems of transportation and internal communication, its complex system of money and credits, and its industrial organizations. This law of division which lies in the nature of all organic development and which man has followed more or less blindly for ages in the performance of his work has now been recognized by modern scientific management, which adopts as a fundamental principle that all tasks be so divided that each worker is confined to that simple operation which he can perform the most efficiently.

## SIMPLE AND COMPLEX DIVISION OF LABOR

The fact that division of labor has proceeded from simple to complex forms has led some economists to classify division of labor under the two heads, simple and complex. The classification is, of course, an arbitrary one. The degree of division has been continuously increased and is being increased today, so that the extent prevailing at any one time would appear complex compared to that of the previous period. However, this two-fold classification roughly corresponds to two general stages in the history of division of labor. By simple division is meant the splitting up of the work of production into crafts or trades, a form of division which dates back to antiquity, but which reached its climax in the guild system of medieval times, the golden age of the craftsman. It still persists; the doctor, dentist, carpenter, and custom tailor are modern examples. By complex division is meant the separation of the trade or craft into several processes, which in turn are subdivided into minute operations. Thus the making of cloth is divided into spinning, weaving, dyeing, fulling, and finishing, and these again still further subdivided. A rather freely quoted but exceedingly apt illustration of the effect of

complex division of labor on the craft of the old-fashioned butcher is given by Professor Commons in his description of labor conditions in the meat-packing industry:

Notwithstanding the high skill required, the proportion of skilled workmen in the butchers' gang is very small, owing to a minute division of labor. It would be difficult to find another industry where division of labor has been so ingeniously and microscopically worked out. The animal has been surveyed and laid off like a map; and the men have been classified in over thirty specialties and twenty rates of pay, from 16 to 50 cents an hour. The 50-cent man is restricted to using the knife on the most delicate parts of the hide (floorman) or to using the axe in splitting the backbone (splitter); and, wherever a less skilled man can be slipped in at 18½ cents, 20 cents, 21 cents, 22½ cents, 24 cents, 25 cents, and so on, a place is made for him, and an occupation mapped out. In working on the hide alone there are nine positions, at eight different rates of pay. A 20-cent man pulls off the tail, a 22½-cent man pounds off another part where the hide separates readily, and the knife of the 40-cent man cuts a different texture and has a different "feel" from that of the 50-cent man. Skill has become specialized to fit the anatomy.

## GENERAL INCREASE IN PRODUCTIVITY DUE TO DIVISION OF LABOR

Though the individual appreciates the value of specialization in reference to his own work, he fails as a rule to realize the tremendous increased productivity in the nation as a whole that results from the ever-widening application of this great principle to the arts of industry. It is hard for a twentieth century man even to conceive of an industrial society devoid of division of labor. To do so would be to go back to primitive times when each individual shifted for himself. So far has this principle raised us above our ancestors that the mere idea of a civilized man making his own shoes, clothes, furniture, and food from start to finish is as ludicrous as it would be impracticable. So accustomed have we become to the advantages of our present system that we seldom stop to think of the variety and number of specialized workers who contribute to the making of even the most common articles of daily use. So simple an article as the collar we wear involves the storekeeper and his staff, from whom we purchase it,

the manufacturer with his salesmen, the members of his organization, his skilled and semi-skilled labor force (a collar passes through a hundred and fifty different hands in its making in the factory), the textile workers who made the cloth, the planters who raised the cotton, the makers of the tools, machines, and buildings for all these, the railroad companies and employees who transported all these commodities, and so on back through an endless maze, each worker as superior to us in his particular line as we are to him in ours. To the cumulative increase in production arising from this division of labor is largely due the luxury and wealth of civilized life.

## DIVISION OF LABOR INCREASES PRODUCTION IN THE FOLLOWING WAYS

First, by adding to the skill and dexterity of the workman. It is obvious that a man will attain more skill by confining himself to one trade than by becoming a "Jack of all trades." Practice makes perfect, and the law of habit enables the task to be carried out almost automatically, with a minimum of fatigue. Speed, ease, and accuracy result.

Second, by shortening the period of preliminary training necessary for the learning of a trade. The more minute the division of labor, the shorter the task, and the easier it is mastered. In the skilled trades the seven years' apprenticeship has shrunk to three years and with the rapid increase of semi-skilled jobs, and the minute division of labor due to efficiency engineers, the requisite training for many jobs can be acquired in from two days to three months. This is illustrated by the situation in the foundry of the Ford Automobile Company.

The big foundry is now working about 1,450 men all-told. Of the moulders about 55 men in the jobbing department are all-round molders. Of the others perhaps 5 per cent are skilled molders and coresetters, the remaining 95 per cent are simply specialized laborers. Many of them never having seen the inside of a foundry, who being given one piece only to put up, learned the "trade" in two days (if a man cannot learn to put up a small plain job in two days the Ford foundry bosses pass him up as hopeless) and began to turn out a full day's work of good castings on the third day of employment. "Ford Methods and Ford Shops," by Horace L. Arnold, *Eng. Mag.*, Vol. 48: 524.

Third, by permitting the most economical utilization of labor. In the meat packing industry just referred to, of a gang of 230 men killing 105 cattle an hour, 11 were paid 50 cents an hour, 3 received 45 cents, while 86 were paid 20 cents and over, and 144 got under 20 cents. Instead of the whole job being done by all-around butchers it is so divided that the small part of the work demanding a high degree of skill is delegated to 11 picked men; that requiring only mediocre skill is given to the 86 men of medium grade, while the greater bulk of the work which requires no special ability is dispatched by the lowest grade of labor. The great shortage of skilled labor in British industries during the war has given rise to the practice described as "the dilution of skilled labor." The work previously done by the skilled mechanic or other tradesman has been so subdivided that the operations requiring a lesser degree of skill are performed by women, after a brief preliminary training, leaving only the finishing touches or those operations demanding the highest degree of skill to the mechanic.

Under scientific management the tasks are divided according to the grades of ability required to perform them, and the men are carefully selected with a view to their fitness for each task. The planning and routing of work is taken out of the hands of the workmen and given to men selected by the management for their superior education and ability, who perform this work very much more efficiently than the workmen. The skilled mechanic is relieved of the unskilled work connected with his task and, therefore, turns out a larger product, while the specialized laborers dispatch their simplified tasks with the accuracy and speed born of constant repetition. Thus tasks are scientifically divided according to brain, brawn or skill, and the ability of each worker is applied in the most productive manner.

Fourth, by confining himself to one task the specialist saves the time which would otherwise be lost in passing from one job to another. A workman doing two or three kinds of work often wastes time in either changing tools or in shifting his position from one place to another.

Fifth, by simplifying the task division of labor facilitates the substitution of machinery for hand work. Once a task is reduced

to the mechanical repetition of a few simple operations the next step is the invention of a machine, which will perform the task with greater speed and accuracy than the human hand. The simple division of labor existing in the beginning of the 18th century in England paved the way for the mechanical inventions that ushered in the industrial revolution. The textile industry which early showed a division into processes, as spinning, weaving, fulling and dyeing, took the lead in the adoption of machinery. Spinning which involved the mechanical twisting of the cotton fibre, was first taken over by a machine. Hargreaves in 1764 invented the spinning jenny, which was followed in 1769 by the water frame of Richard Arkwright. In 1779 Crompton patented his spinning mule, which combined the good points of the previous two inventions, and produced a finer and stronger thread at a faster rate. Attention was next turned to the more complicated process of weaving, with the result that in 1782 Edmund Cartwright invented the power loom. Watts' improvement of the steam engine, made possible the use of steam as a motive power, and by the beginning of the nineteenth century machinery had supplanted handwork in the textile industry.

No sooner had division of labor admitted machinery into the industrial system than machinery began to repay the good turn by advancing specialization. These two aid and abet each other; division leads to the use of machinery and machinery induces further division of labor. The specialized machine calls for a specialized worker. A host of semi-skilled craftsmen and specialized laborers has sprung up in our factories and offices, whose function in life it is to operate the machine. The tendency is, however, for the machine to become more and more self-sufficient, to require less and less skilled supervision by the operator, who in many cases is only required to start and stop it. The question arises as to whether the development of automatic machinery will not eventually reduce machine operation to the level of common labor, demanding only specialized skill for setting up the machines. A second way in which machinery has increased division of labor is through the creation of those industries engaged in the making of machinery, and their dependent trades and professions, such as the various branches

of mining and engineering. These give rise to a widespread division of labor, resulting in an endless variety of specialized occupations.

Under scientific management the substitution of machinery for man power has been carried to an extent hitherto impossible. Motion study work, one of the foundation stones of scientific management, has as its object the reduction of jobs to a few simple and mechanical operations. The next step, the invention of a machine to accomplish the task, is thus greatly facilitated. In those shops where scientific management has been adopted or where motion study work only has been carried out, the substitution of machinery for human labor has been remarkably accelerated. As efficiency engineers bend their energies toward reducing human tasks to fewer and simpler operations, the easier it becomes to replace the man by a machine which performs the work with greater speed, accuracy and ease than any man could possibly do it. Scientific management thus greatly promotes the use of machinery through its minute subdivision of labor, and is destined, as it becomes more universally adopted, to extend the application of machinery to human tasks to a degree today scarcely realized.

## THERE ARE THREE DISADVANTAGES CLAIMED AGAINST DIVISION OF LABOR

First, that the narrow range of activities of highly specialized work leave no play for the use of the higher faculties, while the monotony born of constant repetition exerts a deadening effect on the worker. It is a question whether division of labor is to blame for the monotony and lack of the educational element in many kinds of specialized work. A large class of skilled and semi-skilled technical work and ordinary labor, which has been specialized, never was of a particularly elevating or broadening character. This much may be said for division of labor, that it tends to counteract the narrowing effect of work by allowing many hard and monotonous hand tasks to be given over to machinery, and also tends, as a result of increased productivity, to decrease the hours of labor. It is further claimed that the specialized worker is forced to take a greater risk, in that he must

depend on one small job, to earn his living. This danger is lessened by the fact that specialization in shortening the preparatory period of training enables the worker to master a new trade with greater ease, or to learn two trades, holding one as a reserve in case the other fails. In many shops where scientific management has been introduced, in the Franklin Car shops, for instance, the men are encouraged by a higher rate of pay to learn two jobs. It has been further charged against specialization, that owing to the narrowness of their training, the workers are unable to adapt themselves to new conditions and methods, and thus industrial progress is hindered. This is true provided workmen depended on their jobs for their education and training. It would be manifestly unjust, as well as disastrous, if the worker did not receive in shorter hours and increased pay, part of the benefits derived from the superiority of his specialized labor. There is a tendency to reduce working hours, also to increase by law the period of education the boy must have before he is allowed to work. By extending the schooling of the youth previous to his becoming a worker, and allowing him more leisure to continue his education after he becomes a worker, the harmful effects of specialization will be offset.

## DIVISION OF LABOR DEPENDENT ON THE EXTENSION OF THE MARKET

It is evident that there could be no division of labor without exchange. One man could not spend his entire time making one product, unless there were others with whom he could exchange that product, for the things he needed. And in order for him to exchange his whole output there must needs be a sufficient number of accessible consumers. In other words, division of labor is limited by the extent of the market for the product. The small town of the middle ages afforded a sufficiently large market for the shoemaker, but it could not have absorbed the output of a modern shoe factory turning out a thousand pairs of shoes a day. Through the invention of the locomotive by Stephenson and of the steamboat by Fulton in the beginning of the nineteenth century, with the remarkable development of transportation which has resulted, the village market has been extended to

include the nation and for many products the world at large. This extension of the market by transportation has made possible the production of commodities on a scale large enough to enable manufacturers to avail themselves of the advantages due to specialization.

## LOCALIZATION OF INDUSTRY

There is a geographical division of labor resulting in the concentration of certain industries in particular localities. Owing to the development of transportation, which has allowed goods to be profitably marketed at an ever increasing distance from the plant where they were manufactured, the localization of industries, during the last hundred years, has proceeded at a rapid rate. Thus Pittsburgh specializes in the production of steel, Akron in rubber, Troy in collars and shirts, Detroit in automobiles. Districts and nations follow the same principle on a wider scale; California supplies citrus fruits, the middle west grain, the south cotton, East Pennsylvania anthracite coal, while New England makes textiles, shoes and other manufactured goods. Great Britain devotes itself to manufacturing and exchanging its products for raw materials and goods; mutton and wool from Australia and New Zealand, wheat from Canada and United States, cotton from India and the South. Just as individuals confine themselves to one occupation, so do localities specialize in the production of certain commodities.

The following are the chief factors determining the localization of industries. Cheap and plentiful power exerts a magnetic influence in attracting industries to particular districts. Pittsburgh owes its superiority as a steel centre to its proximity to the finest beds of coking coal in the world, as well as to its supply of that purest of fuel—natural gas. A second factor is the availability of raw materials. This operates most extensively in the extractive industries. Memphis owes its importance as a lumber centre to its nearness to the forests of the south. The city of Lancaster, situated in the midst of the rich tobacco growing county of Lancaster, Pennsylvania, spends most of its time in making tobacco and cigars. Proximity to markets is another factor not as important as it was before the development of

transportation but still important. New England is a manufacturing centre today primarily because those states were populated when industries were being established. Since 1850 the centre of manufacturing has followed the centre of population westward. The importance of proximity to markets and raw materials depends on the cost of transportation. Climate of course largely determines agricultural specialization and also affects manufactures. Cotton spinning requires a moist climate, tobacco a dry atmosphere. A plentiful labor supply is a vital factor. Manufacturing industries tend to locate in those districts where there is a good supply of labor. Often an industry owes its start in a locality to accident. Lynn, Massachusetts, owes its prominence in the shoe industry to the fact that in 1850 John Adams Dagyr, a skilled Welsh shoemaker, settled there and became famous all over the country as a maker of fine shoes. Had he taken up his residence in North Adams, Massachusetts, that city might have been a centre for the shoe industry. Once an industry secures a flying start in a community certain inherent advantages arise which tend to perpetuate it. It acquires a specialized labor force, a fact alone which offers a powerful incentive to new plants seeking a location.

The big reason why the shirt and collar business grew to such proportions in Troy was its labor advantages. For a great many years after the industry was established in Troy only hand labor and practically no machinery was used in the manufacture of collars or shirts. Considerable skill was required to do the work at all and much more to do it efficiently and expeditiously.

The people who took up this employment were the natives of the district, an exceptional class of people, usually having had good home surroundings and educational advantages. No foreign labor was then and little is even now found in the factories.

Such people naturally furnished very high-class service to their employers. Their children grew into the work, and succeeding generations in turn fell heir to these occupations. In this manner and by natural growth there grew up and was established a highly skilled class of employees in the Troy collar factories.

As the business expanded, it was thought, for very good reasons, that the establishment of factories in other parts of the State would be advisable. But practically all attempts to start factories elsewhere

were complete failures on account of the lack of trained labor. It was found that this labor could not be trained in any reasonable period of time.

In recent years the situation has changed somewhat on account of the fact that a great deal of machinery has been introduced. Troy still has a great advantage as a collar manufacturing center, however, for training in the use of the machinery in this industry is local to this section.

Other advantages arise from the conveniences which accrue to dependent and interdependent industries being situated together. Those allied trades manufacturing the machinery, supplies and accessories, find a ready market for their products while those using the by-products of the bigger industries are handy to their raw material. Thus specialization facilitates coöperation, the advantages of which induce still further specialization.

By the operation of this principle each locality tends to produce those commodities to which it is best adapted by situation, skill, climate or resources. If this ideal could be universally and completely realized, and each district and each nation produce only those commodities which it could produce more economically than others, and exchange those commodities for the products more economically produced by other localities, all goods everywhere would be produced at lowest cost. Besides transportation costs, which limit this process, there are political reasons which make this course unwise under present conditions. These will be discussed later.

## TEST QUESTIONS

1. How is the principle of division of labor carried out in F. W. Taylor's system of Scientific Management?
2. Give a definition of "division of labor."
3. What part does this principle play in the evolution of all living organisms and economic organizations?
4. Distinguish between simple and complex division of labor.
5. Show how division of labor is carried out in the making of any ordinary article such as a collar.
6. Explain five of the chief advantages of this principle.
7. What is the relation between machinery and division of labor?
8. Name three disadvantages of division of labor.

**9.** What connection is there between division of labor, transportation, the extension of the market and large scale production?

**10.** Name the factors governing the location of industries.

**11.** Why is Pittsburgh a steel center? Troy the center of the collar industry? Lynn a shoe manufacturing city?

**12.** What advantage arises from geographical division of labor?

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## CHAPTER VI

# CAPITAL AS A FACTOR IN PRODUCTION

### CAPITAL A DERIVED FACTOR

We have thus far discussed only the two primary factors of production, nature and man, the former contributing the raw materials and forces, out of which and by whose aid all wealth is produced; the latter, the manual and mental effort required in the process. To the action of these two elemental agents the production of all wealth can finally be traced. There figures, however, in the roundabout system of modern production, a third factor termed capital, a product of nature and labor, but which assumes in the intervening period occupied by the changing of the raw material into the finished product the character of a separate factor. Though all capital can be analysed into its two constituent elements, nature and labor, it is convenient for practical purposes to distinguish it as a separate agent, just as in practical affairs we deal with water in preference to its two constituent elements, hydrogen and oxygen.

The derived nature of capital might be illustrated in the simple case of a woodman felling a tree. The woodman represents labor, the tree nature, the axe capital. The woodman as a man, the tree as a product of nature are elemental factors in the process, each is finally responsible for the part it plays in the production of timber. But what about the axe? Does responsibility terminate in that also as an elemental factor? Evidently not, for whether the axe serves its purpose well or ill depends on the material of which it is composed and the skill exercised in its construction. In other words, nature and labor are responsible for the productivity of the axe. From the mining of the ore, in the various stages through which it has passed in its transformation into the keen edged head of an axe, labor

and natural forces acting together, have fashioned it, with the aid of tools previously made in the same manner. It cannot be counted a primary factor in production any more than a rifle in the hands of a man who had shot another could be counted, as a primary factor in the killing, though both axe and rifle would be important secondary factors. It is in this sense that capital figures as a factor in production.

## IMPORTANCE OF CLEAR CONCEPTION OF CAPITAL

The increasing dependence of industry on capital and capitalistic methods of production, coupled with the tendency for its control and ownership to concentrate into the hands of large corporations, governed by a few individuals, has given rise to problems which powerfully affect the welfare of the whole nation. For the peaceful and just solution of these, a clear conception of the nature of capital, the services it performs, and its relation to labor, are absolutely necessary. Conflicting interest, as well as the complex nature and operation of capital itself, tend to confuse ideas, and have given rise to different opinions as to what is and what is not capital.

## DIFFERENT DEFINITIONS OF CAPITAL

An introductory text on economics should not confuse the mind by a consideration of dissimilar definitions; but on the other hand the student should not be kept in ignorance of the fact that in the field of economic theory men cross swords to decide the truth. Capital, as defined by Adam Smith is, "that part of a man's stock which he expects to yield him a revenue." He would exclude a dwelling house occupied by the owner. Hermann, who makes the distinction between capital and non-capital, that between durable and perishable goods, would include a house as a capital good, but would exclude, on account of its perishability, fruit in a fruiterer's store, which Adam Smith again would call capital. Some economists include all wealth as capital; others, as Clay, confine capital to that part of wealth used for production; while still others, as Kleinewachter, would further limit it to the tools of production alone. Again some authors strictly limit capital to material goods,

others, as McLeod, extend it to include immaterial goods which produce profit, including labor, credit, art, education and even an author's mind. Karl Marx confines capital to those productive instruments which are to be found in the hands of persons other than the laborers, and are used to exploit the laborers. With him capital is a "means of exploitation." Jevons, on the contrary, conceives capital as "the aggregate of those commodities which are required for sustaining laborers of any kind engaged in work." Böhm-Bawerk stoutly maintains, "that it is not the means of subsistence, and in particular it is not the means of subsistence alone, that constitutes capital. Capital only comes into existence when man enters upon that profitable roundabout journey that the means of subsistence have made possible; when he builds machines, tools, factories, raises raw materials, and so on."

All of which recalls an incident in the life of the late William James. While on a hunting trip he returned to camp to find his companions engaged in a ferocious dispute; feelings ran high and friendship was strained to the breaking point. James was asked to decide the question which was this: suppose a squirrel to be on the trunk of a tree, and a man were to encircle that tree; does the man go around the squirrel or not? (He goes around the tree sure enough and the squirrel is on the tree, but does he go around the squirrel?) One side maintained he did not, for as he circled the tree, so did the squirrel, always keeping the tree between himself and the man. The other side were just as emphatic in stating that he did, because if he went around the tree and the squirrel was on the tree, he must go around the squirrel. James decided the issue by affirming that which party was right or wrong depended entirely on what was practically meant by "going around the squirrel."

If you mean, said James, passing from the north of him to the east, then to the south, then to the west and then to the north of him again, obviously the man does go around him. But if on the contrary you mean being first in front of him, then on the right of him, then on his left, and finally in front again, it is quite as obvious that the man

fails to go around him, for by the compensating movements the squirrel makes, he keeps his belly turned toward the man all the time. Make the distinction and there is no occasion for any dispute. You are both right and both wrong, according as you conceive the verb, "to go around" in one practical fashion or another.

## WHAT IS PRACTICALLY MEANT BY CAPITAL

So with regard to the conception of capital. The difference of definition is due primarily to the fact that economists differ in what they "practically mean" by capital. As Böhm-Bawerk puts it:

> The material difference in the definitions is not so much that the one thing to be defined appears to each in a different light, as that each one is defining an entirely different thing.

After all it does not so much matter what capital means as what we mean by capital. And by capital as a factor in production we mean all *economic goods,* land excepted, used as aids to further production; all wealth used for this purpose is capital.

## CATEGORY OF CAPITAL GOODS

This definition automatically divides wealth into two parts: first, consumption goods, comprising all commodities possessed by consumers, for the satisfaction of wants; second, capital goods consisting of all commodities in the hands of producers, used for productive purposes, such as:

1. Permanent improvements in land, as drainage systems, harbors, dams and fences
2. Buildings used in production, as factories, barns, power-houses, also rented dwellings
3. Tools and machinery
4. Rolling stock of railroads, trucks and wagons
5. Horses and other beasts of burden
6. The raw and auxiliary materials of production
7. Stocks of goods on dealers' shelves
8. Money.

It has been said that the difference between capital and con-

sumption goods is but a difference of degree, in the sense that both are means to the satisfaction of wants, both yield utilities —the difference being that the former usually yield their utilities indirectly and slowly, but the latter directly and more immediately. This difference, however, is fundamental and fully justifies the distinction. Capital goods are in the hands of producers for the purpose of further production; consumption goods are in the possession of consumers for the purpose of consumption. The former are circulating in the course of exchange; the latter are withdrawn from the market in the hands of private individuals: the former add to the productivity of labor, the latter do not. The distinction then is not only fundamental but practical for it marks off for separate study a complex but concrete group of intermediate products whose common function is to act as an aid to labor in production, an aid without which industrial society could not for one moment produce those multitudinous things that go to make modern life worth while.

## FIXED AND CIRCULATING CAPITAL

Capital is sometimes spoken of as either fixed or circulating. These are terms of common usage and like most popular distinctions they are based on a practical difference in the nature of the two kinds of capital goods they distinguish. In modern industry capital goes through a series of cycles. It usually starts in the hands of the entrepreneur in the form of money or credit, with which he enters the market and purchases plant, machinery, raw materials, etc. These are transformed in the processes of production into the finished product which is sold on the market for money. This cycle from money into money consists of three stages. First: that in which the money capital is exchanged into elementary capital goods. Second: wherein these goods are transformed into the finished product. Third: whereby the produced commodities are exchanged into more money. With this money the entrepreneur again buys more elementary capital goods and the cycle is repeated. This periodical rotation of capital is called its turnover. From the point of view of the business man, the turnover is the length of time his money

capital takes to reproduce itself in the price of the product, plus of course an added value in the shape of a profit. While the length of this time varies in different branches of industry, the year is usually taken as the unit time of the rotation or turnover of capital.

Now it is the relation which capital goods bear to this unit period of production that has led to the distinction between fixed and circulating capital. Most of the raw and auxiliary materials used in production pass into the product of the current period, and their total value is reproduced in the price of that product. These forms of capital are termed circulating capital goods. It might be well to introduce here auxiliary capital goods. Some of the materials of production enter directly into the product with of course a change of form, as iron ore into steel, and sand into glass. Others, however, such as the gas used for fuel in a blast furnace or oil used for machinery, do not pass bodily into the product, though they do add value to the product; these are termed auxiliary capital goods. Most auxiliary capital is circulating capital and is merged in the current product with the raw materials. An exception to this would be fertilizer applied to land, the benefits from which might be spread over two or three years' crops. In this case part of the value of the fertilizer would be transferred to the current crop, part would remain in the ground.

Distinct from the above means of production which are consumed within the current period are the bulk of the instruments of production, plant, machinery, etc., which last for years and yield a part of their capital value to the product of the current period. These do not circulate bodily into the product in the same manner as the raw materials but retain their original form, separate from the product they helped to create. Their value, however, they do yield to the product, but by degrees. If the life of a machine is ten years, it is apparent that its total value is distributed to the product which it has helped to create in that ten years. At the end of the first year one-tenth of the capital value of the machine will usually have passed into the product of that year, but nine-tenths remains "fixed" in the machine, the predominant capital characteristic of which is

fixity, hence its name, fixed capital. It does circulate but with the slowness of the tortoise, not the speed of the hare. As Karl Marx aptly puts it: "In the performance of its function that part of the value of an instrument of labor, which exists in its natural form constantly decreases, while that which is transformed into money constantly increases, until at last the instrument is exhausted and its entire value detached from its body, has assumed the form of money." In business this transformation is brought about through a depreciation account. Supposing the life of a $1,000 machine to be ten years, with a scrap value of $100, $90 would be deducted from the money price received for each year's product and placed in the depreciation account, this fund with the $100 received for the scrap in ten years would contain the amount of money originally invested in the machine.

## THE PRODUCTION OF CAPITAL

It is conceivable that in the life of primitive man there was a stage when all his labor was demanded to provide food, clothing and shelter for immediate needs. As long as all his working hours had to be spent hunting food to keep body and soul together, he could accumulate no capital. In order to provide tools to satisfy future wants more effectively he must first spare some part of his labor from the satisfaction of present needs. He might set aside one hour each day for the making of tools or weapons, in which case these capital goods would arise directly from the labor power saved from the satisfaction of present needs. Or our primitive man might lay by a portion of food gathered each day until he had a sufficient store to last him while he devoted his whole time for two or three days to the construction of his implements. In this case the food saved would be used to allow of future labor power being applied to the making of the tools. Here the first form of capital would be in the shape of a store of food, withdrawn from consumption, to be used for the purpose of further production, the implements produced would be the second form of capital, which the first form aided in making by setting free the labor power necessary for their production. All capital comes into existence, in the first

place, through this labor power saved from the application to present needs and applied to the purpose of further production. This surplus labor may be turned directly into some instrument of production or into a store of goods, to be used for the liberation of future labor power, for production purposes. In a modern industrial society this store is not saved in the form of actual commodities but in the shape of money which is used for the same purpose as the store of primitive man, for the liberation of labor power for production purposes.

Take the case of a farmer. By saving part of his wheat crop he provides himself with capital in the form of seed for the following year. But in order to add to his equipment of other kinds of capital goods, as ploughs or barns, something more must be done than to save wheat. The farmer could build the barn himself in time saved from wheat growing; or he could sell part of his wheat and with the money hire a carpenter to erect the barn. In the latter case surplus labor produces surplus wheat, which is exchanged for money, which in turn is saved and used to employ labor to erect a barn. Or the farmer might borrow the money from a neighbor or a bank with which to erect his barn. In which case he borrows the capital store of another and uses it to produce a barn for himself. Here one person does the saving and the other utilizes that saving in setting labor to work for the production of capital goods. In modern society the saving tends largely to be done by one set of persons and the production power applied by another set.

## SAVING IN MODERN SOCIETY

Hoarding is a relic of by-gone ages. Money is no longer put by in an old stocking or hidden under a mattress. It is plain that wealth stored away in this manner is not aiding in further production. Today money to be saved is usually deposited in a bank or invested. In modern societies there has grown up an elaborate mechanism of investment the purpose of which is to facilitate the transfer of the money saved into the hands of those who are desirous of using it for the purposes of further production. Savings banks throughout the country gather up the small savings of millions of the common people. These

individual amounts are usually of little account, and their owners are not in a position to utilize them in further production. But pooled in these institutions they amount to a considerable sum; and in the hands of the bankers who are in touch with business men, a large part of this eventually is loaned to manufacturers and to merchants. The savings bank is only one part of the gigantic mechanism of investment. Other banks, promotion companies which retail the stock of new corporations by salesmen direct to the small investor, brokerage houses, life insurance societies and other financial institutions—all are engaged in collecting and directing this flow of stored up money capital into the channels of production. By their aid the store of capital saved by the nation is put into the hands of employers who use it to set laborers to work to produce the costly and varied capitalistic machinery which renders modern production so tremendously effective.

## MAINTENANCE OF CAPITAL

Savings and labor are necessary not only for the production of capital but for its maintenance. The productive equipment of society is continually wearing out, buildings are deteriorating, machines are depreciating or becoming obsolete, and it is essential for the efficiency of production that the capital equipment be maintained in first class condition. Part of the savings of the nation must be used in the form of a replacement fund, to employ the labor necessary to repair and reconstruct the capital goods destroyed. We have already referred to the manner in which business men replace used-up capital goods and take care of the wear and tear on fixed capital by means of the depreciation account. In replacing a worn-out machine, the business man does not, of course, directly employ the labor used in its construction; but the machine he buys has come into being as a result of other money capital being used to set free labor for its production; in like manner the raw materials used in its construction have been produced by still previous capital used in the extractive industries in the same manner. Therefore, in buying a machine which has been made in anticipation of his needs, a business man is reimbursing other pro-

ducers who have borrowed money and used it to hire labor to the end that his machine can be replaced when worn out.

## SUMMARY

Capital is a derived factor in production in the sense that it is itself a product of nature and labor. It comprises all intermediate products used for the purpose of further production. These are sometimes classified as fixed and circulating capital goods. Those that endure for several periods of production are termed fixed while those whose values are completely transferred to the product of the current period, are termed circulating. Capital comes into existence and is maintained through saving and labor.

## TEST QUESTIONS

1. Explain why capital is referred to as a "derived" factor of production.
2. What is a good definition for capital?
3. Name the eight heads under which the nation's capital goods may be classified.
4. Why distinguish between capital and consumption goods?
5. What is the distinction made between fixed and circulating capital?
6. How does capital come into existence?
7. How is it maintained?

## CHAPTER VII

# THE TWO IMPORTANT FUNCTIONS PERFORMED BY CAPITAL IN MODERN PRODUCTION

Capital serves in production first as an instrument by means of which the productivity of labor is increased; second as a store of wealth by means of which labor is able to be employed in the profitable but long-time system of modern production.

### THE EVOLUTION OF THE INSTRUMENTS OF INDUSTRY

It has been said that what distinguishes man from all other animals is the fact that he is a user of tools. Certainly, placed in a state of nature without them he would be a most helpless creature. Between the flint-headed spear and the automatic rifle, the stone hammer and the steam hammer, there stretches a period of time usually estimated at 200,000 years during which man has risen from the condition of a creature scarce able to wrest a subsistence from nature to a position of supremacy as a member of a civilization that by virtue of its mastery over the forces of nature satisfies his wants on a scale so lavish that even the poorest enjoy comfort that kings never dreamed of. The economic progress of the race is in no other manner so fascinatingly revealed as in the evolution of the instruments used by man on his way from savagery to civilization.

### DEVELOPMENT OF MACHINERY

The most important feature of this evolution has been the development of machinery. We might divide the history of production into two periods, that of the tool and that of the machine. The first dates from the time of primitive man to the middle of the eighteenth century, during which man fashioned the materials of his work by hand with tools, many of which, like the old-fashioned spinning wheel of the seventeenth century England,

he had used for ages in much the same form. The second, starting in the eighteenth century with a remarkable series of mechanical inventions and the application of steam power to the driving of these, ushered in the era of machine production which is in full swing today. The chief cause of the transition from handicraft to machine production was the invention of mechanical contrivances to operate the tools previously guided directly by the human hand. Just as soon as the tool is taken from the hand of man and placed in a mechanical contrivance, its essential character is changed. Man still controls it, but indirectly through a mechanism. It is this changed relationship between man and tool that constitutes the difference between a tool and a machine. The old-fashioned cobbler stitched his shoes by hand with a needle, the modern shoemaker stitches his with a needle the marvelously rapid movements of which are regulated by that complicated mechanism, the sewing machine. In advancing from tools to machine, therefore, man devises a mechanism that performs with tools operations previously performed by the workman with his tools. Up to the year 1735 spinning had always been done by hand, with the aid of the spinning wheel. John Wyatt initiated the development of machinery in the textile business by the invention of a mechanical device which he described as a machine "to spin without fingers." This was the forerunner of a series of mechanical inventions that ushered in the new period of production by machinery.

## APPLICATION OF STEAM POWER

Having relieved himself of the necessity of directing the tools he worked with by the invention of a machine, man's next step was to employ some greater force than his own in driving the machine. Having only two hands, man is limited to the number of tools he can handle. Not so with the mechanism of his invention, which from the outset began to outstrip him in the number of tools it worked simultaneously. The early developments of machinery were chiefly along this line. Hargreave's spinning jenny, invented in 1764, operated twelve spindles; Arkwright's water frame and Crompton's spinning mule further increased the number. As the machines grew in size and com-

plexity they demanded a greater motor power to drive them than man power. Wyatt used horsepower, Arkwright built a small factory on the banks of the River Derwent and drove his spinning frames by waterpower. Neither horsepower nor waterpower were satisfactory; but history seems to show that whatever man needs badly enough his brain supplies. And in this instance the urgent need for a more powerful motor force to drive the newly invented machines was supplied by Watt when in 1784 he brought to a successful completion the invention of the steam engine in the form of his double-acting machinery propelling engine. (As Watt pointed out at the time, his was not an invention for any one purpose, but a universal agent which could be applied to all mechanical contrivances.) No sooner had this new and greater power been applied to the early textile machines than a great stimulus was given to the invention of machinery in all lines of industry, with the result that in England by the beginning of the nineteenth century the old handicraft system had been superseded by the new system of machine production.

## DEVELOPMENT OF MOTIVE POWER MACHINERY

The substitution of a natural force, steam, for human force resulted in the invention of a separate mechanism to supply the motive power for the machine. All fully developed machinery consists of three parts—the tool, or working mechanism, the transmitting mechanism, and the motor mechanism. The evolution of machinery began with the first of these, the working mechanism. The invention of the steam engine marked a new stage in its evolution, in which the development of motive power mechanism played a conspicuous part. The ever-increasing size and complexity of the working machine, the spreading of transmitting mechanisms which enabled a large number of machines to be driven by one motor created an ever-increasing demand for more powerful motive mechanism. The discovery of the new motor powers—gas and electricity—with the invention of the dynamo in 1857 and the internal combustion engine in 1876, resulted in the development of motor machinery capable of exerting gigantic power. As a result first of the invention of working

machines, and second of the application of natural forces to the driving of these by the invention of motor machines, the world's industries in the short space of a century and a half have been completely revolutionized.

## HOW THE INSTRUMENTS OF INDUSTRY INCREASE PRODUCTION

Capital, in its capacity of an instrument, increases the productivity of labor by enabling man to utilize to greater advantage the properties of matter and the forces of nature. It accomplishes this in two ways: (1) By increasing the motive power at man's disposal, (2) by enabling him to direct motive power more effectively.

By the use of such simple mechanical devices as the lever, wedge, pulley, etc., man is able to exert greater power on the object of his labor than with his bare hands. A pole used as a lever enables him to move a block of stone that would otherwise resist his utmost efforts, just as a wedge enables him to split that stone at will. By placing wooden rollers beneath his stone, as did the Egyptians, he is able to move from place to place huge blocks, while by the use of wheels in a complicated mechanism such as a truck driven by steam or gas he transports his stone with ease over long distances. First, with a rock held in his hand, later with one fastened with thongs to the end of a stick, ancient man increased the power of his arm to deliver a blow. But with his steam hammer the modern hammerman can tap an egg without breaking it or flatten a steel ingot with a blow that would put Thor himself to shame. With microscope and telescope man has increased his power of sight; while the telephone and dictaphone have given new powers to his voice.

Not only does machinery by means of mechanical devices and the utilization of natural forces add to human labor power, but it enables man to direct these powers more effectively, so that he performs more accurate work and work of a more delicate nature than he could accomplish alone. The Pratt-Whitney measuring machine, which decides the thickness of cigarette papers, measures a millionth of an inch. Whenever exact and minute measurements are required, machinery outdoes the hand. One of the

greatest mechanical devices is the slide-rest invented by Henry Maudslay early in the nineteenth century. It has been said that the influence of the slide-rest on industry was as great as that of the steam engine, which, in common with all other machinery, owes its perfection to this ingenious means of giving to metallic objects the most precise and perfect geometrical forms. The secret of Maudslay's service to industry was to take the tool from the worker's hand and place it in a mechanical rest which exerts a far more even and accurate pressure than human hands are capable of. Another phase of the directive function of machinery is the accurate repetition of precisely identical movements and operations. Wherever continuity of movement is required, machinery outclasses man and as well relieves him of a monotonous task.

## INCREASED PRODUCTION THROUGH MACHINERY

As a result, man by harnessing the powerful forces of nature to modern machines produces in greater quantity and with better quality products unattainable by his own unaided labor. Before Eli Whitney invented the cotton gin in 1793 the separation of the seed from a pound of cotton took on an average one day's labor. By means of his invention a negress was able to clean a hundred pounds daily, and since then, through improvements to the cotton gin, that amount has been increased. In speaking of machinery in the shirt and collar industries, a recent government report states:

The great development of the wearing apparel industries, including men's shirts, has been coincident with the invention of special appliances and attachments adapting the sewing machine to practically all stitching processes, including button-hole making and button sewing. By these inventions not only has the cost to the consumer been reduced to a minimum but the product is made infinitely better. Hand labor has practically disappeared in the sewing of men's shirts. Buttonhole and button-sewing machines, with a daily capacity of from five to six thousand buttonholes or buttons, have replaced the laborious and expensive methods of hand labor. In the early stages of the industry the machines were run by foot power and later on by steam but now electricity is used almost entirely. Some of these machines attain a maximum speed of 3,500 stitches a minute. Button-hole making by

hand is a tedious process, with a maximum capacity for a skilled worker of 7 to 8 dozen buttonholes in a 9-hour day. The machine process with a fairly skilled operator yields 5,000 to 6,000 buttonholes per day.

What has happened in the shirt and collar industry is typical of what has occurred in most all industries in the United States. All along the line electrically driven machines with their steel hands working with marvelous power, speed, and accuracy are fashioning the products once made laboriously by hand; and not alone the products of man's hand, but of his head. Calculating machines of all kinds, comptometers, cash registers, adding machines, and bookkeeping machines, with their mechanical brains nerved with electricity, outstrip human brains in accuracy and speed. These are revolutionizing the office just as the earlier machines did the factory, so that the routine brain work of a modern office is largely performed by machinery.

Not only has machinery enabled man to produce products at a faster rate and of a better quality, but others he could never have made by hand alone. Glass cannot be made from sand by hand—many kinds of tools and machines are necessary for its manufacture. So with iron and steel and a thousand others. Though nature neglected to provide man with wings, he has at last solved the problem of human flight with his latest machine and now flies higher and faster than the birds. Already the United States mail is being carried by aeroplane, and between the principal cities of Europe regular aerial transportation routes are now an established fact.

## THE FUTURE OF MACHINERY

The most remarkable thing about machinery is its recency. What is a century and a half in the life history of mankind? Yet not in all the thousands of years man was a user of tools did changes occur in his social and industrial life to be compared to the revolution which has taken place during the present brief period of machine production. His accomplishments today in the eyes of his ancestors would appear miraculous. The newness of some of our modern inventions is rather strikingly brought to mind when we consider that telegraphy (1837), the oldest of the great electrical inventions, has sprung up within the life-time of

men living today; that the dynamo (1857) is but sixty-five years old. It is hardly conceivable to us moderns that forty-seven years ago (1876) telephones did not exist; that people living forty-five years ago (1878) had never seen an electric light and that electric cars (1881) were then unknown. The fact worth keeping in mind is that the evolution of machinery is forging ahead as fast today as it ever was. Improved machinery is constantly replacing old in every branch of industry. Electricity, say those who know it best, is but in its infancy. If the prophecy of Steinmetz is fulfilled, in a few years electrical power will be as cheap as water. Any day may bring forth a new power which will eclipse those we now have. There is no reason why this evolution should stop. Wonderful and powerful as are the machines of today, those of tomorrow will be more so. The changes of the past presage even greater changes for the future. What they will be no man can guess; but their effect will be to lighten human labor and add to human happiness in so far as their benefits are distributed justly among all people.

## CAPITAL AS A STORE OF WEALTH

Tools and machinery increase the productivity of labor, but they themselves must first be made, and their use involves a roundabout system of production, consisting of numerous intermediate stages, all of which necessitates a long period of time to elapse before the appearance of the finished product. Modern production begins with the extraction of raw materials and the making of machinery involves extensive transportation, numerous processes, and is carried on in anticipation of demand. It is here that capital comes to the rescue in its capacity of a store of wealth to supply the producers with the means of subsistence while they expend their labor in this profitable but long-time system of production. It is this element of time in modern production that is at the bottom of the dependence of the laborer on the capitalist. The laborer, unable to wait until the finished product of his labor arrives by the roundabout process, becomes dependent on the capitalist, who holds in his possession the means without which the productive enterprise cannot be carried out. It is evident that an individual or a community of individuals,

without any stock of goods saved up from past industry, would be forced to live from hand to mouth and would gain but a bare existence; it is only after they have accumulated a surplus that they would be able to devote their energies first to the making of plant and machinery and then to making with these the commodities they desire.

## GROWTH OF CAPITAL

Under the handicraft system the amount of capital required was small, but with the rise of machine production capital has come to be demanded in larger and larger quantities. The total manufacturing capital in the United States has grown from $533,000,000 in 1849 to $18,428,070,000 in 1909. In 1850 the average number of employees per manufacturing establishment was seven and the average capitalization $4,330. In 1910 the average of employees increased to 25, and the capitalization to $68,638, an increase of 1,485 per cent in capital to one of 225 in labor. The striking fact revealed by these figures is the remarkable increase in the amount of capital used by the average concern in comparison to the small increase in its labor force. The figures also illustrate the growing tendency toward large-scale production, which is the outgrowth of the development of machinery and division of labor. The economical utilization of machinery and division of labor make necessary a large output. The economies due to large-scale production have tended to concentrate production in fewer and bigger establishments. This tendency is particularly evident in the iron and steel industry, which not only supplies the materials out of which machinery is built, but which uses gigantic machinery of all kinds to produce these materials. In 1850 there were 468 iron and steel plants in the United States. In 1910 there were 654; the average number of employees in 1850 was 53; in 1910, 426; the average capital of an iron and steel plant in 1850 was $46,700, while in 1910 the average capital had increased to $2,282,000; in the same period the product increased from $43,000 to $2,119,000. The number of establishments has increased but 40 per cent, while the product has increased 4,700 per cent. The notable feature, however, is the tremendous increase in capital for the average steel plant.

## COMPLEMENTARY NATURE OF CAPITAL AND LABOR

One of the most prominent rubber manufacturers said recently to an interviewer: "All the millions of dollars we have invested in this plant wouldn't be worth a cent if they were not vitalized by human effort." He might just as truly have said, "All the labor of the 20,000 men in this plant wouldn't be worth a cent if they were not equipped with capital." Both statements are equally true and reveal the complementary nature of the two factors, labor and capital. Either alone is impotent, together they are all powerful. Take the case of this particular producer. In 1898, believing there was a future in the rubber business, but having no money of his own, he borrowed the necessary capital, $13,500, organized a company, bought a small factory building, and started in to make rubber carriage tires. In the early days of its history the company had pretty hard sledding owing to insufficient capitalization; people didn't have much faith in the rubber business in those days, and it was only by the exercise of extraordinary ingenuity and perseverance that the increasing demands for capital were met. In 1917 the net assets of this company amounted to $60,000,000. It owns one of the finest plants in the world, equipped with the latest and most efficient machinery for manufacturing all kinds of rubber product. It has acquired 20,000 acres of rubber lands in Sumatra and 24,000 acres of desert in Arizona that are being reclaimed for growing long-staple cotton, and also owns a cotton mill in Connecticut. Its sales for 1917 reached $111,000,000.

## IMPORTANCE OF CAPITAL

It is not alone efficient labor and abundant raw materials that result in industrial efficiency, but also quantity production coupled with the use of labor-saving machinery. That concern, other things being equal, which is equipped with the most efficient machinery, will produce the largest product at the lowest unit cost. To the individual and the nation alike, capital in its two-fold capacity is an essential factor in the economic struggle for existence. It is obvious that a nation cannot engage in the building of railroads, canals, harbors, irrigation plants, and other profitable but time-consuming projects without capital. It is equally plain that a nation whose industries are poorly supplied

with obsolete machinery will be unable to compete successfully with another supplied with a modern and superior equipment. The coming international economic struggle will hinge on machines, and the capital wealth necessary to purchase them and utilize them in quantity production.

## TEST QUESTIONS

1. What two distinct functions does capital perform in our economic system?
2. What part has the evolution of the instruments of production played in furthering human progress?
3. Wherein lies the difference between a tool and a machine?
4. What three stages mark the evolution of the instruments of production?
5. In what two ways does capital in its capacity of an instrument of production increase the productivity of labor?
6. Give an illustration of the superiority of machine production over hand labor.
7. How does capital facilitate production in its capacity of a store of wealth?
8. Give some idea of the growth of capital in the United States in the last half century.
9. Make clear the relationship between labor and capital in production.
10. Give some idea of the importance of capital in our present industrial system.

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## CHAPTER VIII

# ORGANIZATION AS A FACTOR IN PRODUCTION

### ORGANIZATION IN PRODUCTION

We live today in an age of organization. The achievements of the present are the result of organized effort. The individual working for himself has given away to the combination of individuals working together for a common purpose. Individual action has been replaced by collective effort. We find this evidenced in all spheres of human activity, political, social, and religious, but it is in industry that organization has achieved its most remarkable results and is found in its most highly developed state. There is scarcely a thing we use from the time of rising in the morning to retiring at night which is not the product of some organization. The bed we sleep in, the soap we wash with, the clothes we wear, the food we eat, the car that whirls us to and from our place of business, the telephone on our desk, all alike are the result of organized effort, and moreover without organization they would not be produced at all. In organization we moderns live, move, and have our economic being.

### REASON FOR ITS INCLUSION AS A FACTOR IN PRODUCTION

Following the lead of Adam Smith, it has been customary to consider land, labor, and capital as the sole factors of production Since the time when he wrote his famous "Wealth of Nations" changes have occurred which seem to make it advisable to segregate organization as a separate factor in production. The industrial systems of the leading countries of the world have evolved a complexity of structure compared to which that of the time of Adam Smith seems simple. New problems have arisen, intricate problems, urgent problems on the solution of which hangs the happiness of the workers and the welfare of the nation. Large-

scale production incurring the use of tremendous sums of capital invested in quantities of modern machinery entailing the employment of an army of workers engaged in a multiplicity of varied activities, all operating under a central control, have brought into prominence the economic unit itself, which in the course of its evolution has developed a size and complexity of structure worthy of special consideration. The productivity of any nation today depends as much on the character of its business organizations as on its natural resources, its labor force, or its capital; for it is only through the former that the latter three are united for effective production. There is a more urgent need today for a close study, an accurate knowledge, and a clear understanding of the underlying principles of business organization than at any other period in the country's history. To place it in the position of a separate factor of production will single it out for attention and study.

## ORGANIZATION DEFINED

In the separate discussion of land, labor, and capital we have naturally enough emphasized their individual importance. It is just as necessary to realize their absolute interdependence. Under our modern industrial system with its large-scale production and division of labor, either factor by itself is comparatively helpless; only when working together are they effective. It follows, therefore, that the structural unit by means of which they are combined for effective production is performing a highly important function. Organization as a factor in production may be defined as an arrangement of land, labor, and capital for the purpose of producing commodities or services. Every business concern is such an arrangement.

## THE ESSENTIALS OF ORGANIZATION

What are the dominant characteristics, the fundamental features of organization in general? A grasp of these will give us a keener insight into the nature of business organization. Organization has been variously defined as follows: "The act of arranging or an arrangement of related or interdependent enterprises into a group with such system as will enable and make it possible

to compel each to coöperate harmoniously with the others in the accomplishment of a common end." "A harmonious arrangement of specialized parts for the accomplishment of a common purpose"—"a living structure composed of organs"—"a systematic union of individuals into a body whose officers, agents and members work together for a common end." An analysis of these definitions shows that all organizations involves, first, an arrangement; second, specialized parts; third, some form of centralized control; fourth, a common end or purpose. In short the essentials of organization are:

1. Arrangement.
2. Specialization.
3. Centralization of control.
4. Unity of purpose.

## ARRANGEMENT

An organization *is* an arrangement, a contrivance. To organize is to arrange and on the arrangement depends the successful operation of the organization. The object of arrangement is coördination. The interdependent parts of which the organization is composed must be so placed that their activities coördinate. In the human body, the parts are so related that they coördinate perfectly, each performing its function in the general scheme of things and all working together for the common good. The organs of the digestive system—mouth, tongue, oesophagus, stomach, and intestines—are so combined that together they function to digest food. In the same way the departments of a factory are so arranged that together they function to manufacture a product. But while in the human body the arrangement is contrived by nature and the organism comes into being already developed, in the business organization the arrangement is undertaken by man, who must perform the work of construction. His raw materials are land, labor, and capital, in the form of men, money, machinery, materials, and plant, and his problem is to arrange them in such a manner that they function to produce commodities or services. The departments of a manufacturing plant, for instance, must be so related that the raw materials which enter at one end pass from department to department

without any back handling till shipped out as finished products at the other. Men and machinery must be so coördinated that they work together to the best advantage. Time and motion study work consists largely of an arrangement between the man, the material, and the machine; the position and the motions of the worker are so ordered that the job is done in the shortest time with the least expenditure of effort. This is scientific organization of the job—an arrangement based on systematic observation, not on rule-of-thumb or guesswork. Organization throughout is a matter of arrangement.

## SPECIALIZATION

In this arrangement nothing is more vital than the specialization of its parts. An organization does not consist of one individual, but of a number of individuals; it is not a homogeneous whole but a heterogeneous whole composed of different parts. This is true of every kind of organization, whether it be an animal organism, a baseball team, or a business corporation. In each the end or purpose is accomplished by a number of differing individuals or parts, each adapted to execute some particular activity. In the animal organism the eye does the seeing, the ear the hearing, and the feet the walking; in the winning of the baseball game each member of the team has his special work of catching, pitching, or fielding; and in the business corporation each department has its own special function; the sales department is organized to take care of the selling activities, the purchasing department does the buying, and so on. A specialization of parts based on functions is of the very essence of all organization. In animal organisms, as we have noticed, the higher the organism in the scale of life the more highly specialized are its parts. The same law applies to business organizations which have evolved from the individual producer who carried out all of the simple functions of business himself to the most modern development, the big corporation with its numerous highly specialized departments, machinery and workers. In organization specialization is synonymous with progress. The most efficient business organizations are those in which specialization of departments—men, machinery, and equipment—has been carried

to a high degree. The work of organizing is largely a matter of this specializing; first, in determining the divisions and departments best adapted to the carrying out of the various activities and then in the building up of these with specialized men, machinery and equipment. Specialization, therefore, is a fundamental principle of organization.

## CENTRALIZATION OF CONTROL

As an organization consists of a number of separate parts, some means of centralized control is essential to secure the coordination of their activities in the accomplishment of the common end. All kinds of organization possess some form of centralized control. Provision for this office is the predominating feature of modern business organization. In man the cerebrum, the throne of the mind, is the center of control; in it dwells the "I," the "thinker," who through the lower nerve centers directs all the members of the body according to his will. In the business corporation the center of control is the board of directors; from this body the control passes to the executive department, the general manager, and from him down through the whole organization. This principle of centralization of control is carried out through every part of the organization. The control of each department is centralized in the head of that department just as that of the whole organization centers in the board of directors. The more highly specialized the organization, the more numerous its parts, the more complex it is, the more necessary is some form of centralized control to secure unity of action.

## UNITY OF PURPOSE

Arrangement, specialization and centralization of control are all means for achieving the purpose for which the organization was brought into being. Each part of the organization exists solely for the sake of contributing in some special way to the accomplishment of this common end. In a steel plant, every department, every building, every machine, and every man is there to help make steel. The making of steel should be the common tie that binds them into a working whole. A great deal of friction and waste effort would be avoided in business concerns today

were the common aim more clearly kept in mind by the separate departments and individuals. Unity of purpose inspires coöperation and is essential to all organized effort.

## FORMS OF BUSINESS ORGANIZATION—THE SOLE PROPRIETORSHIP

The simplest form of business organization is the one-man business concern, often called sole proprietorship. One man owns and controls the whole undertaking. It is the parent form of business organizations, and in its crudest state way back in primitive times one man not only owned and controlled the business but performed all of its various functions himself. In its more highly developed state it appears as a highly specialized organization owned and controlled by one man, as the John Wanamaker and Marshall Field stores were previous to their incorporation. It was the typical form of organization of the handicraft system in the middle ages and is the prevailing type today in farming, retailing, and in the professions. In 1900 there were 171,000 establishments under individual ownership forming 63 per cent of all establishments. In 1904 the number had dropped to 113,900 and 52.7 per cent of the total. In 1909 the percentage of the total was 52.4 per cent. The value of the products produced by individually owned establishments shows the same tendency, falling from 16 per cent in 1900 to 12 per cent in 1904 and to 10 per cent in 1909.

The advantages of the sole proprietorship form are: (1) Ease of starting; no articles of agreement need to be drawn up or certificate of incorporation obtained; (2) close relationship between interest, authority and responsibility—the person who has everything to lose or gain by the management of the business has that management entirely in his hands. This acts as a direct check on waste and is an incentive to efficiency; (3) centralization of control allows a promptness and facility of action not as easily attained in a complicated organization. Its disadvantages are:

1. The one individual lacks the breadth of knowledge and ability contained in the personnel of the partnership or corporation.

2. Difficulty in raising sufficient capital.
3. The unlimited liability of the sole owner for the debts of the business.

## THE PARTNERSHIP

With the introduction of machinery and the spread of division of labor, there was a gradual development of the business in size and complexity of structure. It became increasingly difficult for one man to raise sufficient money or to assume the control and direction of the larger quantities of men, machines, equipment, and plant demanded by the enlarged unit. The sole proprietorship was thus supplemented by the partnership form of organization, wherein two or more individuals formed an association for the purpose of conducting a business, sharing in the ownership and control according to an agreement among themselves.

Like the sole proprietorship, the partnership has the advantage of facility of formation; there is also a direct relationship between effort and reward which acts as a stimulus to efficient management by the owner. It possesses an advantage over the single entrepreneur form in that the combined ability of several heads allows some degree of specialization in control and management and also its borrowing capacity enables it to raise larger sums of capital. It lacks the centralized control of either the sole proprietorship or the corporation.

This divided control has often been a serious disadvantage in partnerships, causing lack of harmony and unity of action. Though able to raise larger sums of capital than the single entrepreneur, the partnership's capacity in this direction is inferior to that of the corporation. Liability to disruption is another disadvantage of the partnership which may take place by the death, insolvency, or withdrawal of one of the partners. Finally, the unlimited liability of the partners for debt is a decided disadvantage of the partnership form of organization.

## THE CORPORATION

As a result of a long process of evolution from the individual entrepreneur, the partnership and a transition from the joint stock company, rarely found in the United States though still common

in Great Britain, we have arrived at the corporation, which is the prevailing type of organization today. About 80 per cent of the manufactured products of the United States are produced by corporations. The corporation comes into existence and is maintained by virtue of the general state corporation acts. Under such an act any citizens who meet the requirements of the law may form a corporation by drawing up according to form a charter or certificate of incorporation, on the acceptance of which by the proper officer of the state the corporation comes into being. It is thus a creature of the state, its certificate of incorporation is its birth certificate wherein its powers are defined and certain rights granted. It is a legally constituted association of individuals authorized by law to conduct business as a single entity.

The advantages of the corporation are:

1. Greater permanency; the individual members may die or retire, but the corporation continues its existence as a distinct entity.
2. Limited liability; the liability of each stockholder is usually limited to the amount he has invested in the company.
3. Facility for raising large amounts of capital by selling the capital stock to numerous small shareholders. The tremendous sums of capital required by large-scale production can be raised.
4. Centralization of control and direction—the binding legal constitution of the corporation with its provision for the concentration of control in the board of directors makes for unity of action.

There are several disadvantages of the corporation form. Its formation necessitates the expense and formality of filing a certificate of incorporation with the state. Its powers are restricted to the definition of its purpose in this document. It is subject to stricter supervision and regulation than the sole proprietorship or the partnership. Through the separation between ownership and management which occurs in the large corporation, the spur to efficient management is often dulled.

## INTERNAL ORGANIZATION OF A CORPORATION

We have discussed the chief forms of organization mainly from the viewpoint of ownership and have noticed their external characteristics. We will now glance at the internal arrangement of a typical corporation. Commencing with the big divisions and working down, we find the corporation to be divided into two main parts, one of which is devoted chiefly to administrative affairs and is termed the corporate or administrative organization; the other, devoted to the direct production of the commodity or service, is usually called the operating or production organization. Both, of course, are concerned in the production of the commodity and both exercise administrative powers, but each is named after its predominant function.

## THE CORPORATE OR ADMINISTRATIVE ORGANIZATION

The purpose of the administrative organization is to control and direct the affairs of the whole corporation on behalf of its owners, the stockholders. It is the means by which the stockholders exercise their functions of ownership—and control. It constitutes the governmental structure of the corporation and consists of the stockholders, the board of directors, the executive, the general manager. The body of stockholders represents the ownership of the corporation, and is the ultimate source of authority and control. Then come the board of directors elected by the stockholders and endowed by them with full authority to control and direct the affairs of the corporation. The board of directors is thus the center of control and direction for the corporation as a whole. It carries out its policies and plans through its executives. The executive department exists to execute the directions of the board. In the smaller corporation the chief executive is the president who exercises full supervision over the business and is directly responsible to the directors. In the larger corporation there is usually an executive committee, the chairman of which is the chief executive. Other executive officers are the secretary and treasurer. The general manager is often classed with the operating organization; his function, however, is administrative. He is the connecting link between

the two organizations. He is appointed by the president or the directors and is responsible for the success of the operating organization. He is the center of control and direction for the operating division and his function is to correlate the various departments, coordinate their activities, so that all the parts work smoothly and efficiently together to turn out the largest amount of product at the lowest unit cost.

## THE OPERATING ORGANIZATION

While the direct object of the corporate organization is the general administration of the affairs of the company, that of the operating organization is the production of the commodity or service for which the corporation was formed. To accomplish its purpose in the most efficient manner, the operating division is divided into four main departments, the production department, the sales department, the financial and the accounting departments, which correspond with the four universal functions of business. Every concern is producing a product whether it be some concrete commodity such as steel, shoes or locomotives or some intangible thing such as transportation, a bank's service to its depositors or a store's service to its customers which necessitates, first, the buying of some commodity.

The actual making of the product is the primary object, and the internal organization must, therefore, contain a department to perform the service or to carry on the work of manufacture, to secure the raw material and work it up into its finished state. The product is of no use lying in the factory, it must be sold. The selling function varies in importance in different kinds of business, but is present in all in some degree. A well-organized sales department is a vital necessity to the modern corporation. No less so is a good financial department. Manufacturing and selling cannot be carried on without money. The financing of a business in this capitalistic age is no mean task, and demands specialized ability. A separate department is required to take care of financial operations, to procure funds, collect debts and disburse moneys. Last but not least, is the function of accounting. A record must be kept of all the transactions of the business, of all expenses and income, otherwise affairs

would end in hopeless confusion. The accounting department attends to the recording of business transactions, evidences the assets and liabilities, summarizes the income and expenses, and submits such other financial and statistical statements as the executives can use.

These four departments which are included in a typical operating organization are further divided into those sub-departments and sections best fitted to handle their varied activities. The sales department may include an advertising department, a correspondence department, a training division or whatever others are necessary to carry out most effectively the selling plans of the company. No two organizations are exactly alike. The number and arrangement of the departments will depend on the nature of the work to be done. If this principle of division based on functions be carried out through the entire organization from the main division, through the departments and sub-departments to the men and machines, labor and capital will be most economically employed and every individual will be performing that special function for which his special ability fits him. This division must be accompanied by such an arrangement that the separate activities of these specialized parts coordinate perfectly. Unity of action will be secured by centralization of control and coöperation inspired by the common purpose. The complete organization may be likened to a wheel, the hub of which represents the corporate organization from which control radiates through the spokes to the rim which represents the operating division. This arrangement illustrates the central position of the general manager, who through his four department managers directs and coördinates the activities of the various departments and sub-departments of his entire organization.

## SUMMARY

Organization is the keystone of the arch of production. By it, the other factors—land, labor and capital—are locked into a productive unit. Alone these others are helpless; only when combined in some form of organization are they capable of effective action in our modern industrial system. Business or-

ganization, therefore, demands special attention; the best brains of the nation should be focussed on its problems and its principles. Organization means arrangement; it involves specialization of parts which in turn necessitates centralization of control, to coordinate the functions of the parts and to secure unity of action, for the attainment of the common purpose. Arrangement, specialization, centralization of control, and unity of purpose—these are the root ideas of organization. From the standpoint of production a business organization is an arrangement of men, money, machinery and materials for the purpose of producing a commodity or service. The chief forms of business organization are the sole proprietorship, the partnership and the corporation. The internal organization of a corporation is based on functions. The work of the corporation is divided and sub-divided into separate activities and special departments are created to discharge these activities. Harmony of action is induced by centralization of control.

## TEST QUESTIONS

1. What is a business organization?
2. State the four essentials of organization.
3. What part does arrangement play in organization?
4. What is the relation of specialization to organization?
5. Of what importance is centralization of control in organization?
6. What are the chief forms of business organization?
7. State the advantages of the corporation form of organization; its disadvantages.
8. Draw a chart showing the chief parts of a typical business corporation.
9. What is the function of organization as a factor in production?

# CHAPTER IX

# LARGE-SCALE ORGANIZATION

## DEVELOPMENT OF THE CORPORATION

The corporation which as we have seen, permits a greater degree of specialization and integration than previous forms of business organization, has itself undergone changes in size and form. It is estimated that in 1800 there were one hundred corporations in the United States. But the era of the corporation as we know it today did not set in till after the civil war. In 1915, according to the report of the commissioner of internal revenue, there were 299,445 corporations. Since 1870 there has been a remarkable development of the corporation form of organization both in size and complexity of structure. The growth of large scale production which has been made possible by the widening of the market and by the bringing together under the centralized control of the corporation, ever larger quantities of men, money, machinery and materials, has resulted in an extension of the corporation form into the holding company and merger.

The holding company which appeared in 1897, and which is the dominant form of large corporations today, is a combination of smaller corporations, the stocks of which it acquires either in whole or in part, sufficient to give it control of the constituent companies. Centralization of control is thus secured through the board of directors of the holding company. In the merger, which began to assume importance about 1905, the stock of the constituent companies is brought in and cancelled, the only stock being that of the owning corporation. This represents the last stage in the development of corporate combination, wherein the combined companies completely lose their identity in the parent company and a unified and central-

ized organization results. The earlier corporations were associations of individuals into a simple organization; the big corporations of today are associations of already organized individuals or corporations into compound organizations. The trend of development has been from the simple to the complex corporation.

## DEVELOPMENT BY COMBINATION

The most modern phase of corporate development has come about as a result of a process of combination. The first period of development consisted of an internal growth and expansion of the simple corporation which rapidly increased in size. The process of combination by means of which these enlarged units have been compounded into the gigantic corporations of the day, has proceeded along two different lines usually termed horizontal and vertical. By horizontal combination is meant the union of firms making the same kind of products, as, for instance, in the tobacco industry there is a combination of firms making cigarettes, and another of those producing tobacco.

In vertical combination firms engaged in different stages of production are united under one management, as in the United States Steel Corporation, which includes companies engaged in the extraction of raw materials, ore and coal companies; coking concerns; railroad and steamship companies; makers of pig iron and crude steel products; and lastly finishing concerns. Vertical combination is in reality integration, a coördination of related or interdependent activities into one organic whole. As used in economics integration may be defined as the process whereby the owners of an enterprise secure a more or less complete control of all the steps of production, from the extraction of the raw materials to the marketing of the finished product. In most industries, specialization has resulted in the different stages of production being conducted by separate companies. In the steel industry separate concerns carried on ore mining; others smelted the ore into pig iron. Still others mined the coal and made it into coke. The pig iron producer sold his product to the puddler or steel maker who in turn sold his crude

steel or iron to the makers of finished products. Vertical combination or integration is the process whereby these specialized, yet interdependent concerns are welded into one unified organization which controls and coordinates all of the essential activities of production from the mining of the raw material to the marketing of the finished product.

## LARGE-SCALE ORGANIZATION IN THE STEEL BUSINESS

In the march of events in the steel industry, leading up to the formation of the United States Steel Corporation, we are able to see the action of combination on a gigantic scale. The early conditions existing in the steel industry were well told by Percival Roberts in his testimony in connection with the case of the Steel Corporation.[1] Mr. Roberts said that the firm of A. & P. Roberts, with which he became connected in 1876, was started by his father and another in 1852 with a capital of only $8,000, which was considered sufficient in those days to start a works for producing wrought iron; that practically all rolled products were made of wrought iron which was produced in puddling furnaces; that a puddling furnace had a capacity of about four tons of muck bar in twenty-four hours and was operated by four men; that there was no continuity of operations in those days, that after the pig iron had been made in the blast furnace, it was shipped to the rolling mill where it was charged cold into a puddling furnace, and converted into "muck bar" which again was permitted to become cold after which it was cut into various sizes; then reheated and rolled into finished products. He said that in 1876 the total production of pig iron in the United States was less than 2,000,000 tons per annum, as against nearly 30,000,000 at the present time.

He said that in 1885 two Englishmen, Thomas and Gilchrist, discovered that it was possible to remove phosphorus from pig iron during the manufacture of steel by the use of lime in the heating furnace; that this discovery practically revolutionized the iron industry and that by the year 1890 steel had practically supplanted wrought iron for commercial purposes. He said that in the late eighties the introduction of electricity as a motive power so transformed the industry that all works

[1] United States of America and U. S. Steel Corp.—Argument.

had to be rebuilt if the manufacturer desired to keep abreast of the recent developments of the art; that a little later the Jones mixer, which enabled the production of steel to be carried on as one continuous operation from the ore to the finished product, never permitting the material to become cold until it reached the final marketable shape, again materially changed the situation. He said that these changes increased the economic unit of manufacture from a group of puddling furnaces, having a capacity of forty tons in twenty-four hours, to a steel works having a capacity of a thousand tons in the same time.

The gradual growth of the individual plants due to the technical improvements mentioned by Mr. Roberts, was followed by a period of lateral combination, culminating between 1898 and 1900 in a series of giant consolidations with capitalizations ranging from $30,000,000 to $100,000,000, each constituting a union of concerns manufacturing a like or related product. These may be divided into two groups, the primary group, consisting of concerns engaged in the production of iron ore, and the crude and semi-finished steel products, chief among which were, the Lake Superior Consolidated Iron Mines Company; the Carnegie Company; The Federal Steel Company and the National Steel Company. The second group contained the manufacturers of finished steel products. The majority of the tin plate plants were united in the American Tin Plate Company, incorporated in New Jersey in December, 1898, with a capitalization of $46,000,000. The American Steel and Wire Company, which was organized a month later with a capitalization of $90,000,000, secured all of the leading concerns producing wire nails and wire products. The other great consolidations of the secondary group were the National Tube Company, the American Steel Shop, the American Sheet Steel Company, and the American Bridge Company, each of which likewise was a combination of the leading concerns in its particular branch of the business.

The next step was taken when these huge concerns began to integrate, each endeavoring to attain independence by linking up under its control all of the successive stages of steel making from the mining of the ore to the marketing of its finished products. For great as these corporations were, they were by no means self-sufficient. Up to 1898 there had been little inte-

gration in the steel business with the exception of the Carnegie and Federal Companies. Andrew Carnegie, back in the eighties, had shrewdly foreseen its advantages, with the result that the Carnegie Company was highly integrated, so also was the Federal, but neither sufficiently to cope with the extraordinary situation that arose in 1900. The large steel making companies finally recognized the paramount importance of securing an adequate supply of raw materials, and by 1900 the bulk of the ore deposits and coking coal gravitated into the possession of less than a dozen concerns. These companies, though highly integrated on their raw material side, depended on the finished steel concerns to purchase their semi-finished products. On the other hand, the finishing concerns did not produce their own steel but purchased it from the crude steel making companies. The movement of integration was by no means destined to be a peaceful one. In their efforts to link up the chain of production the giants began to invade each other's territory. The finished steel products companies began to reach back and secure ore deposits and to erect crude steel plants. The crude steel concerns, thus deprived of a market for their steel by their former customers turning rivals, began preparation for the erecting of finishing plants. The situation in the spring of 1901 was exceedingly grave and a steel war on a colossal scale with all its ruinous competition and wasteful duplication of plant was imminent. Matters reached a crisis on the threat of the Carnegie Company to erect a huge tube plant on the shore of Lake Erie near Conneaut. With amazing swiftness war was averted and the integration movement reached its climax on April 1, 1901, by the organization of the United States Steel Corporation in which these warring yet interdependent concerns were combined in one enormous completely integrated corporation, with a capitalization of $1,402,846,817, possessing ore deposits estimated to contain about 700,000,000 tons of ore, 50,000 acres of high grade coal lands; limestone and natural gas companies; 1,000 miles of railway; steamship companies; blast furnaces and crude steel works with an annual capacity of 9,400,000 tons of crude steel, rolling mills and finishing mills of various descriptions.

## CAUSES OF LARGE-SCALE ORGANIZATION

The causes responsible for large-scale organizations in general are well illustrated in the events in the steel industry which culminated in the formation of the United States Steel Corporation. The most powerful driving force is desire to escape ruinous competition. Undoubtedly the desire to restrict competition was an active factor in the combination movement in the steel business. All through the nineties competition had been extremely keen and, as was stated at the hearings of the United States Steel Corporation, the nineties were strewn with the wrecks of concerns not able to weather the destructive competition which ran riot in that period. Various attempts were made through pools and agreements to modify this competition without much success, and it no doubt played an important part in the formations of the earlier consolidations. Previous to 1898 competition was between like concerns, lateral competition it might be termed. When, however, the bulk of the steel business had been concentrated into the hands of a dozen giant concerns, and these began to integrate, a vertical competition set in, as we have seen, of a very destructive type. Some idea of the virulence of this competition may be gained by a peep at some of Mr. Carnegie's letters written at this critical period. On December 30, 1898, he wrote his partners in part as follows:[1]

In the case of this Tin Plate Company, as in the case of the American Wire Company, if our president steps forward at the right time and informs those people that we do not propose to be injured, on the contrary that we expect to reap great gains from it that we will observe an "armed neutrality" as long as it is made to our interest to do so, but that we require this arrangement, then specify what is advantageous to us, very advantageous, and he will get it. If they decline to give us what we want then there must be no bluff. We must accept the situation and prove that if it is fight they want here we are "always ready." Here is a historic situation for the managers to study. Richelieu's advice: "First, All means to conciliate; failing that all means to crush." Shakespeare has it: "First in your right hand carry gentle

[1] United States of America and U. S. Steel Corp. Brief for United States, page 270.

peace; but after peace is gone the worst policy in the world is gentle war."

On July 7, 1900, Mr. Carnegie cabled as follows:

My recent letters predict present state of affairs; urge prompt action essential; crisis has arrived, only one policy open, start at once hoop, rod, wire and nail mills, no half way about last two. Extend coal and coke roads, announce these; also tubes, not until you furnish staple articles can you get business among them sufficient to keep mines and furnaces in full operation. Never been time when more prompt action essential, indeed absolutely necessary to maintain property. Have no fear of result victory certain.

On July 11 Andrew Carnegie wrote from Skibo in part as follows:[1]

Confirming my wire upon the situation, let me say that all is coming as expected. There is nothing surprising; a struggle is inevitable and it is a question of the survival of the fittest. For many years we have seen that the manufacturer must sell finished articles. One who attempts to stop half way will be crowded out. Briefly, if I were Czar, I would make no dividends upon common stock, save all surplus and spend it for a hoop and cotton tie mill, for wire mills, for tube mills, for lines of boats upon the lakes, etc.

Had this steel war continued and developed into a relentless struggle between these mammoth concerns, serious losses would have resulted. While no doubt a large part of the purpose which inspired the stoppage of hostilities and the getting together of these concerns, was to avert the financial losses which would result from the cut-throat competition in lower prices of the product, and also of steel stocks which were beginning to assume importance on the stock market, there would have followed tremendous losses from the standpoint of production, from over-duplication of properties. As the commissioner of corporations points out in his report in 1911 on the steel industry:

The active integration movement furthermore presented another very serious consideration. The extensions made by the crude steel-makers into the territory of those manufacturing more finished products and vice versa, meant not only increased competition but also a sudden

[1] United States of America and U. S. Steel Corp. Statement of case, page 59.

and great increase in the productive capacity for crude steel and steel products, an increase that might place production, for some time at least, far beyond the country's power of consumption.

Next to the desire to avoid the losses due to destructive competition, is the desire for the gains which come from the control of prices through combination. Under competition where no regulation of the supply is possible there will be fluctuation and falling of prices. This was the condition in the steel business in the nineties; prices fluctuated violently, in spite of the efforts of the steel men to regulate them by means of pools and agreements. The dissolution of the Rail Pool in the early part of 1897, owing to the quarrel between Carnegie and the Illinois Steel Company, brought the price of rails tumbling from $28 on a ton, the average for 1896, to $16.47 and even to $14. Following this the prices of all classes of steel went down below cost. Since the organization of the United States Steel Corporation prices have been much more stable in the steel business.

Another potent cause of combination is desire for the profits due to stock inflation that occur in the reorganization of combined companies. The large fortunes made by promoters and capitalists almost overnight, out of these combinations has no doubt been a pregnant cause of their coming into being. In the organization of the American Steel and Wire Company of Illinois in March, 1898, each $100 of the stock of the Consolidated Steel and Wire Company, one of the constituent concerns (and itself a consolidation of seven plants) received $175 of preferred stock and $175 of common stock of the new company, or $350 of new securities for every $100 of old. $11,600,000 of the common stock of the American Steel and Wire Company went to its promoters and underwriters. Similar profits were made on the organization of the other constituent companies of the Steel Corporation while in the case of the United States Steel Corporation itself, they were stupendous. Some idea is gained by the enormous profit made by the Underwriting Syndicate which in return for a cash expenditure of $28,000,000 plus its promotion services, received steel stock of an aggregate par value of $130,000,000.

These three causes,—restriction of competition, control of prices through combination and reorganization profits—are all causes influencing the formation of large compound corporations, and by the skeptical may be considered the only ones. There are, however, certain very real economies in production gained by large scale organization which we will treat in the following chapter.

## TEST QUESTIONS

1. What is the difference between a holding company and a merger?
2. What is meant by vertical combination? By horizontal combination?
3. Outline the events in the steel industry leading up to the formation of the United States Steel Corporation.
4. State the four chief causes of combination.
5. In what industries have the tendencies toward combination been most marked during the last ten years?
6. What industries will be likely to pass through these stages of combination in the next ten years?

## CHAPTER X

# THE ECONOMIES OF LARGE-SCALE ORGANIZATION

### GENERAL STATEMENT AS TO ECONOMIES

By a large number of people the economies of large-scale organization are regarded as mere pretexts invented by big business to camouflage its real motives, namely the largest possible profits. And there is without doubt basis for this opinion. There have been many cases of large combinations formed primarily for promotion profits and a monopolistic control of price, in the prospectuses of which the economies of combination have played the part of decoy ducks to lure the general investor, and to attract the attention of the public away from the real facts. A careful study of monopoly prices during the last twenty-seven years shows that the large profits gained in many cases are not fully accounted for by higher prices. In many instances the price has been increased but little, and in some cases not at all, as with steel up to the time of the war, and yet despite this fact, huge profits have been made, sufficient to pay dividends on millions of watered stock and put other millions (about 450, in the case of the United States Steel Corporation) out of earnings into improved plant and equipment. Now if these extravagant profits have been secured with, or without, but a small increase in price, they must have issued largely from the economies of combination. Largely increased profits with, we will say, a slight increase in price, strongly point to the existence of some bona fide advantages in large-scale organization. There seems scarcely a doubt but that costs have been lowered; the wonder is that prices have not been reduced in some measure also. A study of the nature of these organizations would lead us to the conclusion that in many respects they

possess advantages over small competing concerns and this conclusion is well reinforced by the experience of practical men connected with their operation. These advantages will, of course, apply differently in different industries, and their extent will vary according to the nature of the industry.

### PURCHASING

In the buying of materials and supplies the large concern usually has an advantage over the small by buying in larger quantities at a lower price. This is well illustrated in the retail field by such organizations as the large five and ten cent stores, the chain stores and the large mail order houses, which owe a good measure of their success to their superior purchasing abilities.

Not only is there a saving by buying in large quantities at a lower price, but by concentrating the buying in one department, under one head buyer, greater efficiency is obtained than when each concern had its own separate purchasing department. Mr. Pope, vice-president of the American Bicycle Company, in his affidavit to the Industrial Commission stated, that as a result of consolidation, "buying is concentrated in the hands of one officer and his assistants and this saves energy and expense; a smaller aggregate quantity of supplies was carried than before and thus interest, insurance, storage and shop charges had been reduced."

### EXPENSIVE AND HIGHLY SPECIALIZED MACHINERY

Many a small concern is handicapped owing to its inability to obtain or use the most efficient machinery in its line. This is not necessarily due to lack of capital, but oftentimes to insufficient output. Machinery and large-scale production have grown up side by side and the one is necessary to the other. Specialized machinery is only possible with quantity production. It would be an utter impossibility for an automobile plant turning out but a few cars yearly to develop the highly specialized machinery for which the Ford plant is particularly famous.

Perhaps the most striking example of an industry whose marvelous growth has sprung from the development of huge and

highly specialized machines, is the steel industry. But this growth would have been impossible without the development also of huge organizations capable of purchasing and utilizing this machinery.

## MORE EFFICIENT USE OF PLANT AND EQUIPMENT

A common occurrence, following the consolidation of a number of competing plants into one centralized organization, has been the closing down of the weaker, and the concentration of production in the more efficient. In the case of the whisky trust, to cite a rather trite example, out of the 81 plants acquired all were shut down but 10 or 12. In the period of competition preceding this consolidation more plants had sprung up than were necessary to fill the demand. By concentrating production in the most efficient plants and running those on full time, costs were cut way down. John W. Gates when asked why, after the organization of the American Steel and Wire Company, they had closed some of the plants said, "We have closed all of the plants that could not operate economically and increased those that could." When questioned as to the defects of the closed plants he stated that "Sometimes it was one of location and sometimes it was badly constructed machinery and sometimes it was a combination of both." Mr. Havemeyer also stated in evidence before the Industrial Commission:

> that the greatest advantage of the sugar combination is in working the refinery full and uninterruptedly. By buying up all the refineries, burning them up and concentrating the melting in four refineries and working them full, you work at a minimum cost.

It should be noted here that the ability of the combination to make this saving is due to the condition of over-production and duplication of plants which has arisen under the preceding period of competition and that this saving is effected in two ways: first, by utilizing the most efficient plants; second, by running those plants at full capacity.

## PLANT SPECIALIZATION

A further advantage arising out of a centralized control of plants lies in the ability of the management to extend the prin-

ciple of specialization to individual plants. Instead of each plant manufacturing several different sizes or varieties of products, by limiting it to one or two standard articles for which it is especially adapted, the costs of production may be materially cut. As that practical steel man, Charles Schwab, once said:

> You can get a greater output and a cheaper output from a mill by running that mill continually on one product. If we have two mills each of which is run on a specific product, one can be run on one, and the other on the other product, and thus get out a greater tonnage and do it at a much less cost.

## STANDARDIZING THE BEST METHODS OF MANUFACTURE

One undoubted superiority of the combination over disconnected competing plants, lies in the opportunity it affords for the exchange of information and the selection of the best processes of procedure followed by any of the plants and their adoption in all. Judge Gary in testifying to the economies achieved by the organization of the Federal Steel Company, said some years ago:

> I do not care what plant one goes into there are beneficial features in that plant that are not in other plants. In talking with any expert, information is received that will be beneficial if given to an official perhaps very remotely located, and of course the effort is to utilize to the best advantage everything that is a benefit in any particular plant.

In the last few years tremendous savings have been made by the United States Steel Corporation through its whole hearted adoption of this policy. Mr. Lapham, vice-president of the United States Leather Company, also testifies to the advantages of this principle in the leather combine by stating that, "the chief saving effected by the consolidation has been the introduction of the best methods in all of the tanneries." This exchange of ideas, practices, and knowledge made possible by coöperation and combination is of incalculable benefit to any industry. To a limited extent it is possible under coöperative competition, but its benefits are more fully realized when production is controlled by one centralized organization.

## INTEGRATION

Still further economies are gained when the combination is not merely lateral but vertical, linking up under a unified control the consecutive stages in the production of one commodity.

In the first place there is a nicer adjustment of demand and supply between these various stages of production. The producers of the raw material depend for their demand on the manufacturers who in turn rely on the raw material men for their supply. It often occurs when these stages are carried on by separate interests, that the manufacturers are unable to secure a sufficient supply of the proper quality at the time they need it, and as often those in the raw material end find themselves with an over-supply on hand. If then these interdependent concerns operating at different stages along the channel of production are directed by a central intelligence equipped with accurate information of the requirements of each, much of the loss through delays will be prevented and the stream of production will flow more evenly along its course.

Not only does integration make possible a better regulation of inter-productional demand and supply, but secures great economies in manufacturing by permitting a correlation of processes, which if carried on separately, would result in waste. In the steel industry this is particularly evident. Should the blast furnaces be run independently of the bessemers and open-hearths, and these in turn be run separately from the rolling mills, inconceivable wastes would follow. The contrast presented by the picture of Mr. Roberts of the disjointed methods of steel making in the seventies, with the smooth running continuity of production in a modern steel plant, makes clear to the veriest layman the tremendous savings secured through placing under a central control all of the processes of steel making.

## DIVISION OF LABOR

Large-scale organization, whether in the form of a single large plant or a combination of plants, permits a greater degree of division of labor. We have already discussed the advantages of this principle and its dependence on large-scale production. It

will suffice to call attention to one aspect of labor specialization, that has been brought to the front during recent years by our large industrial combinations, namely, the advantages derived by its application to the higher orders of ability. This is brought out in a very practical way by a statement of Mr. Schwab in reference to the advantages of the United States Steel Corporation.

> The steel making industry is, says Mr. Schwab, peculiar in this, that no matter how small the operations are there are certain skilled men in each line necessary. If a firm has two furnaces or fifty-two, they can't do without one skilled man in each of their lines, as a skilled melter, skilled superintendent, skilled chemist, skilled draftsman and so on down the line. Now we can consolidate all these industries, we can have one selling man for example, one chief chemist, one chief engineer, that will answer all purposes, for all these works, by adopting the same methods at each of their works.

In short, large-scale organization permits a more profitable employment of high priced and highly specialized men, precisely as it does in the case of machinery.

## COMPARATIVE COST ACCOUNTING

It is often urged against the large combination that it loses the stimulus that comes from competition; that it lacks the incentive to cut costs or improve processes. But judging by the experience of some of the large combinations this does not seem to be an inherent lack of large-scale organization. In fact it has been found possible in some cases by standardizing systems of accounting to inject an even keener kind of competition into the operating plants and reduce costs below their level under previous competition. The old Carnegie Company was the pioneer in this practice; and the Steel Corporation through its monthly comparative cost statements prepared by its statistical bureaus, copies of which are sent to the operating heads of each company, has been eminently successful in increasing output and cutting costs. To cite one instance from the experience of this corporation; as a result of sending to each blast furnace manager once a month the costs of each of the various blast furnaces, putting the most economical at the top and the least

at the bottom, with the name of the manager and the conditions, they obtained a saving in the first year of approximately $4,000,000 in that department alone. Not only has it been found possible by means of comparative costs to fan the flame of competition and pit department against department and plant against plant, but also to locate the causes of inefficiency of the high-cost plants and raise them to the level of the more efficient. By this means large-scale organization retains the benefits of competition and in addition secures the advantage of constructive coöperation.

## SALES EFFICIENCY

It is often said that production within the plant has been pretty well systematized but that the place for improvement is in getting the product from the plant to the consumer; here is where the waste lies. There seems little room for doubt but that the cost of selling many commodities is outrageously high and that if the price of commodities is to be lowered to the consumer the point of attack should be the distributing end of production. Here, again, large-scale organization seems to offer some help.

A common occurrence following the formation of combines has been the disposal of many of the salesmen. The Whisky Trust were able to get along with 300 less; the American Steel and Wire Company dispensed with 200, and so on. Here the salesman, instead of the mechanic, is a victim of a labor-saving device, not this time an invention of iron or steel, but an improvement in the machinery of organization. Where before five concerns each sent a man over the same territory, now one is able to handle the business at almost a fifth of the expense. There is, of course, a limit to the number of salesmen it is wise to dispose of. But the chief saving is not by any means in the reduction of salesmen; when a number of competing companies, each of which previously maintained a separate sales office and organization, unite and form one centralized sales office under the direction of a picked sales manager, the cost in officers' salaries, rents, clerical hire and so on, is much reduced, and the selling activities better directed and coördinated

with production. There are cases where it is not wise to dispose of local officers but even so considerable coöperation is feasible, and overlapping of territory avoided.

The large combination also possesses advantages in selling in foreign markets. The Standard Oil Company of New Jersey, The International Harvester Company, The Steel Corporation and others have succeeded in securing a worldwide distribution of products such as would have been beyond the power of small concerns. The Webb bill permitting combinations of competitors in foreign trade is a recognition of this fact.

In the matter of advertising, the combination seems to possess some advantage. When a number of competing concerns are united, the waste due to competitive advertising can be eliminated. The number of brands may be reduced by standardization. Instead of each concern carrying on its own advertising, the whole of it may be concentrated under one control and a better distribution of the advertising obtained at a lower unit cost. Some saving no doubt is obtained by advertising a number of related products under one brand, as the Armour people with their oval label and the Dupont Company, the National Biscuit Company and numerous others, each of which has a whole family of products advertised under the family name.

## DELIVERY

Most of the big combinations claim considerable savings in the cost of delivery of their finished products by the elimination of cross freights. The orders received by the combination are distributed to the most conveniently located plants; so that the consumer in the Chicago district receives his goods from the Chicago plant while the orders from the East are filled from the Philadelphia plant, thus making a considerable saving in freight charges over what would be necessary were the plants under separate management. Not only is the large national organization, by its geographical distribution of plants able to deliver more directly to the consumer, but the same savings are open to local industries. In the retail field there is a great opportunity for the reduction of delivery costs. Six laundry or grocery wagons go up one street where perhaps two could do the work.

It would, of course, be a gigantic task to eliminate the waste efforts of competitive deliveries of grocers, bakers, etc., in any big city, but a large retail combination should be able to deliver at a lower cost than if each of the stores maintained its own delivery system.

## BY-PRODUCTS AND RESEARCH

One of the most interesting features of industrial progress of recent years has been the remarkable manner in which industry with the magic wand of science has changed its wastes into useful products. Slag heaps have been transformed into concrete bridges and buildings; out of the offal of the slaughter house have come all sorts of things from violin strings to rare medicines; even the smoke from the furnace has been arrested in mid-air and made to yield dyes, perfumes and powerful explosives. Millions have been saved which were before lost. The United States Steel Corporation is saving between 1,700,000 and 1,800,000 tons of coal a year by the use of blast furnace gases and gas from coke ovens, and is manufacturing annually from blast furnaces slag previously wasted, over ten and a half million tons of cement. It should be borne in mind that this by-product development is itself a by-product of large-scale production. The large plant makes possible a utilization of materials that in a small concern would be wasted.

Closely related with by-product saving is the experimental and research work carried on by the big organizations. The object is to improve the product or service to the consumer, to find new uses for the commodity, or more economical methods of manufacture. These research departments are often conducted along broad lines and are by no means entirely commercialized. Scientists of various descriptions, chemists, physicists, engineers, are employed and allowed to "carry on" pretty much as they please, indulging in many cases in almost pure scientific research. Experimental research of this nature is beyond the reach of the small concern and seems further to discount the argument that big business lacks the spur to progress furnished by competition. A trip through the laboratories of some of the large organizations, such as the Eastman Kodak Company,

the Edison Company, the General Electric Company, The Curtis Publishing Company, The American Telephone and Telegraph Company and numerous others, and especially a chat with their occupants, would be an enlightenment to those who believe that large-scale organization by its very nature puts a damper on the fires of progress.

## ECONOMY IN MANAGEMENT

Finally, in the field of management itself the combination possesses advantages. Under competition each concern had its own president and officers; after combination it has been found feasible to reduce the number of these expensive executives and yet run the concerns efficiently. The American Steel and Wire Company at its organization dispensed with fifty per cent of the high-priced executives of the constituent plants by putting the operating end of the business in charge of officers in New York and Chicago. There is, of course, a limit to this economy as to all others, but as a general principle, a more effective employment of managerial ability and a saving in the cost of management results from a centralization of organization.

## CONCLUSION

The above list by no means exhausts the economies of large-scale organization, but presents a brief discussion of the major ones. It should be noted that these include not merely the advantages due to quantity production or size of plant, such as are sometimes referred to under the term "large-scale production," but take in those economies which proceed from the modern development in the field or organization we have termed "large-scale organization." The advantage of the big combination or the large compound corporation over a number of separate competing concerns, lies in the fact that it furnishes a form of organization permitting a fuller expression of the principles of organization. It secures a greater degree of centralization of control, of specialization, of unity of purpose.

During the last few years large-scale organization has been rightly scrutinized and criticized. The radical element in the nation, however, has at times jumped to the conclusion that be-

cause some combinations have been guilty of malpractices, all are bad and should be destroyed; and much legislation has acted on this principle. An impartial analysis of their advantages simply as producers is, therefore, not out of place. If many of the commodities consumed by the public can be produced through these organizations more cheaply than ever before, if they increase the production capacity of the nation and render it more efficient in international competition, to destroy them would be short-sighted, especially if some effective regulation of them in the public interest can be secured.

## TEST QUESTIONS

1. Name twelve economies of large-scale organization.
2. What is the distinction between "large-scale production" and "large-scale organization"?
3. What advantages has a combination over a number of separate competing companies in the matter of sales efficiency?
4. How has large-scale organization encouraged the utilization of by-products?
5. How can competition be secured within a large combination?
6. Do facts justify the statement that "trusts" tend to arrest the improvement of the products they control?

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# PART III

# EXCHANGE, VALUES AND PRICES

## CHAPTER XI

# ORIGIN AND NATURE OF VALUE

### DIVISION OF LABOR RESULTS IN EXCHANGE, AND OUT OF EXCHANGE SPRINGS VALUE

In any system of industry based on private enterprise exchange is the necessary sequence of division of labor. It is evident that if each individual is to devote himself to the production of one commodity there must follow an exchange of products. In a primitive community devoid of division of labor and exchange, there was no separation of individuals into producers or consumers. Immediately two individuals exchange their products the producer and the consumer appear as separate individuals, each party to the exchange is producer to the other, and each is consumer to the other. As each naturally wishes to make a favorable exchange, a division of interests occurs; the question comes up of the amount of one's product which one will exchange for a certain quantity of the other's, and thus the problem of value appears.

### EXCHANGE, VALUE AND DISTRIBUTION

In a primitive society where each individual was self-sufficient, producing only that which he consumed and consuming only that which he produced, there would be no labor troubles or industrial unrest. No one could feel he was not receiving a square deal or that he was not getting as much as he was worth; each would be receiving exactly what he produced; the amount he consumed would depend directly on the amount he produced. Just as soon as exchange arises the producer ceases to produce directly what he consumes. The amount of commodities he enjoys as a consumer is determined by the amount of the products of others his own product will command in exchange, on the exchange value of his product.

If instead of bartering his product directly for the products of others, he sells them in the market, and with the money received buys consumption goods, the case remains the same except that he has exchanged his product for that of others through the medium of money. The amount of goods he will obtain as a consumer will depend on two exchanges, first on the sum of money he receives in exchange for his product, and second on the amount of commodities his money will exchange for on the market.

With the development of division of labor and the extension of the market with all its intricate machinery for facilitating exchange, most products pass through the hands of several producers before reaching the consumer. If it be a production good as iron or steel it may never reach any so-called ultimate consumer, but will aid in the production of some consumption good or service. Even if it be a consumption good, such as shoes in the hands of a manufacturer, it will usually circulate through the wholesaler and retailer before it finds the consumer. This process of exchange is further complicated by the fact that one individual does not produce a whole product, but several coöperate through some form of business organization. Out of the money price for which the product is sold on the market, each receives a share in exchange for the part he has played in its production. The owners of land receive theirs in the form of rent, the owners of capital in interest, the workers in wages, and the owners of the organization in profits. These money shares they exchange in the market for commodities produced by others in a similar manner. In this case, instead of each exchanging his products he exchanges his services, and the amount of goods he will have at his disposal as a consumer will depend on the exchange value of the services he renders in production.

In our present economic system we do not produce directly the commodities we consume, but secure them through a roundabout process of exchange in return for the part we play in production. In reality the world is a market, and we are the buyers and sellers. We enter it first as sellers of our products or services and later as buyers of the things that make life worth while. The amount of money which we as buyers have to spend depends

on the amount we as sellers have been able to obtain for our services or products. It is in the factory under the laws that govern efficiency that commodities are produced. But it is in the market under the laws that govern value, that they are distributed. From the time we leave school till we totter toward the grave the great majority of us are selling either service or products. On the value of these depends our share of the things that make life worth living. As buyers and as sellers we are equally interested in the forces that determine the values of things. No subject so closely affects our well-being.

## THE DIFFERENCE BETWEEN UTILITY AND VALUE

In our discussion of production we were concerned with utility; the moment we introduce the subject of exchange we begin to speak of value. The problem of production is the creation of utilities in economic goods; that of exchange, we say, is the determination of the value of those goods. First, let us distinguish clearly the difference between the terms "utility" and "value" as they are used in economics. Utility we have defined as the power a commodity possesses of satisfying a want. In general parlance, the word value is often used to express what in economics is termed utility. The economist says fresh air under ordinary conditions has no value. The man in the street answers back that of course air has a value, and the argument waxes hot. Now, as James would say, "You are both right and both wrong; it all depends on what you practically mean by the term value." If by value is meant want-satisfying power, fresh air certainly has value; if by value is meant the power to command other things in exchange, then fresh air under ordinary conditions has no value, for who in his right senses would pay anything for a cubic foot of air? In economics the term value is used to express the power which a good has to command other goods in exchange for itself.

Utility and value, then, are two different powers. It is a familiar fact that many things, as water in the lakes, sunshine and fine scenery, satisfy wants, yet have no power to command anything in return. They are free goods, possessing utility but no value. The various commodities and services which are the

objects of business transactions not only satisfy wants but possess the power of exacting a payment for this satisfaction. In addition to mere utility they possess value, the power of commanding other things in exchange for themselves.

## UTILITY AN ELEMENT OF VALUE

Though utility and value are different they are intimately related. Free goods possess utility, but not value; all goods, however, having value possess utility. It is evident no one will give anything for something he does not want. Utility, then, is of necessity an ever-present element of value. Is there any other universal element in value? As both free and economic goods have utility, to what do economic goods owe their value?

## HOW VALUE ORIGINATES

For the sake of illustration, let us suppose some outdoor loving American, lured perhaps by aggressive Canadian advertising, is spending his vacation canoeing on one of Ontario's wild and beautiful lakes. Since it is a hot summer day, he is thirsty, and so dips his cup in the lake or better still, in camping vernacular, "shoots the bottle"; that is, he lowers a stoppered bottle weighted with a stone to the bottom of the lake, jerks out the stopper and draws up a bottle of cool water to quench his thirst. Let us suppose, again, a traveler on the Sahara Desert with only a meager supply of water left in his canteen, which he has been hoarding with jealous care, arrives at an oasis owned by an Arab sheik and bargains for a supply of fresh water. In both cases the commodity quenches thirst and has utility; in the second case it possesses also value. What is the cause of the value of the water in the second case? The illustrations suggest the answer: scarcity. Though scarcity is often obscured by other causes more apparent, it is a fundamental cause of values everywhere, and it is worth our while to see just how it gives rise to value.

Let us notice why water under the conditions of supply given in the first case has no value. No matter how thirsty is our canoeist, there is more water in the lake than he can drink. So that if a cupful is taken away no want will go unsatisfied owing to its removal. Nor if a cup is added to his supply will any

want be satisfied which otherwise would have remained unsatisfied. None of his wants depend on any unit of the supply for their satisfaction, and no unit is essential to the satisfaction of any of his wants. Therefore, if a cup is added he gains nothing and if a cup is taken he loses nothing. As long as he has more water than he wants a cup more or less is a matter of complete indifference to him. And although if he is thirsty he will drink it with as much gusto as the finest champagne, he would pay not a cent for it.

On the Sahara the conditions are reversed, the traveler instead of having more than he wants, wants more than he has. If he should spill a cup on the desert sand a want will remain which otherwise would have been satisfied. A cup added to his supply means a want filled which without it would have to go unsatisfied. A want now depends on each unit of his supply and each cupful possesses an importance as the means to the satisfaction of some want. If a cup is taken away he loses a satisfaction, if one is added he gains. Water thus becomes an object of economy; rather than suffer thirst he will be willing to pay for a cup of it.

## UTILITY AND SCARCITY

Hence it follows that whenever the supply of a good is in excess of wants for it, units of that good will have no value and the good becomes free. Just as soon as the supply of a good is less than the wants for it, units of that good become objects of economy and possess value. Economic goods are thus defined as those goods the supply of which is less than the demand for them. Value then is born of a union of utility and scarcity. Neither one of these alone gives rise to value, for however useful a commodity is, its supply must be limited to have value; and however scarce a commodity is, it must be wanted to possess value. In all values everywhere these two elements are always present. They are the two universal causes of the values of economic goods.

## THE RELATION OF LABOR TO VALUE

While the exchange value of economic goods springs from a union of utility and scarcity, there are many other subordinate causes that help to determine values, all of which operate

through these two fundamental ones, and sometimes obscure them. One of the most important of these is labor. So important is it, that it has been regarded by some as the sole element and determinant of value. This view has resulted in the famous labor theory of value, espoused by no lesser lights than Adam Smith, Ricardo, and especially by Karl Marx. Ricardo regarded labor "as being the foundation of all value and the relative quantity of labor as almost exclusively determining the relative value of commodities." Karl Marx states that "the value of a commodity is determined by the quantity of labor expended during its production." While we are yet not quite prepared to discuss what does determine the relative amounts of exchange values of commodities, we will stop to notice that labor cannot be the sole determinant.

Though the values of things in general may correspond roughly to the quantity of labor expended on them, such is by no means always or necessarily the case. In the first place, once a commodity is made the amount of labor is fixed, but not so its price. A residence built in a neighborhood that for some reason becomes undesirable may in a few years sell for half its original value. A painting that during the lifetime of the artist fetched but a few dollars may after his death be worth hundreds. Even his autograph, dashed off by a few strokes of his pen, may then sell for more than his painting did while he was alive. Of a stock of straw hats, those that sell in June for $2.50 have had the same labor expended on them as those that are reduced to $1.25 in August. A change of fashion may leave a garment which cost much in labor almost valueless. On the other hand, many things have great value even though untouched by the hand of man. Coal in the seam, iron, copper, gold, possess value just as they lie in the earth.

That labor is an important factor in determining values no one for one moment doubts. Where the labor theory championed by Marx errs is in setting up labor as the sole source and determinant of values. Commodities do not possess value because labor has been spent on them but because they satisfy wants, and their supply is limited in relation to those wants. It is true that most commodities owe their want satisfying power

largely to labor which plays an important part in creating the utilities in economic goods and utility is one of the causes of value. Labor thus indirectly influences value through utility. Most commodities owe also their scarcity largely to the fact that labor must be spent on them and scarcity is the other cause of value. Labor then might be termed a secondary or indirect cause of value by virtue of its being a tributary cause of both utility and scarcity to whose union value owes its origin.

## VALUE AND PRICE

We defined value as the power which a commodity possesses of commanding other things in exchange for itself. It is measured by the amounts of other commodities one product is able to command in exchange. Under a system of barter where things were exchanged directly for each other their values would be expressed and measured in amounts of each other. The value of a bushel of wheat would be measured by the amount of corn, cloth, leather or hats it would exchange for. To express the value of a number of articles in terms of every other would be a most awkward method of measuring and comparing values. With only one hundred products to exchange there would be required no less than 4,950 separate valuations. Very early in most countries, owing to the awkwardness of barter, some one commodity came to be used as a medium of exchange and it became customary to express the values of all others, in terms of this one commodity, known as money.

By expressing the values of all commodities in terms of money, it is possible to compare the values of a multitude of the most diverse things, such as a doctor's skill, a lawyer's advice, a suit of clothes, a shave, or a victrola. Money acts as a common denominator of values, a means of ascertaining at once the relative value of any one of a number of entirely different things and in so doing tremendously facilitates the exchange of commodities. It has thus become a standard of value by which the values of all things are judged. The value of a bushel of wheat or a day's labor is no longer measured directly by the amount of other commodities it might command in exchange, but by the sum of money it will bring in the market, which is termed

its price. And the price of a commodity or service has come to be universally regarded as the measure of its exchange value.

The fact that commodities are no longer exchanged directly for one another but indirectly through the medium of money, tends to make us forget that the ultimate object of every sale of a product or service is not the money it brings, but the commodities for which that money will eventually be exchanged. A sale is but one-half of an exchange and the amount of commodities which are finally obtained depends not only on the price received from the sale but also on the prices paid for the purchased goods. The money value of a clerk's services for a month may be $100, but their real value is measured by the amount of commodities he is able to purchase with his salary. The clerk does not work for money itself but for a home and the other things it will buy. And though it is generally true that the amount of money the clerk receives is a measure of the amount of goods he will be able to command, it is well to recognize that the price of a commodity or service is not its real value but a measure of its value and a measure which though generally correct is not always so. Just as the compass at different places does not accurately indicate true north, but a little east or west of it, so the money price of a commodity at different times may not accurately indicate its true value but may require a correction.

At any one time the price of a product or service is an accurate measure of the amounts of other commodities it commands in exchange. But prices change and a change in price of one commodity does not always mean a corresponding change in its value. Suppose that at one date wheat is $1 a bushel, corn 75 cents a bushel, hats of a certain grade $2, shoes $4 a pair. If at the end of a certain period the prices of all these articles have doubled, their relative values remain the same. The price of hats has doubled but so have the prices of other commodities, so that the value of hats in terms of wheat or corn is still the same. Though the farmer can sell his wheat at $2 instead of $1, he must pay double for his hats and shoes; he must still raise four bushels of wheat to purchase one pair of shoes. If the prices of all should fall to one-half their original amounts so that wheat sold

for 50 cents and shoes at $2 a pair, their real values in terms of each other would still remain unchanged and the farmer's four bushels of wheat would be worth a pair of shoes as before.

A change in the prices of all commodities means a change in the value of money. A general rise in prices means a corresponding fall in the value of money. If prices double and wheat which was sold at $1 a bushel now sells at $2 a bushel; corn which before was 75 cents now sells at $1.50 a bushel; and $2 hats sell for $4, it is evident that a dollar will purchase now only half of these commodities that it would formerly, which is the same as saying that the value of a dollar has been cut in half. If there should be a general fall of prices to one half their original amount so that wheat sells for 50 cents instead of $1 a bushel, and other commodities likewise, then a dollar will purchase two bushels of wheat where before it was worth only one; its purchasing power will be doubled which means that the value of money will be doubled. Thus prices and the value of money are usually said to vary inversely, whenever prices go up the value of money goes down and vice versa. A like change in the prices of all commodities means a change in the value of money but leaves the value of any particular commodity unchanged. A rise or fall in the price of a commodity does not necessarily indicate a change in its true value, that is its value in relation to other commodities.

On the other hand, the fact that the price of a commodity or service remains the same over a period of time does not necessarily indicate that its value is the same. For if in the meantime the prices of other commodities have risen its value in relation to those commodities will have fallen. Suppose that at the entrance of the United States into the world war the salary of a clerk was $100 a month and that the prices of commodities have in the interim jumped 100 per cent. His $100 now purchases but half of the food, clothing and shelter it did before. The money value of his services may remain the same but their true value in amounts of those things that maintain existence, is cut in half. He may be granted a $50 raise and imagine he is forging ahead, when in reality he is still a quarter of a lap behind his old position. If, however, instead of rising, the prices

of commodities should fall, and the wages of our clerk lag behind, his $100 would increase in value.

The general level of prices or the value of money changes but slowly, but the individual prices of most commodities change quickly and constantly and a change in one means a change in its relation to others; so that as a general rule a rise or fall in the price of a single commodity registers a rise or fall in its value and for most practical purposes price is the measure of value.

Having surveyed the origin and nature of value and noticed the relation of price to value, we are ready to see how prices are determined and what forces actuate their rise and fall.

## TEST QUESTIONS

1. How does a division of interests spring up in a system of exchange?
2. Show the distinction between utility and value and the relation between utility and value.
3. How does scarcity affect value?
4. What is the relation of labor to value?
5. Explain why at two different periods a change in the price of an article may not mean a change in its value.
6. What is meant by the statement that the value of money and prices vary inversely?

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## CHAPTER XII

# THE LAW OF DEMAND AND SUPPLY

### STATEMENT OF THE LAW

Ask the average business man what determines prices and he will promptly answer "demand and supply." He expresses a truth hammered out of experience. It is a matter of universal observation that an increase or decrease in the supply of a commodity tends to lower or raise its price, and similarly that any increase or decrease in the demand for a commodity tends to raise or lower its price. The market price of a commodity sold under competition is thus said to be governed by the law of demand and supply, which means that its price is determined by the relationship existing between the demand for it and the supply of it.

### THE MEANING OF DEMAND

In order to see just how this famous law operates in determining prices, we must first obtain a clear understanding of the terms, "demand" and "supply," which are not quite as simple as they seem. In fact considerable confusion has resulted through neglecting to define the exact meaning of both demand and supply as they are used in reference to the above law. Demand, for instance, does not mean plain desire nor the mere amount of a commodity that will be purchased irrespective of the price. There is no one such amount but several varying with the prices asked. At a low price a comparatively large quantity will be bought; a higher price will induce a lesser quantity and so on. Therefore at any one time on a particular market, the demand for a commodity will consist of a number of different amounts which buyers will purchase at different prices. The amount that will be bought will always depend on the price asked. To speak of the demand for a commodity in the sense

of the mere amount that will be purchased, without reference to any price is meaningless. It is impossible to estimate the amount that will be bought without knowing the price that is to be asked. Demand is a relationship between quantity and price. The demand for any commodity is expressed by stating the amount that will be purchased at a certain price, or the amounts that will be purchased at stated prices.

## DEMAND SCHEDULES

On a local produce market at any given time it would be possible for a produce man well acquainted with the market to figure out approximately the amounts buyers would purchase at different prices. Such schedules are sometimes made up on the grain exchanges. A table of the amounts buyers will purchase is called a demand schedule and is in reality an estimate of the demand for a commodity on a particular market at a given time. For the sake of illustration, let us suppose that on a particular produce market on a certain date buyers of apples will purchase the following amounts at the stated prices:

At a price of $1.00—900 barrels will be bought.
At a price of 1.25—800 barrels will be bought.
At a price of 1.50—700 barrels will be bought.
At a price of 1.75—500 barrels will be bought.
At a price of 2.00—300 barrels will be bought.
At a price of 2.25—100 barrels will be bought.

## AN INCREASE OF DEMAND

Now let us assume that the following season the demand for apples on this particular market has increased; apples perhaps have been extensively advertised, business conditions have been good, so that buyers will now purchase the following amounts:

At a price of $1.00—1000 barrels will be bought.
At a price of 1.25— 900 barrels will be bought.
At a price of 1.50— 800 barrels will be bought.
At a price of 1.75— 700 barrels will be bought.
At a price of 2.00— 600 barrels will be bought.
At a price of 2.25— 500 barrels will be bought.

This second schedule illustrates what is meant by *an increase in*

*demand.* Larger amounts will be bought at the same prices than before. At a price of $1.75 buyers will now purchase 700, instead of 500 barrels.

## THE LAW OF DEMAND

At any one time, without any change taking place in the conditions of demand, a larger amount will be bought at a lower price. As the first schedule indicates at a price of $1.75, 500 barrels will be bought, while at $1.50 buyers will take 700 barrels. The terms expansion and contraction describe better the increase or decrease in the amounts that will be purchased at lower or higher prices, under the same condition of demand. The fact that a larger amount will be purchased at a lower price does not signify an increase of demand in the true sense of the term; it simply illustrates a universal law, the law of demand which states that the amount of any commodity buyers will purchase varies inversely with the price. The higher the price the smaller the amount that will be purchased, the lower the price the larger the amount.

## ELASTICITY OF DEMAND

If these amounts vary greatly with price changes, the demand is said to be elastic; if they vary but little it is said to be inelastic. A commodity is said to have an elastic demand when a small change in its price results in a great change in the quantity that buyers will purchase. The amount of such a commodity that will be bought will expand readily in response to a fall in price, and contract readily in response to a rise in prices. Most luxuries or near-luxuries or articles which have available substitutes possess an elastic demand. If prices for such articles go up people restrict their purchases; if they go down they buy more and others buy who before could not afford them. On the other hand, if the amount of a commodity that will be bought is not much affected by price changes, the demand for it is said to be inelastic. Most necessities are of this type: Salt, matches and bread, for instance; also production goods such as machinery and tools. A rise or fall in the price of these will not greatly affect the amount consumed; demand for them is therefore said to be inelastic.

## SUPPLY SCHEDULES

In a similar manner the amounts which sellers are willing to offer for sale will vary with the prices that can be obtained. A schedule of the amounts of a commodity that will be offered for sale on a particular market at a given time is called a supply schedule. Such a schedule is an estimate of the conditions of supply for a commodity and illustrates what is meant by the term supply. We will suppose that on the same produce market, at the same time, covered by the first demand schedule, sellers are willing to offer the following amounts at the prices stated below:

At a price of $1.00—200 barrels will be offered.
At a price of 1.25—300 barrels will be offered.
At a price of 1.50—400 barrels will be offered.
At a price of 1.75—500 barrels will be offered.
At a price of 2.00—600 barrels will be offered.
At a price of 2.25—700 barrels will be offered.

## AN INCREASE IN SUPPLY

We will assume that in the following season apples are more plentiful, owing to an abundant crop or to a decrease in the production costs or transportation charges, so that on the same market sellers are willing to dispose of the following amounts:

At a price of $1.00— 400 will be offered.
At a price of 1.25— 600 will be offered.
At a price of 1.50— 800 will be offered.
At a price of 1.75—1000 will be offered.
At a price of 2.00—1200 will be offered.
At a price of 2.25—1400 will be offered.

This second schedule illustrates an increase of supply. The conditions of supply have changed so that now larger amounts are offered at the same prices.

## THE OPERATION OF DEMAND AND SUPPLY IN COMPETITIVE MARKET ILLUSTRATED

The next question is: *How* are prices determined by demand and supply in competitive buying and selling? In order to illustrate their mode of operation, we will take the two schedules

of apples, which represent the conditions of demand and supply for apples on a produce market at a given time:

| *Demand* | *Supply* |
|---|---|
| At a price of $1.00—900 bought. | Price of $1.00—200 offered. |
| At a price of 1.25—800 bought. | Price of 1.25—300 offered. |
| At a price of 1.50—700 bought. | Price of 1.50—400 offered. |
| At a price of 1.75—500 bought. | Price of 1.75—500 offered. |
| At a price of 2.00—300 bought. | Price of 2.00—600 offered. |
| At a price of 2.25—100 bought. | Price of 2.25—700 offered. |

Under the conditions of demand and supply given above, would $1.00 be likely to become the market price for apples? At that price, as the schedule shows, buyers are anxious to secure 900 barrels, but sellers are only willing to offer 200 for sale. The shortage would soon become apparent and there would be a rush of buyers, many of whom, rather than be disappointed, would offer higher prices, with the result that competitive bidding would force the price up. At a price of $1.50 the schedule indicates that there will still be a scarcity of apples for sale, in proportion to the demand for them, and sellers will not hesitate to take advantage of the competition among buyers and will boost the price. Should it rise to $2.00, sellers who up to this time have been holding back will put their supplies on the market until, as the schedule indicates, there will be 600 barrels offered for sale. The heightened price will also cause buyers to reduce their purchases and many of the poorer ones to drop out, so that the demand shrinks to 300 barrels. If the price were to be maintained at $2.00, only half of the supply would be disposed of. Competition among sellers, who do not wish to be left with a supply on their hands, will lower the price. At $1.75 a barrel, the schedules indicate sellers are willing to sell and buyers to purchase the same amounts, namely, 500 barrels. This price would "clear the market" and satisfy all concerned. And this is the price that demand and supply with the aid of competition tend to establish. This is the natural market price, the natural price in that it is the price which demand and supply, when perfectly free from combination and monopoly, tend to establish by competition. It is at bottom a psychological operation brought about by competing buyers and sellers, each seeking his own gain in a perfectly natural manner.

## THE EQUILIBRIUM PRICE AND THE EQUATION OF DEMAND AND SUPPLY

The price that demand and supply tend to establish is sometimes called the equilibrium price; a good name in that it suggests the real nature of this whole process of price determination, which is in reality a balancing of two opposite forces. The price which is finally fixed or to which all other prices are constantly tending is said to be the equilibrium price, on account of its being that one price which under the given conditions equalize demand and supply. In the two schedules above, $1.75 is the one price which equalizes the amounts which sellers wish to sell and buyers to buy. The fact that competitive prices are ever tending toward that one price which equalizes demand and supply has led economists to state that prices are determined by the equation of demand and supply. It is as if two blind forces were forever groping for the price that will establish their equilibrium and set them at rest.

## DEMAND AND SUPPLY CHARTED

The interaction of demand and supply is often illustrated by a diagram on which the schedules are represented by curves. In Fig. 2 distances along the line OX measure amounts of commodities; in this case the unit amount is 100 barrels of apples, and distances up the vertical line OY denote prices. The curve SS is the supply schedule charted, indicating the amounts sellers will supply at the stated prices: at a price of $1.00 the curve shows that 200 barrels will be supplied, and so on; this curve ascends to the right, indicating the increase in the amount of the supply as the price goes up. In a similar manner the demand schedule is represented by the curve DD, which registers the amounts purchasers will buy at the stated prices, and ascends to the left in accordance with the universal fact that the amount demanded decreases with the increase in price.

## HOW THE EQUILIBRIUM PRICE IS DETERMINED BY THE EQUATION OF DEMAND AND SUPPLY

This diagram serves as a map of a market for a commodity at a given time and charts the two great market forces, demand

and supply. It pictures the equilibrium price which, when demand and supply are charted in this manner, will always be at the intersection of the two curves. At a price of $1.50 the supply curve registers a supply of 400 barrels, while the demand curve shows buyers anxious to purchase 700. At this price the demand is heavier than supply and will force the price upwards by competitive bidding. It might rise to $2.00, but at this price level the curves indicate a demand for 300 barrels and a supply of 700. Buyers will hang back, while competition among sellers

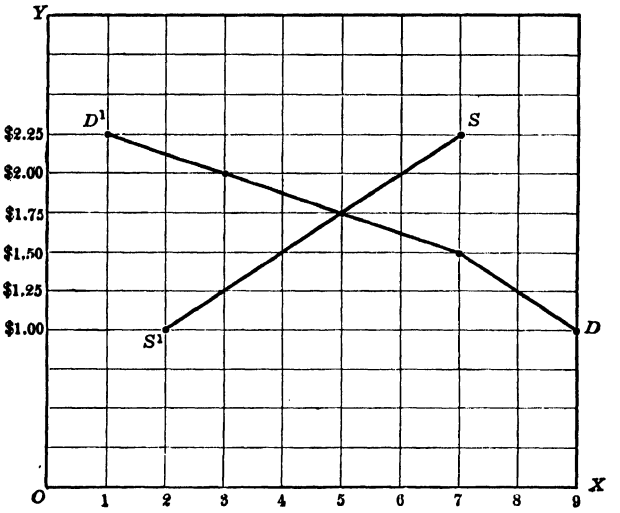



FIG. 2

will be active, and this condition of light demand and heavy supply will force the price down. The diagram shows that at the price level of $1.75 the two curves intersect, indicating that buyers are willing to buy and sellers ready to sell the same amount at that price, which is the one price under the given conditions which equates demand and supply.

Notice by the diagram that at any price above this intersection the supply will always be heavier than the demand, in consequence of which the price will be forced downward. At any price below the intersection, demand will overbalance supply and the price will be forced upward. Whatever the actual prices

are, therefore, whether above or below the equilibrium price, they will always tend toward it, actuated by this balancing process of demand and supply working through competition. Just as the delicate needle of the mariner's compass ceaselessly oscillates to and fro, never resting, never satisfied till it points to magnetic north, so price, continually swinging back and forth, always seeks that point on the market compass that satisfies its nature as magnetic north does the steel needle.

## THE INTERACTION OF DEMAND AND SUPPLY ILLUSTRATED BY DIAGRAMS

The statement that prices are determined by the interaction of demand and supply is well illustrated by graphing the effect

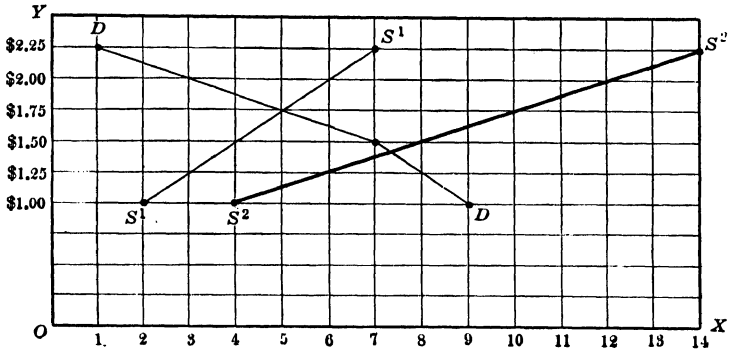



FIG. 3

of a change in either the conditions of demand or supply on the equilibrium price. Thus far, in order to illustrate the principle we have assumed the conditions of both to be constant; we have taken the market conditions at a given time; but in actual life the conditions of either demand or supply do not remain the same for long, but are frequently changing, causing actual prices to swing up and down, as stated above. Figure 3 registers the effect of a change in the conditions of supply on the equilibrium price.

The demand curve DD is identical with that of Fig. 2, and the supply curve $S^1S^1$ marks the old conditions of supply. The curve $S^2S^2$ indicates an increase of supply, showing that

sellers are now offering larger amounts than before at the stated prices. At the old price of $1.75 there is a demand as before for 500 barrels, but the curve $S^2S^2$ points to a supply of 1,000 barrels. This increase in supply will lower prices. As the chart shows, the new curve $S^2S^2$ intersects DD lower down, establishing an equilibrium price somewhere between $1.50 and $1.25. If the supply had decreased, its curve would run above and to the left of $S^1S^1$, and would therefore intersect the demand curve higher up, establishing a higher equilibrium price, toward which the market prices of the commodity would then tend.

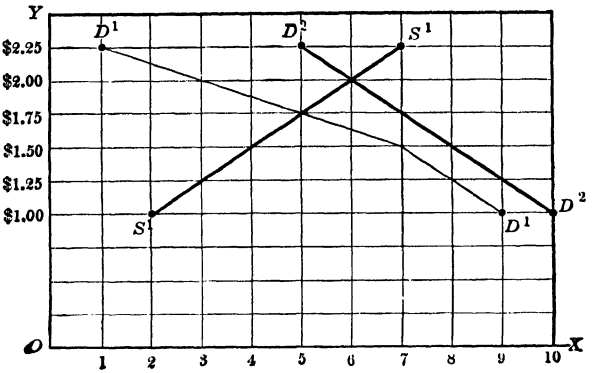



FIG. 4

Figure 4 registers the effect of an increase in demand on the price. The new curve $D^2D^2$ runs above and to the right of the old curve $D^1D^1$, cutting the supply curve $S^1S^1$ at a higher point, and thus establishing a new and higher equilibrium price. It is thus easy to visualize how any change in either demand or supply, or in both, affects the price of any commodity sold under competition. It would not be possible to chart the demand or supply of a commodity with the exactitude that we have done here, though, as we have intimated, the demand and supply for many commodities can be estimated approximately. We have utilized these schedules, which are estimates of actual conditions, to illustrate the operation of a universal law. The prices of all commodities sold under competition are governed by it, and not only the prices of commodities but the services of men

and women; most of us live under its sway and the amount of this world's goods that falls to the lot of each of us is meted out to us largely by this same law.

## CHANGES IN DEMAND AND SUPPLY AND PRICE FLUCTUATIONS

In actual affairs changes in demand due to fickle fashion, changing tastes and habits, increased or decreased purchasing power of consumers, or changes in the general level of prices, are constantly causing changes in demand. At the same time new inventions, new discoveries of raw materials, new processes of manufacture, weather conditions bring about changes in the supply of commodities. Many of these causes are so remote from the consumer that he is totally unaware of them; he feels, however, their effects on prices. The more rapidly these changes occur, the more rapidly the price fluctuates. On a typical grain market, with its intricate system of world communication, which keeps it in almost instantaneous touch with happenings affecting the demand and supply of grain in all corners of the earth, prices are fluctuating every minute or hour of the day. The demand and supply of many staple manufactured articles do not change so rapidly, and their prices therefore change more slowly. The estimation of the present and future conditions of demand and supply of commodities, then, plays a very important part in every-day business practice, for it is by this means that changes in prices can be foreseen.

## TEST QUESTIONS

1. What is meant by the statement that the price of a commodity is governed by the law of supply and demand?
2. What is demand? What is a demand schedule?
3. State the law of demand.
4. What is meant by elasticity of demand? Mention four commodities possessing elastic demand; four with an inelastic demand.
5. What is a supply schedule?
6. Explain how in a competitive market an equilibrium price would tend to be established.
7. Show by a diagram how a change in demand will raise or lower the equilibrium price.

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## CHAPTER XIII

# THE FORCES BEHIND DEMAND; THE DETERMINATION OF INDIVIDUAL DEMAND

### THE REAL FORCES DETERMINING PRICES ARE BACK OF DEMAND AND SUPPLY

The law of demand and supply is a general law. An explanation of its action does not disclose the real forces determining prices. We have spoken of demand and supply as forces, but in so doing it is evident we have used the word force loosely, for they are not by any means elemental forces, but rather the resultants of other forces working beneath them. The law of demand and supply expresses the relationship that exists between the demand for a commodity and the supply of it; but demand and supply themselves are relationships between amounts and prices. By demand is meant the largest amounts of a commodity buyers will purchase at certain prices, or the highest prices that will be paid for certain amounts. Likewise supply means the largest quantities that will be offered for sale at certain prices or the lowest prices at which certain quantities will be offered for sale. After we have discovered how prices are determined by demand and supply, we have only scratched the surface of the price problem. It still remains to discover what determines both demand and supply. Each of these represents a condition and the real question at issue is: What determines the conditions of demand and supply? What determines the largest amount of a commodity buyers will purchase at a certain price, or sellers will offer for sale? The estimation of demand, which as we have intimated, is of practical importance in every-day business, requires a knowledge of the forces underlying demand and of the way in which they operate in the fashioning of price.

## WHAT DETERMINES INDIVIDUAL DEMAND

The total demand for a commodity is the aggregate of all the individual demands for that commodity. If, for instance, there is a demand on a local produce market for 800 barrels of apples at a price of $1.25, it means that there are buyers of apples in that market who together will purchase that quantity at that price. The demand schedule of a commodity is simply a total estimate of the amounts individual buyers will purchase at stated prices. Individual demand schedules added together constitute the demand schedule for the whole market.

As the demand for a commodity is compounded of individual demands, the question narrows itself down to what determines the demand of the individual. What are the forces that influence the buyer? What determines the highest price an individual will pay for a certain amount of a commodity, or the greatest quantity he will buy at a certain price?

## THE DETERMINANTS OF INDIVIDUAL DEMAND

The highest price a normal individual will pay per unit for a certain amount of a commodity, or what amounts to the same thing, the largest number of units he will purchase at a given price, is determined by a comparison of the marginal utility of the commodity with the utility of the money he must pay. This is the principle that governs the buying of the individual. The two forces determining his demand, then, are the desire for the commodity and the desire for money, or as sometimes stated, the utility of the commodity and the utility of money. Such is the formal statement of the case. In the previous chapter we saw how the market price was influenced by the interaction of demand and supply. In this chapter we will notice how the price the individual will pay is determined by the interaction of the two primary forces, human want and love of money, preëminent in their influence on human conduct.

## THE PRINCIPLE OF DIMINISHING UTILITY

Before we explain how individual demand is influenced by these forces, we will see how these forces are themselves governed by certain principles. Every small boy knows that the first apple

tastes better than the second, the second than the third, and that if he but has enough, there comes a time when he even loses his enthusiasm for apples. Now the small boy's diminishing desire for apples illustrates a law of human nature as universal as the law of gravitation. We are all in the same boat with the small boy and find the intensity of our wants decreases as the supply of that which satisfies them increases. It follows, therefore, that units of any commodity decrease in utility as their supply is increased, and if the supply finally exceeds our wants, their utility shrinks to zero. This universal experience is usually referred to as the law of diminishing utility and simple as it is, it is at the bottom of the whole price question.

## THE CONCEPTION OF MARGINAL UTILITY

Arising out of this universal fact that similar units of a commodity when used yield decreasing utilities, is the conception of marginal utility. The last unit to be consumed possesses the least utility of any; this unit is termed the marginal unit, and its utility is referred to as the marginal utility of the supply. If our small boy had a limited supply of these apples, the last one eaten would yield the least utility of any of the three, and its utility would measure the marginal utility of his supply of apples. Whenever the marginal utility of a supply of a commodity is spoken of, it refers to the least utility possessed by any unit, which is always that of the last to be consumed.

## HOW MARGINAL UTILITY DETERMINES THE UTILITY OF EACH UNIT OF THE SUPPLY

The conception of marginal utility is important because it determines the estimate we as individuals place on the utility of each unit of a commodity we may have in our possession or contemplate possessing by purchase or otherwise. We have just noticed that similar units of a commodity when considered as a supply to be used possess varying degrees of utility. Similar units of a commodity, however, regarded as a stock in our possession have equal utilities. This seems a contradiction, but it is merely a change of viewpoint. As the owner of a stock consisting of similar units, three apples for example, we would regard them

all alike. If we were to dispose of one it would not matter which, for they each have the same utility. But let us consider these three apples as a supply to be used and each has a different utility; the first that we would eat, the greatest, the last to be eaten the least. If we now dispose of one of our supply, which will it be? Always the one with the least utility, the marginal apple; for we will eat the two that remain, and it will be the third that we will be short of. If makes no difference which apple is taken it will always be the one with the least utility, so that when we regard the three apples as a stock in our possession the estimate we will place on each will be determined by our estimation of the utility of the least or marginal unit of those same apples regarded as a supply to be used.

## THE LAW OF MARGINAL UTILITY

Suppose we increase our stock and now have in our possession four apples. To each of these we attach the same importance, namely; that determined by the utility yielded by the last of them to be enjoyed when regarded as a supply to be used. This last would now be the fourth apple, which possesses less utility than did the third of the smaller supply; accordingly each of the four apples of our increased stock possesses less utility than the three of the previous stock. By adding a fourth apple to our supply we have lowered its marginal utility. For this is the law of marginal utility, that it varies inversely with the supply—increase the supply and you inevitably lower its marginal utility; decrease it and you just as surely raise the marginal utility. As, therefore, marginal utility determines the utility of each and every unit of the supply considered as a stock, it follows that any increase in the supply lowers the utility of each unit of any stock in our possession or which we might be about to place in our possession by purchase or otherwise; conversely any decrease will raise each unit in our estimation.

## MARGINAL UTILITY AND THE LAW OF DEMAND

It is apparent that we are now involved in psychological considerations. We have just explained the principle which governs

our valuations in all spheres of life and furnishes the reason underlying a universal fact in our experience—that the more of a thing we have the less we value it, and vice versa. This same principle underlies the law of demand, which states that the higher the price the smaller will be the amount sold, and that the larger the amount to be sold the lower the price it will fetch. The larger the amount, the lower its marginal utility and the utility of each unit to the buyers, who will naturally be willing to pay less per unit; the smaller the amount to be disposed of the higher will be its utility and the higher will be the price the buyer will pay. While these principles of diminishing and marginal utility explain the law of demand as applied to an individual, they do not completely account for the law in the market as a whole, for the reason, to be taken up later, that the utility of money varies with different individuals.

Marginal utility therefore is a practical principle, entering into every-day business practice. We may be entirely unaware of it, yet it governs our actions just the same. In buying we are constantly estimating marginal utilities; it is a question of one more or less. Shall we buy two or three collars, ties, or if disgracefully wealthy, cars? In so doing we are comparing marginal units, the third collar, the second necktie, with the money we must pay. And now that we have become better acquainted with these powerful psychological principles influencing economic activity, we are ready to see how they operate in determining the demand of the individual buyer.

## HOW MARGINAL UTILITY INFLUENCES THE DEMAND OF THE BUYER

Every good buyer seeks to spend his income in such fashion as to receive the greatest amount of utility in return for the least expenditure of money. In purchasing a single unit of a commodity such as a victrola or a Winchester rifle, he compares its utility with that of some other commodity he might like to buy with the money he is asked to pay. If at the price asked, the utility of the money in his estimation overbalances that of the article, he refuses to buy—"it isn't worth the money." If the price seems small in proportion to the satisfaction he will get out of

the article, he gains by the exchange. The highest price he will pay is determined by a comparison between the utility of the article and that of the money price. But the question is when he buys several units of a commodity, which as we have seen have varying degrees of utility, what decides his purchase? What determines the largest amount he will buy or the highest price he will pay for a certain quantity? There we bring into action our knowledge of marginal utility and answer by saying that the demand of the buyer is determined by a comparison of the marginal utility of the commodity with the utility of the money price.

We will now see how this principle governs the buying of the individual, and in order to illustrate it fully we will purposely exaggerate the exactness with which we are able to measure the utility of the commodity in terms of money. In practical affairs, money is the only measure we can apply to utility, and we all are constantly measuring the utility of commodities in terms of it, by the comparisons we make with the marginal units of our purchases. We will assume that one unit of commodity utility is equal to the utility of one cent. In so doing we are measuring the utility of the commodity in terms of money. We will suppose that the first unit of a limited supply of a commodity, apples or any other article of which we might purchase four or five, would possess 25 units of utility, the second 20, the third 15, the fourth 10 and the fifth 5. If the buyer were to pay in proportion to the utility of the commodity to him, rather than go without he would be willing to give (as one degree of utility equals one cent) 25 cents for the first unit. So much he would pay and no more. He would likewise be willing to pay as much as 20 cents for the second, 15 cents for the third, 10 cents for the fourth and 5 cents for the fifth. But apples are not bought in this manner today and the question is what would determine the largest amount he would buy at any given price, let us say, 10 cents. His fondness for the commodity as indicated by his utility scale would lead him to buy two or three without any hesitation at 10 cents apiece. He might be undecided whether to buy three or four. The utility of the fourth apple and the utility of 10 cents are equal. The utility of the fifth unit is less than that of 10

cents. So that he will not pay 10 cents for it. Therefore the largest amount he will buy at the given price of 10 cents is four. He would lose on every unit he would buy over four. The amount then that he will purchase at any given price is determined by the balancing of the marginal utility of the commodity with the utility of the money he must pay for it. Just as soon as the utility of the last unit considered is equal to the money price he stops buying. It is the marginal unit acting as a danger signal that halts the buyer, while a comparison between its utility and that of the money that must be paid determines his purchase.

This principle may be graphed as in Fig. 5. Distances along the line *OX* denote units of the supply; distances up the vertical line *OY* measure both units of commodity utility, and of money. The curve *UU* is the utility curve, its downward slope indicating the diminishing utility of the supply, of the five units. The shaded section represents the utility of the fixed price of 10 cents. The utility of the fourth apple is slightly greater than the utility of the price, as shown by the excess of the white in area four. In the fifth area the utility curve cuts through the shaded part denoting that the utility of the fifth unit is less than that of the price, 10 cents. The marginal utility of any given amount is measured by the height of the line of its marginal unit. For instance, the marginal utility of a supply of four units is measured by the height of the line *PP*. The price level of 10 cents cuts the utility curve at *P*, showing that the utility of that amount of money is equivalent to the marginal utility of a supply of four units. The amount which the individual will purchase at any given price will be indicated on the diagram by the intersection of the utility curve and the given price level.

## THIS PRINCIPLE DETERMINES THE INDIVIDUAL'S DEMAND SCHEDULE

We are now able to make up the individual's demand schedule; for the same principle that determined the amount he buys at ten cents, determines his purchase at all prices. If the commodity was selling at 20 cents he would buy but two; the third unit would only be worth 15 cents, possessing only a utility of

fifteen, so that he would not pay 20 cents for it. His demand schedule then would be as follows:

At a price of 25 cents he will buy 1
At a price of 20 cents he will buy 2
At a price of 15 cents he will buy 3
At a price of 10 cents he will buy 4
At a price of 5 cents he will buy 5.

## THE EFFECT OF AN INCREASE IN UTILITY ON INDIVIDUAL DEMAND

Any change in the buyer's desire for the commodity the utility of money remaining unchanged, would either increase or decrease

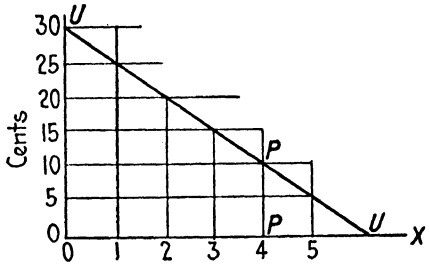



FIG. 5

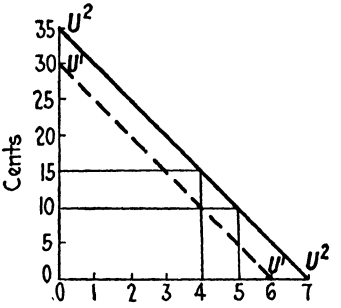



FIG. 6

his demand. If, for example, due to creative advertising or other causes, the commodity were raised in his estimation, his desire for it would be intensified, its utility correspondingly increased, he would thus be induced to purchase a larger quantity or pay a higher price, and in consequence the amounts in his demand schedule would be increased all along the line. This is illustrated in Fig. 6 by raising the utility curve $U^2U^2$ above and to the right of the old curve in Fig. 5. The marginal utility of a supply of four units has now increased from ten to fifteen, the buyer will therefore be willing to pay fifteen cents for four apples instead of the ten cents indicated, by the old schedule, or as the fifth unit has now a utility of ten he would buy five units at the old price of ten cents. An increase in the utility of the commodity has increased his demand at a price of ten cents

from four to five units, and likewise through his whole demand schedule, which will now be:

At a price of 30 cents he will buy 1
At a price of 25 cents he will buy 2
At a price of 20 cents he will buy 3
At a price of 15 cents he will buy 4
At a price of 10 cents he will buy 5
At a price of 5 cents he will buy 6.

## MAXIMUM GAIN

There is one more conception worth noting on account of its practical bearing on life, and that is maximum gain. The amount the buyer purchases is determined we have said by a comparison of the marginal unit with the price; we might say, that the buyer will keep purchasing till the last unit considered shows no gain in utility over that of the money that must be paid for it. It is evident that when a number of units are purchased at a fixed price and that price is determined by the utility of the marginal unit, the one with the least utility of any, that the buyer gains in utility on each of the preceding units. For the sake of illustration let us take the case of one buyer. Column 1 below shows the utilities of successive units to him. Column 2 denotes the utility of the fixed price of 10 cents. Column 3 indicates the gain in utility of each unit of the commodity he buys at a fixed price of 10 cents. Column 4 shows his maximum gain.

| | Utility of Successive Units of Commodity | Utility of Money Price | Buyer's Gain Per Unit or Loss | Maximum Gain |
|---|---|---|---|---|
| 1st Unit, | 25 | 10 | 15 | 15 |
| 2nd Unit, | 20 | 10 | 10 | 25 |
| 3rd Unit, | 15 | 10 | 5 | 30 |
| 4th Unit, | 10 | 10 | 0 | 30 |
| 5th Unit, | 5 | 10 | (−5) | 25 |

The fourth column shows that the buyer's gain increases as he buys, and reaches its height at the third and fourth units. By purchasing three or four units he derives the maximum gain from the transaction. He may be undecided whether to buy three or four, but he will not buy five as it will reduce his

maximum gain; five marks the point of *diminishing returns* to the buyer; every unit he buys thereafter reduces his gain.

Should he only buy two units, he fails to secure the maximum gain. We may say, therefore, that the buyer's purchase is determined by the point of maximum gain.

This surplus gain accruing to the buyer has been termed by Marshall, the English economist, "consumer's surplus;" it is the difference between the total utility of the commodity and the total utility of the money the consumer pays for it and thus represents a surplus utility to the consumer. The total utility of the purchase of our buyer above would be found by adding up the successive utilities in column one of the four units he purchases, which together equal seventy. The total utility of the money he pays for these is forty, leaving him a surplus of thirty.

## PURCHASER'S PROFIT

Failure to grasp this fundamental idea of the mutual advantage of exchange has been the origin of more than one popular economic misconception, and much practical economic misconduct. It is plain to all that the seller gains by the sale; but the complementary fact that the buyer gains by a purchase has not always been so clear. Due to this one-sided vision, was the idea on which the mercantile policy of Great Britain rested in the 18th century, that the prosperity of the nation depended on "a favorable balance of trade," an idea which still persists in the belated minds of many of us. The old idea of an exchange was that of a bargain, in which one party to the transaction was worsted, usually the buyer, as the Roman proverb "caveat emptor" signifies. It seems likely that our British brethren inherited the mercantile idea from this old Roman conception of an exchange. The idea has not, however, remained in Great Britain and it is to be hoped that those statesmen who hold the foreign policy of our country in their hands at this critical juncture have sufficient economic knowledge to realize its falsity.

The modern conception of trade as a fair exchange, of adequate service rendered to the buyers by the seller, so emphasized in selling today, is a healthy sign of better times. Sharp prac-

tices though still indulged in are not countenanced by the ethics of the times. We are beginning to recognize that trade to be permanent, whether between individuals or nations, must be profitable to both parties to the transaction.

## SUMMARY

To get at the real forces determining prices we must go back of both demand and supply. The total demand for a commodity is made up of individual demands. The question then is, what determines the demand of the individual? The purchase of the individual buyer is determined by a comparison between the marginal utility of the commodity and the utility of the money he must pay for it. Individual demand is thus determined by the interaction of two opposite forces, the desire for commodities and the desire for money, or commodity utility and money utility. Similar units of a limited supply of a commodity when used vary in utility, decreasing as the supply increases. The marginal utility of the supply determines the utility of each and every unit of that supply regarded as a stock in our possession. In every-day life buyers are constantly comparing the marginal units of their purchases with the money price. It is this balancing of the utility of this marginal unit with the utility of the money he must pay for it, that determines the demand of the buyer. Any change in the intensity of the desire of the buyer for the commodity raises its marginal utility and increases or decreases his demand. In following out the principle the buyer secures a maximum gain of utility, which constitutes his profit on the purchase, a return in utility over and above what he gave.

## TEST QUESTIONS

1. What are the two determinants of individual demand?
2. What is the law of diminishing utility?
3. What is meant by "marginal utility"?
4. How does marginal utility influence the demand of the buyer?
5. What is meant by "maximum gain"?
6. What is the difference between the old and the new conception of a sale?

## CHAPTER XIV

# THE DETERMINATION OF TOTAL DEMAND

### THE INFLUENCE OF THE UTILITY OF MONEY ON INDIVIDUAL DEMAND

Thus far we have emphasized the influence of commodity utility on individual demand. We will now examine the part that money utility plays, which, though important, is not always so apparent.

The utility of money itself varies with different individuals and with the same individual at different times, due chiefly to changes in the general level of prices and in the incomes of buyers. The law of marginal utility affects money in common with other possessions; not perhaps to the same degree on account of the fact that money can be used to satisfy other wants than that for itself; but as the most intense of these are satisfied first, it follows that the more money a man possesses, the less he thinks of a single dollar, and vice versa. To a poor laborer a dollar has a far greater utility than to a millionaire. In common parlance, a dollar looks twice as big to some than others, and this variation in the utility of money to different individuals will naturally make a difference in their demand for commodities. Imagine a clerk in moderate circumstances falling heir to a fortune of a half a million dollars; would not the utility of a dollar shrink in his estimation and in consequence would not the amount of commodities he would buy and the prices he would be willing to pay increase correspondingly?

### THE EFFECT OF A DECREASE IN THE UTILITY OF MONEY ON INDIVIDUAL DEMAND

To illustrate the above principle let us notice how a decrease in the utility of money will affect the demand schedule of our

buyer in the last chapter. We will suppose he has been lucky enough to fall heir to a fortune, and that a dollar seems about half as big as in his poorer days, which is the same as saying that the utility of money to him is just half what it was. Instead of one cent being equal to one commodity utility as before, it will now be equivalent to one-half a commodity utility. He will be willing to pay at the rate of 2 cents for each utility, just twice as much as before. As his fondness for the commodity remains the same there will be no change in his utility schedule which is as follows:

The first unit has a utility of 25
The second unit has a utility of 20
The third unit has a utility of 15
The fourth unit has a utility of 10
The fifth unit has a utility of 5.

The first unit would be worth in his estimation 50 cents, the second 40 cents, and so on down, each double the amount it was worth before. He will therefore be willing to pay a higher price for any given amount or purchase a larger quantity at any given price. Before at a price of 20 cents he would buy no more than two, as the third unit only possessing a utility of 15 was not worth 20 cents. Now that he is rich he doesn't hesitate to buy three and will probably buy four. He would be willing to pay 30 cents for the third unit if necessary and the utility of the fourth which is ten is just equal to the utility of 20 cents in his estimation.

As a poor man the highest price he could have been induced to pay for a given supply of three units would have been 15 cents. Now that the utility of money has changed, he will pay as high as 30 cents for a supply of three units. The utility of the marginal unit, the one he compares with the money he must pay, remains the same, namely fifteen, the utility of the money he compares it with being half what it was, he will be willing to pay just double his previous price for the same utility. As a result the prices he will pay for given amounts and the amounts he will buy at given prices will be raised all along the line. The increased demand due to the change in the utility of money to the buyer is shown in Fig. 7 by the demand curve $D^2D^2$.

Distances along the horizontal line OX denote units of the commodity, the figures up the line OY indicate prices. The two curves $D^1D^1$ and $D^2D^2$ register the demand before and after the change in the utility of money.

## WHAT IS MEANT BY THE UTILITY OF MONEY

Our analysis reveals two elemental forces at work determining individual demand. The first of these, human want, is a positive compelling force. The second, which we have termed the desire for money, is a negative repelling force, the nature of which needs a little further elucidation. What we have spoken of as desire for money or objectively as money utility, is at bottom a dislike to parting with money, and represents the cost of the transaction to the buyer. The money stands for what he must pay for the commodity, and its utility measures the sacrifice he makes in return for the satisfaction of his want. The real force of which we have taken the utility of money to be the measure, is the feeling of sacrifice he experiences as he considers what he must pay. The money he pays may stand in his mind for the effort he has made to earn it. The income of most buyers does in reality represent the effort they have put forth in production; which effort they have exchanged for money income, which money income they finally exchange for commodities. It may also represent some other commodity. A man may be undecided whether to spend $35.00 on a set of Robert Louis Stevenson or a rifle. In his mind there will be a balancing of Stevenson and the rifle. If he decides to purchase the books, it is at a sacrifice of the rifle. As money is the universal measure of value we have become so accustomed to balance what we buy with it, to estimate the worth of commodities in terms of it, that we automatically come to regard it as what we pay. Here for all practical purposes we may measure and speak of this force in terms of money.

## THE CO-DETERMINATION OF DEMAND

Buying is a mental process in which two ideas are balanced in the buyer's mind, the utility of the article or the marginal utility of the supply he is considering, and the utility of the money he

must pay. This fact requires emphasis, as one of the modern theories of value, the marginal utility theory as it is commonly expounded by economists, through neglecting the part played by the utility of money, exaggerates the influence of commodity utility on price. Now as we have seen the utility of the commodity, the power it possesses to command desire, is the positive and more active factor, but to ignore the utility of money, the power it possesses to command desire, and influence the decision of the buyer is to ignore one of the facts of the case and result in a one-sided theory of value. In practical life the pocketbook plays a prominent part in deciding the purchaser's demand, and any theory of value which does not take into sufficient consideration the influence of money utility, does not square with the facts of the case. There are two determinants of individual demand, the utility of the commodity and the utility of money; these together decide the highest price the individual will pay for any given amount and the largest quantity he will purchase at any given price.

## THE FORMATION OF TOTAL DEMAND

We will now observe how the total demand for a commodity is made up out of the individual demands; tracing it from its rise in the springs of human wants, watching its flow down through the lower and lower levels of price, constantly increasing its volume by fresh supplies, like a river on its way to the sea. We will assume that consecutive units of a given commodity possess the following utilities to four individuals A, B, C and D.

TABLE II

| Units | A | B | C | D |
|---|---|---|---|---|
| First, | 25 | 40 | 15 | 25 |
| Second, | 20 | 35 | 10 | 20 |
| Third, | 16 | 30 | 5 | 16 |
| Fourth, | 14 | 25 | | 14 |
| Fifth, | 10 | 20 | | 10 |

We will also assume that the utility of one cent to D equals one commodity utility and that the utility of money to D is four times as great as to A; thrice as great as to B; and twice what it is to C. Each then will be willing to pay the following prices for consecutive units of the commodity:

TABLE III

| Units | A | B | C | D |
|---|---|---|---|---|
| First, | $1.00 | $1.20 | $.30 | $.25 |
| Second, | .80 | 1.05 | .20 | .20 |
| Third, | .64 | .90 | .10 | .16 |
| Fourth, | .56 | .75 | | .14 |
| Fifth, | .40 | .60 | | .10 |

Their demand schedules will be as follows:

TABLE IV

| At a price of | A | B | C | D | Total |
|---|---|---|---|---|---|
| $1.00 | 1 | 2 | | | 3 |
| .80 | 2 | 3 | | | 5 |
| .60 | 3 | 5 | | | 8 |
| .50 | 4 | 5 | | | 9 |
| .40 | 5 | 5 | | | 10 |
| .30 | 5 | 5 | 1 | | 11 |
| .20 | 5 | 5 | 2 | 2 | 14 |
| .10 | 5 | 5 | 3 | 5 | 18 |

The total demand for the commodity, found by adding the individual demands, is indicated in the last column to the right.

## ANALYSIS OF TOTAL DEMAND

Figure 8 charts the total demand, showing the order in which the units that constitute it would be purchased by the buyers and the utility and values of each. Height above the horizontal line OX measures both degree of utility and money

price. Prices are indicated up the line OY. Distances along the line OX measure units of the commodity, the numbers indicate the order of the units that will be bought, the capital letters the buyer. The third unit will be purchased by A, the small I indicating that it is A's first unit. The dotted curve uu registers the degree of utility of the units, the demand curve dd registers the price that will be paid for each unit or number of units and the amount that will be bought at any price. The utility of the third unit is for example measured by the height of the vertical line rising from 3 to the dotted curve, namely twenty-five, which is the utility of the first unit to A. Its

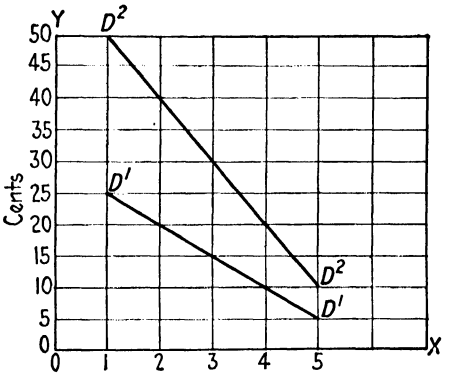



FIG. 7

price is measured by the height at which the vertical line cuts the demand curve, equal to $1.00, or the price that A is willing to pay for his first unit. The heavy black lines indicate the amounts that will be bought at the stated prices, or the prices that will be paid for given amounts.

Figure 8 furnishes us with a complete analysis of total demand. It shows the price that each consecutive unit would bring by whom it would be bought, and its utility. It shows us the demand at any price and of what individual demands it is compounded. It also shows us the relationship of utility to the total demand. Having thus seen how the total demand is built up out of individual demands, we are now ready to see how it is determined.

## THE DETERMINATION OF TOTAL DEMAND

The question is what determines the highest price that will be paid for a given amount or the largest amount that will be bought at a given price. What for instance, decided the amount that will be bought at 30 cents. A and B are willing to take ten units at a price of 40 cents: at that price they buy their limit, hence they do not decide the demand at a level of 30 cents. The amount that will be bought at a price of 30 cents is determined by C who is termed the marginal buyer and is re-

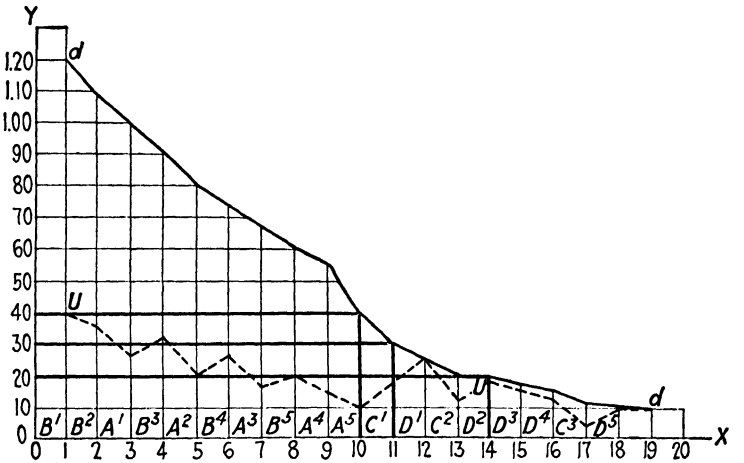



FIG. 8

sponsible for the increase in the demand at the lower price. In the same way he determines the highest price at which a supply of eleven units of a commodity will be bought. The highest price ten units will bring is 40 cents. At that price only ten units would be purchased. If eleven units are to be bought they must be offered at a price to tempt C which is 30 cents.

Likewise, the demand at any point will be determined by the marginal buyer or less strictly speaking, the marginal group of buyers. The diagram indicates that at a price of 20 cents there is a demand for fourteen, the increased demand is here due to C buying more and the purchase of a new buyer D. A and B

are not effective buyers and their purchases do not increase the demand at this price. We would call C and D the marginal buyers; their valuations determine the price at which a supply of fourteen units will be bought. Strictly speaking it is the last purchase of the last buyer which determines the highest price at which any amount will be bought in this case, the price that D is willing to pay for his second unit determines the one highest price at which the whole supply of fourteen would be purchased.

Now since it is the purchase of the last buyer that decides the total demand, and that purchase as we have seen is decided by a comparison of the utility of the commodity with the utility of money to him, we may say that the greatest amount of any commodity that will be bought at any given price or the highest price that will be paid for any given amount is determined by a comparison of the marginal utility of the commodity by the marginal buyer or group of buyers with the utility of the money price.

## MARGINAL UTILITY AND TOTAL DEMAND

It is well to notice here the relation of marginal utility to the determination of total demand. The marginal utility theory of value as often stated by many economists, that the price of a limited supply of a commodity is determined by its marginal utility, is highly misleading. It is not the unit possessing the least utility of the whole supply that influences the price, but the unit which has the least utility to the marginal buyer. This unit would only possess the least utility, if the utility of money were the same to all buyers which it never is. In the case of the individual to whom, at any given time, the utility of money is the same, consecutive units will decrease in utility and the last unit, the one which influences the purchase price, will always be the unit with the least utility. Not so with the total demand, as the two curves in Fig. 8 show. It might be said that the unit with the least value of any determined the value of every unit in the supply. Marginal valuation determines the value just as marginal utility does the utility of units of a stock. But the marginal valuation is not determined by the marginal utility of the supply, but by the marginal utility

of the part of the supply bought by the marginal buyer or marginal group of buyers.

## THE FAMILIAR LAW OF DEMAND EXPLAINED

These two forces, the desire for commodities and the desire for money or dislike of parting with money working through individual purchases determine the demand for all commodities in the marts of the world. Operating in the manner we have described, they fully account for the familiar and universal fact that the higher the price the smaller the amount that will be bought or the larger the quantity to be bought, the smaller will be the price paid for it. Among the prospective buyers of any commodity are some who desire it more than others and some to whom the utility of money is greater than others. The rich and those who are particularly fond of the commodity represented in our case above by A and B will purchase a limited supply at a high price and at a lower price some of these will extend their purchases. As the price falls, new buyers will enter the market who are less fond of the commodity or who could not afford to purchase at the higher prices, causing a larger and larger supply to be bought.

The demand price is determined by the buyer or group of buyers at the margin. The actual selling price in so far as it is influenced by the buyers, is determined by the less eager or poorer buyers to whom the price of the article is a consideration.

## THE ESTIMATION OF DEMAND

Now that we have traced the action of the fundamental forces underlying demand we will notice briefly some of the factors that influence these. The estimation of demand plays an important part in modern business. A knowledge of the conditions of demand, of the number of possible buyers, their purchasing power, their likes and dislikes, is extremely valuable to those who have products to sell. While it would be impossible to refer to all those factors that must be taken into consideration by business men in estimating the demand for their products, among the more important are population, percentage of rural or urban residents, age, sex, occupation, number of families,

number of wholesalers or retailers, local peculiarities, climate, custom, class, tastes, and income.

While the demand for some commodities such as the commoner kinds of food, clothing, soap and so on, depends to a great extent on mere numbers, that for most things is influenced by the character of the population of a district or country. The demand for toys depends on the number of children, that for sporting goods on the number of youths and outdoor lovers. Sex is an important factor in the case of clothes, perfumes, hair nets and safety razors. Occupation is the limiting factor in many articles. A plow or tractor manufacturer is interested in the number of farmers. A saw manufacturer in the number of carpenters, plus perhaps the number of home owners, as the recent advertising of the Disston Company suggests. The rural or urban percentage of a population affects the demand for those commodities sold chiefly to a country people or city dwellers. It is often important to take note of local peculiarities such as the demand for stogies in Pittsburgh, snuff in the South or the preference for whitewash to paint in some central Pennsylvania counties. Climate limits the demand for some things both as to time and place; there is little call for straw hats in winter or for furs in summer. The demand for light-weight clothing and porch furniture is heavier in summer than in winter, in California than in Maine. The sale of other things is confined to certain classes and depends on social tastes. Such is the case with silk hats, walking sticks and tuxedoes. Last but not least comes income. An article that appeals to the rich will command both a higher price and a more restricted sale than one used by the masses. The wealthy buy more expensive foods, clothing, furniture and autos than the poor. But on the other hand a commodity like the Ford car that is within the reach of the lower ranges of income has a tremendously larger stretch of demand than the Rolls-Royce type of car which is limited in its demand to the rich. Income statistics are highly suggestive along this line. The following table, taken from the figures compiled by the Commissioner of Internal Revenue from the income tax returns for 1918, indicates the rapid shrinkage in the number of prospects for commodities that depend on the patronage of the rich.

| Income Classes | Number of Returns | Percentage Number of Returns | Percentage Amount of Income |
|---|---|---|---|
| $1,000– 2,000 | 1,516,938 | 34.28 | 14.02 |
| 2,000– 3,000 | 1,495,878 | 33.83 | 22.78 |
| 3,000– 5,000 | 932,336 | 21.06 | 22.20 |
| 5,000– 10,000 | 319,356 | 7.22 | 13.47 |
| 10,000– 25,000 | 116,569 | 2.63 | 10.90 |
| 25,000– 50,000 | 28,542 | .65 | 6.14 |
| 50,000– 100,000 | 9,996 | .23 | 4.27 |
| 100,000– 150,000 | 2,358 | .05 | 1.78 |
| 150,000– 300,000 | 1,514 | .035 | 1.92 |
| 300,000– 500,000 | 382 | .009 | .91 |
| 500,000–1,000,000 | 178 | .004 | .75 |
| 1,000,000 and over | 67 | .002 | .86 |
| | 4,425,114 | 100.000 | 100.00 |

The estimation of demand is becoming today a matter of scientific investigation. In the market place as in the factory guesswork is being displaced by accurate information obtained by a scientific analysis of the conditions of demand. Large use is made of statistics either compiled from special market investigations or obtained from governmental or trade agencies. Valuable statistics are furnished by many federal and state departments, the Bureau of Labor Statistics, especially, furnishes a variety of statistical data bearing on markets and prices that are invaluable to all who have products to sell. First hand information from dealers and users of products is secured through salesmen and by means of questionnaires sent to the trade. The leading advertising agencies and the sales organizations of the larger concerns maintain research departments which conduct sales surveys. Market analysis is a science in itself. As a result weak spots in sales may be detected and their remedies suggested. Sales standards based on actual market conditions instead of on past performance may be established for classes of consumers and territories. New products need no longer be launched in the dark. Basic data are provided for the direction of sales and advertising campaigns. Improvements are suggested in products, new uses and therefore wider markets discovered and production generally better adjusted to demand.

## THE CREATION OF DEMAND

Business men today are by no means satisfied to take demand as they find it but deliberately plan to create it. Consumer wants are directed and stimulated on a large scale by personal salesmanship and advertising. Merchants and manufacturers do not wait for customers to come to them but instead take the initiative, seek the consumer and sell him. It is hardly an exaggeration to say that the majority of commodities and services marketed from cash registers to insurance are sold, not bought; they never would be marketed were it not for the aggressive tactics of the sellers. Fully half of the insurance policies sold in the last twenty years would not have been written had not the desire to purchase protection been deliberately created in the minds of husbands and fathers by the persuasive eloquence of life insurance salesmen. Such concerns as the National Cash Register Company, the Burroughs Adding Machine Company, The Alexander Hamilton Institute, would never have built up the business they have in the time they have, had they waited for customers to come in and buy. They foresaw a need, produced a product to meet it and then organized and sent out a force of trained salesmen to sell their products. These concerns have relied primarily on personal salesmanship supplemented later by advertising to build up the demand for their products. Now the essence of salesmanship is the creation of the desire to buy in the mind of the prospect. The difference between an "order taker" and a "salesman" is that the order taker simply gives the buyer what he asks for, whereas the salesman creates the desire to buy on the part of the prospect in whose mind no such desire previously existed. This is truly termed in sales parlance "*creative* selling." From the viewpoint of economics what is created is a demand for a product. Salesmanship is an art requiring considerable ability. Much attention is paid by business concerns in the selection of their salesmen and in training them.

Personal salesmanship has its limitations; one salesman is only able to call on a limited number of prospects a day whereas by means of printed matter the product can be brought to the

attention of millions. The use of advertising as a means of creating and stimulating demand on a large scale is of very recent origin. Its growth in the last twenty years has been remarkable. Today it is the most powerful marketing force employed to sell commodities. Its phenomenal growth may be attributed to several causes; first, contrary to the belief of many, it tends to reduce the cost of production, both the manufacturing cost and the selling cost. By virtue of its ability to create demand on a large scale it secures volume production and this lowers factory costs. Though the advertising appropriations of many concerns may run into millions a year the percentage of advertising cost to sales is remarkably low, (ranging from a fraction of 1/66 of 1 per cent for example in the case of the California Fruit Growers' Exchange), to 7 per cent or 8 per cent for some of the smaller or higher cost concerns. It is usually a cheaper method of marketing than personal salesmanship. William R. Basset, President of Miller, Franklin, Bassett & Company, writing in *Printers' Ink* of April 20, 1922, cites the following case from his own experience:

| | | |
|---|---|---|
| The item sold at, | | $100 |
| Manufacturing cost, | $40 | |
| Selling cost using expensive specialty salesmen, | 45 | |
| Profit, | | $15 |
| Profit on sales, | | 15 per cent |

Under a changed policy, the advertising appropriation was greatly increased but the sales were easily closed by mail:

| | | |
|---|---|---|
| Selling price, | | $60 |
| Cost to make, | $40 | |
| Cost to sell, | 10 | |
| Profit, | | $10 |
| Profit on sales, | | 16 per cent |

The sales volume in dollars increased 44 per cent. The reduced selling price was the sales argument. It not only made the product easier to sell to the old market, but at the low price new buying strata were reached.

But the real secret of the power of advertising as a marketing force lies in the fastness with which it works. Time is money in

modern business. Advertising speeds up demand. Business men are not satisfied to let the demand for their products grow up as of old naturally by itself. Through the use of newspapers, magazines, car cards, electric signs and the mails, they influence minds of millions simultaneously. The rapidity and extent to which the tastes of a nation are subject to stimulation and direction by advertising is little short of marvelous. A nation-wide demand is created for a new product in a surprisingly brief time. The automobile furnishes a good example. The remarkably rapid growth of this industry is due largely to the fact that it has employed advertising on an extensive scale to market its product. In 1899 there were but 3,700 cars manufactured, in 1921 the number of cars in use was estimated at nine millions or about one car for every twelve people.

Some of the latest achievements of advertising have been in connection with fruits. The California Association Raisin Company hit on the happy idea of a nickel package of "Sun Maid" raisins. The first package was put on the market accompanied by a barrage of advertising Sept. 1, 1921; by Oct. 1, orders were received for three hundred million packages. Up to April, 1922, over 17,000 tons of "Sun Maid" raisins had been sold in nickel packets. The consumption of raisins has been doubled in the last five years mainly by advertising; the consumption in 1921 equalled 200,000 tons. In an address before the convention of Associated Advertising Clubs of the World at San Francisco in July, 1918, Don Francisco, Advertising Manager of the California Fruit Growers' Exchange, stated that in the ten years since the orange growers have been advertising, the consumption of California oranges in the United States and Canada has increased from ten million boxes to eighteen million boxes a year or an increase in consumption of 80 per cent, a rate of increase four times that of population.

A rather interesting example of the difference between the old and the new methods of building up a market is seen in the case of William Mickelberry of Chicago. Twenty-five years ago Mr. Mickelberry found in his mother's recipe book the directions for making a certain kind of sausage which had been a favorite with the family for many years. He decided to try to

capitalize this recipe. With his wife's aid he made up and succeeded in selling a basketful of sausages to some neighboring retailers. The quality was so good the customers of these retailers asked for more. This formed the start of a business that in twenty-five years was built up by personal salesmanship plus the reputation of the goods. No advertising was done up to very recently, the company taking it for granted that the high retail price of the sausage kept it from having a wider market. An investigation proved that this was not the case; there existed a really wide potential market for the product. A selling and advertising campaign was planned to extend over several weeks. Space was taken in the newspapers, eleven salesmen were drilled in every detail of the advertising and then sent out to secure orders. In fourteen days 1,382 retailers were obtained. It was such a revelation that the company, swamped with orders, had to call off the advertising temporarily while it made manufacturing arrangements to take care of the multiplied demand.[1]

Here is a company which for twenty-five years gradually developed its sales to a point which it considered to be its limit. By means of a sales survey followed by an intensive selling campaign it tripled in fourteen days the demand it had slowly built up in the course of twenty-five years. The company is now reaching out through the newspapers and magazines for national distribution. Thus does the modern concern by the use of modern marketing methods build up almost overnight a demand for its product.

Another feature of advertising which has no doubt contributed to its growth is the control it gives the manufacturer marketing through middlemen over the ultimate demand for his product. Hitherto the manufacturer depended on the wholesaler or retailer or both to push his commodity. If they failed to do so he had little recourse. By packaging and branding his product and advertising it directly to the consumer he is able to control demand at its source. The retailer is anxious to stock the advertised article because it is demanded by his customers, the wholesaler likewise on account of the retailer demand. Thus

[1] *Printers' Ink*, 1922.

by reaching over the heads of the middlemen to the ultimate consumer the manufacturer is no longer at the mercy of the middleman but is able to maintain a measure of control over the demand for his product even after it has left his possession. He is also able to coöperate better with the wholesaler and retailer and aid them in increasing their sales.

Advertising has been accused of increasing the cost of living. In one sense this may be true; in another it is not. When it is inferred, as it often is, that advertising by adding to the cost increases the price of commodities to the consumer, the inference is erroneous as we have seen. It has also been asserted that advertising increases the cost of living by over-stimulating desire, especially the desire for luxuries. There is no doubt, of course, that advertising does stimulate wants and wants for things people could do without, but whether it over-stimulates wants is a question. Advertising is simply a method of selling, of persuading a buyer to buy, and selling has never been condemned. It cannot be accused of *unduly* influencing the mind of the buyer, or using mental "strangle holds" to force buyers to buy as is sometimes done in personal salesmanship when "strong arm" methods are used. It employs much milder methods if more subtle, and relies on the law of averages in reaching large numbers rather than on force. By making things known to large masses of people, by bringing them to their attention in an attractive manner, by making plain the service they are able to render, by emphasizing quality, advertising naturally leads people to want these things. It is true this is all carried out in a very scientific manner. Advertisers are practical psychologists; their copy is not prepared blindly. Human instincts are studied and the appeal is designed and aimed to reach the buyer's heart. They use science rather than force but there is no sin in science.

There is nothing inherently wrong in creating a want for a thing unless that thing is bad, in which case it should not be sold by any method. In this respect it must be admitted advertising has pretty well cleaned house. Most of the leading papers and magazines exercise a rigid censorship over their advertising columns. Fake and injurious articles are fairly well excluded. Then too, the increasing confidence of the public in

advertised articles is based on good business grounds. It does not pay to spend money in advertising a commodity that is not what it is claimed to be. Repeat sales would not be made and no matter how much money would be spent to advertise it permanent sales could not be maintained. The first requisite for any commodity to be permanently advertised is genuine utility.

It may be true that we are living at too fast a pace today; that advertising, city life and other factors tend to over-stimulate our wants, to render us too ambitious. One thing even here should be noticed in respect to the part advertising plays in this tendency. While it is true that people's wants are stimulated by it, that it tempts them to spend, it also urges them to save. Some of the heaviest advertisers today are the banks and insurance companies which are persuading people to save and invest in their future. Likewise our educational institutions are inciting men to invest their income in their education. And while it is true that advertising does deter us from spending the whole dollar on bread for our bodies, in tempting us to buy some hyacinths for our souls, that may not be entirely an evil. Most assuredly advertising has played a powerful part in raising the standard of living of the masses. It has hastened the introduction of new inventions and improvements to the nation at large. It has helped equip the factory and office with labor-saving machinery and furnished the homes of millions with comforts and conveniences. Steam shovels, typewriters, telautographs, telephones, bathtubs, open plumbing, victrolas, automobiles, radio sets all have been helped into common use by advertising.

## SUMMARY

By demand is meant the largest amount that will be bought at a given price or the highest price that will be paid for a given amount. The point of our inquiry has been to discover what determines this amount or price and how it is determined.

As the total demand is made up of individual demands we first found what decided the purchase of the lone buyer; the

desire for the commodity and the desire for money or objectively speaking, commodity utility and money utility.

These two forces operate by means of a comparison in the buyer's mind between the marginal utility of the amount he contemplates purchasing and the utility of the money he expects to pay for it.

We next saw how the individual buyers made up the total demand. We found that the total demand was determined by the group of buyers at the margin or to be exact the marginal buyer—that the highest price that a given amount would be bought at, is determined by the price the group of buyers at the margin, or to be accurate the marginal buyer will pay.

We may say, therefore, that the highest price that will be paid for a given amount or the largest amount that will be purchased at a given price is determined by the comparison made by the marginal buyer between the marginal utility of the last part of the supply he purchases and the utility of money to him.

The practical importance of the two forces determining demand is well illustrated by modern sales practice and in particular by the tremendous scope of present-day advertising.

## TEST QUESTIONS

1. How does the utility of money vary with different individuals?
2. Explain how a decrease in the utility of money to an individual will increase his demand.
3. What two ideas in the mind of the buyer determine his demand?
4. Explain how the market demand for a commodity is made up of individual demands.
5. What buyer determines the market demand under conditions of free competition?
6. What are the two forces determining the prices of commodities under the action of the law of supply and demand?

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## CHAPTER XV

# THE FORCES BEHIND SUPPLY; COST OF PRODUCTION

### THE QUESTION OF SUPPLY

Having uncovered the forces influencing prices on the buyers' side of the market and noticed their modus operandi in determining demand, we will now consider the domain of the seller. Post-war high prices provoked a lively speculation on the part of the public as to their causes and justification. The man who paid $10 for a pair of shoes that before the war could have been bought for $5.00, or 50 cents for two collars that formerly cost him 25 cents, though aware of the increased cost of production to the maker, was apt to suspect that part of the high prices might be due to someone pocketing abnormal profits. He may even have been tempted to wonder sometimes whether there was any limit to the price the seller was able to charge. Governmental price-fixing of commodities during the war has led to a new interest in the question: What is a fair and just price? All of which has kindled in the public mind an active curiosity as to the nature of the sellers' influence over prices and a desire for more light on what takes place in the private office of the manufacturer and merchant when prices are under consideration. The question is: What determines the prices which sellers charge for given quantities of a commodity, or the quantities they will be willing to sell at given prices?

### THE DETERMINANTS OF SUPPLY

The total supply of a commodity like the total demand, is the sum total of the individual supplies. If the supply schedule indicates that a million units will be offered for sale at a price

of $1.00, it signifies that competing sellers of the commodity are together ready to supply that amount at that price.

The lowest price at which any individual producer will be willing to offer any given amount of a commodity, will be determined by his comparison between the disutility or cost of his product, and the utility of the money price he expects to receive. This is the principle governing the selling price of the individual and the two forces involved are desire and cost; desire for the money price, and the cost which must be incurred in the production of the commodity. Just as the buyer compares the utility of the commodity he is about to purchase with the utility of something else costing the same amount, so the seller compares the cost of producing the commodity with the utility of the money return he expects to receive. Both seek a gain in the transaction, the buyer in the excess of the commodity utility he receives over that of the money payment he makes; the seller in the excess of money utility he can obtain over the cost of production. The price the buyer is willing to pay represents the utility of the commodity in terms of money; the price the seller is willing to take represents the cost of production in terms of money.

As cost of production is the chief factor limiting the supply of freely reproducible commodities sold by competitive producers, the point of our inquiry will be to trace its influence on supply prices and amounts. Before doing so, however, we will look a little closer at this force which plays such an important part in modern industry.

## THE MEANINGS OF "COST"

Cost is a term possessed of a dual personality. In political economy cost stands for the efforts, sacrifices and risks incurred by producers in the production of commodities. It is the exact opposite of utility which refers to the satisfaction to be obtained from the products of industry. Hence the word disutility is often used in place of cost. Cost represents the unpleasant in production, utility the pleasure embodied in the fruits of that unpleasantness.

But in the vocabulary of commerce cost stands for the money

expenses incurred by enterepreneurs. To a business man "cost" means the money outlay required for the production of his product; this plus his profit constitutes his selling price.

All the money expenses of production, including the profit of the entrepreneur, are termed in political economy either money costs, or expenses.

To avoid confusion we will use the term Real Cost when referring to the efforts, sacrifices and risks involved in production, Money Cost when referring to the money expenses, while Cost will be used in its usual commercial sense, as the money expenditure of the individual business concern.

## REAL COST AND SUPPLY PRICE UNDER SIMPLEST CONDITIONS

In the case of an individual producing a commodity entirely by himself for sale, the price in expectation of which he would be willing to undertake the work must repay him for the efforts, sacrifices and risks he undergoes. A case in point would be the building of a log cabin in the woods for a summer visitor, by a frontiersman who obtains all his materials from the forest and performs all the work himself. The lowest price for which he would be willing to build the cabin, must be equal in his mind to the trouble he incurs, or he would not tackle the job. A fair and reasonable price would be one that would amply remunerate him for all the efforts, sacrifices and risks he had incurred in the course of the undertaking.

## COMPLEX NATURE OF REAL COST IN MODERN PRODUCTION

But commodities today are brought into existence by the coöperative action of various kinds of laborers, capitalists and entrepreneurs, each contributing his specialized quota, as the raw materials flowing through the channels of production are by consecutive processes transformed into finished products. The real cost of a finished product is, therefore, the sum total of the efforts, sacrifices and risks incurred by all those who have contributed in these various ways to its production, and is even in the case of the most simple commodity a very complex thing.

Consider for a moment the varied expenditure of human effort involved in the making of a pair of shoes; beginning with the work done by the producers of the raw materials, the ranchmen and their cow punchers on the plains, the darkies in the cotton fields, the miner drilling in the bowels of the earth, the packers and their men in Chicago, the tanners engaged in their odoriferous tasks, the operatives working eight or nine hours a day in the noisy textile mills, the shoe manufacturer with his salesmen, clerks, and factory hands, and lastly the only one we are brought into contact with, the retailer who sold them to us. Add to these the labors of the miscellaneous army of supplementary workers, such as the makers of the machinery and equipment used, those engaged in transporting these various products,—the railroaders on land, the sailors on the sea, the capitalists and bankers who have supplied the capital, and we have a partial conception of the accumulation of human toil that enters into the real cost of a pair of shoes.

## HOW REAL COST IS CONVERTED INTO MONEY COST

The real costs of production are continually being converted into money costs, as the raw materials travel along the channels of production toward the ultimate consumer. All along the route as each producer does his bit, he receives a money payment in return for the part he has played in production. The money cost of a finished product is the sum total of the money payments made to all those who directly or indirectly have aided in its production. Just as the real cost of any finished product is the sum total of the efforts, sacrifices and risks incurred during the course of its production, so its money cost is the sum total of the money expenses that have been assessed against it from its inception.

At any stage in the production of a commodity the selling price sums up the money costs chargeable to that particular commodity up to that time, plus the seller's profit. A manufacturer's selling price of shoes, for instance, is determined by his cost of production, plus his profit. This cost consists of money payments for materials, machinery, labor, etc. To this money outlay he adds a sum sufficient to remunerate himself for his

own trouble and risk. What he pays in wages rewards those who have labored with him. What he pays for raw materials and machinery covers the cost of their production, out of the price he pays for leather, the tanner likewise is repaid for his money outlays and receives a profit, while he in turn in the price he pays for hides reimburses the packer and his men.

The price the retailer pays for shoes covers all the money costs incurred by previous entrepreneurs from the producers of the raw materials to the shoe manufacturer; to this the retailer adds his own cost, which, plus his profit, constitutes his selling price. And the price to the ultimate consumer includes all the money costs assignable to the commodity in the course of its production.

## MONEY COST AND SUPPLY PRICE

Money costs are the payments necessary to induce the various producers to contribute their shares to production. We may divide the producers into laborers, capitalists and entrepreneurs, and look upon the money costs as the payments that must be made to these agents of production to induce them to furnish the requisite quantities of labor, capital and organization. In which case the money costs are the supply prices of the quantities of the factors of production, and the supply price of the finished product is the sum total of the supply prices of the factors of production that have been demanded to bring it into being.

We thus see how in the devious course of modern production, real cost crystalizes into money cost and money cost by a process of aggregation builds up the supply price of the finished product. Thus in this indirect and roundabout way, the supply price of a finished product is that which has been necessary to induce those who have been instrumental in its production to play their part.

## RELATION OF REAL COST TO SUPPLY PRICE OF LAND

In our account of the evolution of real cost into supply price we omitted, in speaking of the supply prices of the factors of production, any mention of the supply price of land or natural products. Rent is an important item in the costs of business

men; and in so far as commercial rent is due to improvements on land or natural resources, real cost enters into it and influences the supply price of this factor. It enters it, however, in the form of labor, capital, or organization and should be credited to these agents of production.

Rent from the viewpoint of political economy, however, is the return paid to owners of land for the part their land, strictly as a natural product, plays in production. Now the land in the United States or the coal or iron lying beneath that land is certainly not the fruits of man's labor, and its supply therefore is not influenced by real cost. The supply of land is limited in the first place by nature and is further limited and controlled so far as its productive use is concerned by private ownership. The supply price of the factor land then is not the sum necessary to induce owners of land or natural resources to put forth any production effort, but to induce them as owners to allow their land to be used for production purposes.

## COST OF PRODUCTION

The supply of produced commodities today is *directly* regulated by entrepreneurs, be they sole proprietors, partnerships, or corporations; and they reckon their costs in terms of money. These decide what shall be made and how, coördinate the other agents of production, pay them for their services, assume the responsibility of marketing the product, and decide on the price. Their costs are the sums they pay to the other agents of production; these, plus their profits, constitute their selling price.

The modern business concern is confronted with no more difficult task than to determine accurately its cost of production. The way commodities are fashioned today by the thousand, in complex organizations of highly specialized workers and machines, arranged in departments, each performing its particular function, makes the finding of unit costs a problem of no mean order. It is scarcely to be wondered at that up to a few years ago the great majority of concerns preferred to guess at their costs, a practice by no means extinct. Keen competition, however, and the splendid work carried on just previous to America's entrance into the war, by the Federal Trade Commission under the Hon.

E. N. Hurley in reference to cost finding, followed by the requirements of the government during the war, including also the income tax, have worked a revolution in the field of costs. Guess work is being replaced by accurate knowledge, and more than one concern has discovered to its surprise that it has been selling one or more of its products actually at a loss. Many of the best brains in business have been engaged on cost problems, the universities throughout the country have coöperated, with the result that a science of cost accounting has been developed and a goodly number of trained cost men are being prepared in our university schools of commerce every year for this important branch of work. Now that war is over and the nation is entering on a new era of intense international competition, less than ever can business men afford to play blind man's buff with their costs.

## A SIMPLE ANALYSIS OF MANUFACTURING COST

What constitutes cost may perhaps be best illustrated by a brief survey of manufacturing costs, in which field cost finding has been carried to its highest degree of efficiency. The Federal Trade Commission as a result of its exhaustive research and study of the cost of production of a large number and variety of businesses, presents in document No. 1356 entitled "Fundamentals of a Cost System for Manufacturers," a simple yet complete analysis of manufacturer's costs.

The three elements of cost are *Material, Labor,* and *Overhead Expense.* The first two of these are divided into direct and indirect.

*Direct Material* is that which forms part of some particular job, or which can be charged directly to a unit of product. Indirect material is that which cannot be located as belonging to any job or unit.

*Direct Labor* is that which is applied directly to a particular job or unit of product. Indirect labor is that which cannot be located as belonging to any particular job or unit, as the labor of a works manager or superintendent of foremen.

Direct Material and Direct Labor constitute what is generally known as *Direct* or *Primary Cost,* and shows the actual amount of cost directly chargeable to a particular job or unit of product.

*Overhead Expense* is expense of every kind connected with the business, none of which can be located as belonging to a particular job or unit. These expenses, while part of the cost, are general, and therefore cannot reach the job or unit directly, hence a method must be devised for them to reach the cost sheet indirectly, and in such a manner that each job or unit will receive its fair proportion of the total. For this reason overhead expense is sometimes termed indirect cost.

Overhead expense is divided into two classes, *Factory Overhead,* which consists of items directly belonging to factory pro-

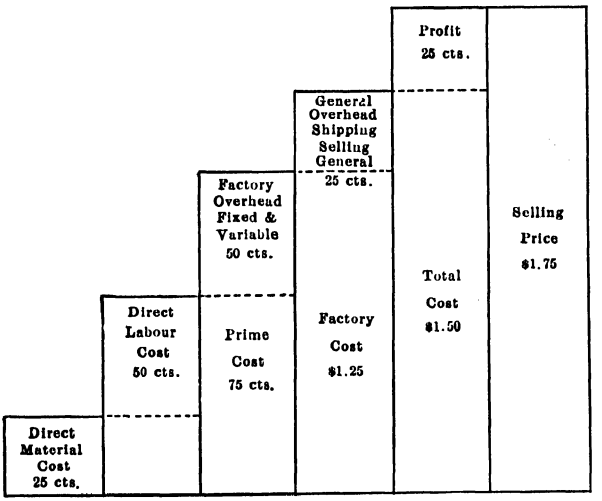



FIG. 9

duction, *General Overhead,* which is expense not directly connected with the factory.

Factory overhead is split into two parts, *Fixed* and *Variable* charges. Fixed charges consist of building expense or rent, power, insurance, taxes, and depreciation. Variable charges, the controllable expenses of factory operation, complete factory overhead, and include such items as indirect labor, repairs, lubricating oils and miscellaneous supplies.

Direct cost plus factory overhead constitute what is usually termed *Factory Cost.*

The next step, now that the goods are completed and placed in the storeroom as finished goods, is to compute their share of *General Overhead,* which consists of the shipping, selling, and *General Expenses* of the business.

*Shipping Expense* includes a proportion of fixed charges, freight or drayage, shipping clerks' wages, supplies, and incidental expense items.

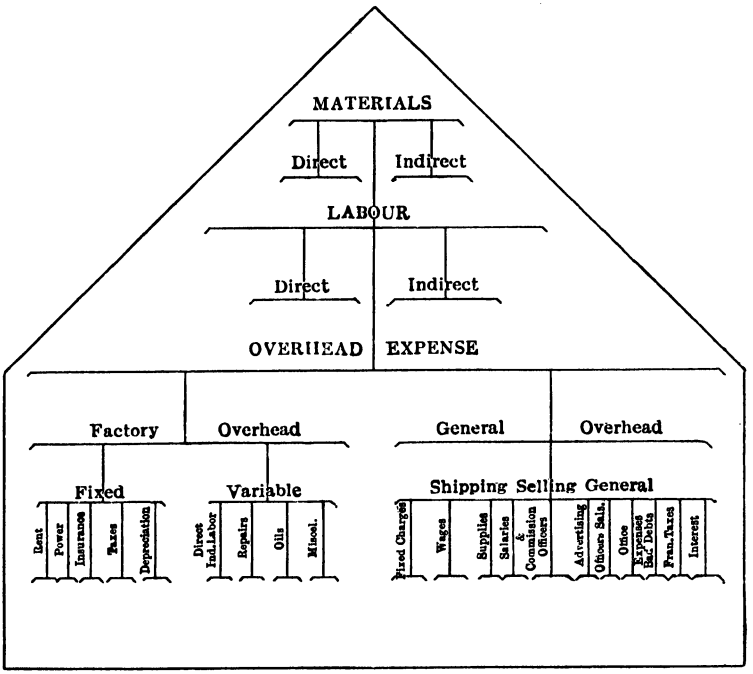



FIG. 10

*Selling Expense* involves such items as salaries and expenses of sales force on the road and in the office, advertising, catalogues, cost of handling cancelled orders, etc.

Last but not least come *general expenses,* such as officers' salaries, office expenses, insurance, defective work, taxes, interest when charged and other items of a general nature.

With the adding of general overhead to factory cost the riddle is solved and *total cost* is found—this plus profit constitutes the *selling price.*

This analysis shows how cost mounts up by a series of steps to the selling price, and Fig. 9 illustrates the process. Figure 10 shows at a glance the three chief elements of cost with their divisions and subdivisions.

## JOINT COST AND SUPPLY PRICE

Many commodities are produced under conditions of joint cost, the productive process gives birth not merely to a single product, but to twin, triple and in some cases a whole family of kindred products. These are often termed joint products and include by-products; familiar examples are sugar and molasses; cotton and cotton seed; beef and hides, with their numerous retinue of by-products; coke and coal tar with its varied progeny; and a legion of others whose numbers are constantly being augmented by scientific research.

When two or more commodities are produced *entirely* under conditions of joint cost, such as sugar and molasses, both of which emerge from the same plant and neither can be said to possess a distinct supply price of its own, to neither is it possible to attribute a definite proportion of the common cost. They do have a collective supply price, the sum total of their joint costs, for less than this they will not continue to be produced. The actual price of each will depend on the condition of demand for each. A share of the joint cost may be assigned arbitrarily to each according to the judgment and interest of those concerned. One method of segregating the cost of a principal product from a by-product is given by the Tariff Commission in its report on the costs of production in the sugar industry.

> If for the marginal factory the total cost of producing both sugar and its by-products is $140 per ton of sugar produced, and the receipts for the by-products are $20 on every ton of sugar produced, then a price of $120 per ton would permit that factory to continue without loss, while all the lower cost producers would make a profit. In such a view of the case the cost of producing sugar may be said without any great impropriety to be $120 per ton.

In the case of two or more commodities produced *partly* under joint cost, but which incur special costs in the separate subsequent processes which each must undergo to arrive at com-

pletion, the price of each must at least cover its special cost. The joint cost will be assigned to one, or divided between them, as judgment dictates or demand decides.

When there is one principal product, and a number of by-products, it is a common practice, in determining the cost of the principal product, to deduct from the total cost, the value of the by-products. The following description by L. D. H. Weld of Swift & Co., of the packers' method of determining beef costs furnishes a good illustration:

In the cattle operations of the packing industry, beef is the major product and has to be sold promptly, and consequently it is necessary for the packers to determine its cost. By-products include hides, oleo oil, tallow, bones, etc. Only about 45 to 60 per cent of the live weight of cattle emerges as beef, but this is the most important single product, both in weight and more especially in value.

In figuring the cost of beef, the packers keep separate account for each lot of cattle handled. The cattle are bought in lots, and consequently the cost price of each lot of live animals is known. To this original cost are added the expenses of buying, killing, dressing, trimming, loading, etc., thus giving the total outlay on the lot. From this total outlay is subtracted the current market value of by-products (less expenses for preparation and marketing). The remainder represents the cost of the beef, at the packing plant, before the payment of freight and selling expenses, which are finally added in order to get the total cost. This total cost of the lot is divided by the total number of pounds of beef, in order to get the cost per pound.

This whole process is illustrated by the following figures, which apply to a representative lot of cattle, but at a time when by-product values were relatively low:

EXAMPLE OF COST-FIGURING FOR LOT OF CATTLE

| | |
|---|---|
| Live Cost—46 Head, Weight 52,390 lb., Avg. 1,138 lb., Native Steers, at $7 | $3,667.30 |
| Expenses—Killing, dressing, chilling (estimated for month) | 118.03 |
| Allowance—Condemnations, trimming, etc. (average) | 17.77 |
| TOTAL Outlay on Lot | $3,803.10 |
| Less: Credit for hides (cured values less expenses curing and marketing) | $ 387.06 |
| Less: Credit for fats (value of products less expenses) | 116.30 |

| | |
|---|---|
| Less: Credit for other by-products (value of products less expenses preparing) | 125.73 |
| TOTAL By-products Credits | $ 629.09 |
| Balance—Plant cost of carcasses—in cooler | $3,174.01 |
| Dressed carcasses weighed 29,615 lb.—yield 56.53 per cent of beef. | |
| Average dressed cost per cwt. | $ 10.72 |
| Add selling costs and expenses | 1.87 |
| TOTAL Dressed Cost of Lot per cwt. | $ 12.59 |

It should be noted in this example that whereas the live cattle, weighing 52,390 pounds, were bought for $7 per hundred pounds, only about 56 per cent of this live weight emerged as dressed beef. This is the principal reason why the cost per pound of dressed beef has to be so much higher than the cost per pound of live animals.

The accuracy of this method of figuring the cost of beef depends largely on the accuracy of the by-product values used. If less than market values were deducted, the cost of beef would be too high, and consequently the profit would appear too small. The packers explain that whatever values are used in determining costs, the selling price of beef is not affected because fresh beef is a highly perishable product and must be sold promptly at the prevailing market price, but that in order to run their business properly, it is necessary to determine costs and profits for each department as exactly as possible.

The packers also call attention to one difficulty of this costing method. They have to use the *current* value of cured hides, for example, in determining the cost of beef at any one time, whereas it takes several weeks to cure the hides, and when they are finally sold, they may bring a higher or a lower price than had been figured on. Actual selling prices of hides and of by-products are used in figuring their earnings, but this does not affect the method of cost finding from day to day, because future values of by-products cannot possibly be estimated.

## TEST QUESTIONS

1. What is the chief factor in determining supply?
2. What is meant by "real" cost? By money cost?
3. Does "land" have any "real" cost?
4. Make an analysis showing the elements of manufacturing costs.
5. What is meant by "joint cost"?
6. Describe the method of costing used by the packers.

## CHAPTER XVI

## INFLUENCE OF COST ON SUPPLY

In the preceding chapter we saw how in our complex industrial system real cost underlies the supply prices of commodities, influencing them indirectly through the supply price of the factors of production employed to bring them into being. We saw also that the supply was directly influenced by money cost, operating through the cost of production of entrepreneurs, an analysis of which we have presented. It is the entrepreneur who runs the supply train; it is his hand which is on the throttle. The amount he will produce and the price he will be willing to sell at will be determined directly by his cost of production. Our next step will be to see HOW the amount and the price of the supply are governed by cost. We will find that cost influences supply in three ways: (1) By increasing as the volume of production increases; (2) by decreasing; (3) by remaining constant.

### INFLUENCE OF INCREASING COST ON SUPPLY PRICE OF INDIVIDUAL PRODUCER

In the case of an individual producing a commodity the unit cost of which increases with the amount he produces, the price at which he will be willing to furnish any given quantity, or the quantity he will be willing to sell at any given price, will be determined by the cost of the last or marginal unit.

If, for instance, additional units of a commodity are produced at the following cost:

The fifth at a cost of $1.00
The tenth at a cost of $1.10
The fifteenth at a cost of $1.25
The twentieth at a cost of $1.50,

the largest amount the producer will be willing to supply at a price of $1.10 will be ten. He makes a gain on each unit up to the tenth, the cost of which just equals the price he is offered. As every unit over this amount costs more than $1.10, he will not be willing to supply more than ten at that price. And so with any given price, he will be willing to continue production up to the point where the cost of the last unit equals the price.

In the same way the price at which he would be willing to furnish any given amount would be determined by the cost of the last unit. He would not be willing to supply ten units for $1.00 a piece, as he would suffer a loss on each unit he produced over the fifth; to induce him to supply ten, the price must be sufficient to cover the cost of the tenth unit.

The amounts of the supply schedule of an individual producing under the law of increasing cost would be the maximum amounts he would offer at the given prices, and the prices, the minimum prices necessary to induce him to supply the given amounts.

## LAW OF INCREASING COST OR DIMINISHING RETURNS

In agriculture and the extractive industries to a lesser degree, there is a tendency for commodities to be produced under the law of increasing cost. In the cultivation of a farm for example, a point is reached where an increase in product is obtained only at a more than proportionate increase in cost. This tendency is sometimes referred to as the law of diminishing returns, and may be stated as follows: In the cultivation of a given area of land or in the operation of a natural resource, after a certain point has been reached, increasing applications of labor and capital produce less than proportionate returns in product; provided no changes occur in the arts of production.

It is immaterial whether we refer to this law as the law of increasing cost or diminishing returns, it is evident that if the unit return diminishes in proportion to the unit cost, the cost increases in proportion to the return. Buried deep in the nature of things, this law has reigned in agriculture since the time of Adam, but to Ricardo is given the credit of its first formal statement.

## EXPLANATION OF LAW; ITS LIMITATIONS

In the earlier stages of the cultivation of a tract of land, increased applications of labor and capital, in the form of extra ploughing, harrowing, fertilizing, etc., may yield more than proportionate increases in product. After a time, however, extra doses of labor and capital will inevitably result in smaller and smaller returns, until the point is reached where the extra return is just about equal to the additional dose of labor and capital. This point has been termed the margin of cultivation; the last dose of labor and capital the marginal dose, and the extra product just balancing it, the marginal return.

We may state the same fact from the viewpoint of cost. Up to a certain point additional units of a product may be secured at a decreasing cost, after the point of minimum cost has been passed, additional units can only be obtained at an increased cost, and the point will finally be reached where an additional unit will cost as much to produce as it will bring in the market, this marks the terminus of profitable production. We may speak of it as the margin of production, the last unit as the marginal unit and its cost, marginal cost.

Many rash and pessimistic predictions have been made from the time of Malthus to the present, by failure to realize the limitations of this law, the practical importance of which lies largely in its influence on the food supply of man. While the population of a country is ever increasing the amount of land from which foods can be procured is limited, and if this law is true, as the population increases, it can be fed only at an increasing cost. This was the fact that lent color to the Malthusian theory which so strongly agitated the British in the nineteenth century. The little proviso at the end of this law is important—"if no changes occur in the arts of production"—if the knowledge and equipment of the cultivator remained stationary, then indeed there would be cause for alarm.

We live, however, in a world of change and though agriculture did not awaken quite as soon as manufacturing to the power of the machine, or the magic of science, the last seventy years have witnessed a revolution in methods of providing men's tables with food. Better fertilizers, better methods of cultivation,

better grains and stock, through the efforts of Uncle Sam's scientists in the Department of Agriculture, and of men like Luther Burbank; the rapid and widespread utilization of machinery, the latest example of which is the farm tractor of which 180,000 were in use in 1918, all have tended to counteract the law of increasing cost. It has even been claimed that they have nullified it. Such, however, is not the case, for this law is rooted in the very nature of the universe, and though it may be and has been offset by other laws, it still remains in operation, as every farmer knows. No matter how long improvements in the art of agriculture, due to invention and discovery, postpone the point of diminishing returns to any piece of land, there comes a time, if more product is demanded, when it must be produced under the law of increasing cost.

In considering the effect of this law on the food supply of any one country, we must take into account the development of land and marine transportation, which has opened up a way of escape to the world's seven densely populated centers of civilization, from the otherwise inevitable action of this law in raising the cost of food. As any one country exhausts its fertile soils, and gets into the condition of England in the early part of the nineteenth century, ocean transportation comes to the rescue, carrying food raised on the broad fertile plains of distant lands, such as the Mississippi Valley, the Canadian Northwest, Australia and the virgin plains on the banks of the LaPlata in Argentine. And who knows but that with the advance of aerial navigation, time and distance will be so commercially annihilated as to place the products of the most inaccessible places of the earth within a few hours' reach of the world's markets, enabling our future centers of dense population to be fed with bread raised in the rich valley bottoms and plains of South Africa and other now remote places.

## INCREASING COST AND TOTAL SUPPLY PRICE

The total supply price of any commodity produced under conditions of increasing cost will be based on the marginal cost of the marginal producer, whose supply is just necessary to satisfy the existing demand.

The total supply is the sum total of the individual supplies. Among the individual producers will be some less favorably situated than others who, utilizing poorer land or forced to engage in more intensive cultivation, are producing at a higher cost; while others more fortunately situated are able to produce at a lower cost. A small amount might be supplied at a lower price, but if a larger quantity is demanded the price must be sufficient to induce the high cost producers to supply the necessary quantity. Those more fortunately situated will not sell at a lower price than their less fortunate competitors, and so will reap a larger profit. The one price at which the whole will sell will be based on the costs of the marginal producers, just as the price at which the individual will be willing to sell is based on his marginal cost.

The sugar industry well illustrates the above principle. In the beet sugar industry of continental United States for instance, there are three well-defined areas of production, namely, the Pacific region with ten to thirteen factories in California and one in Oregon; the Mountain region including twenty-nine to forty-two factories in Colorado, Utah, Montana, Wyoming, Kansas, Nebraska, Nevada and Arizona; and the Eastern region with twenty-four to twenty-seven factories in States lying east of the Missouri River. The average costs of producing a ton of sugar for these areas in 1917-19 were as follows:

Pacific, $96.64 per ton
Mountain, $109.41 per ton
Eastern, $135.20 per ton.

The lower cost of production for the Pacific region is due primarily to the favorable climatic and soil conditions in California. And it is evident that if the price of beet sugar in the United States were to be based on the cost of production in California, a large number of plants in the Mountain and Eastern regions would be forced to suspend operations.

In stating our theory of the supply price of a commodity produced under conditions of increasing cost we maintained it to be based on marginal cost; in actual practice, however, it is likely to be based on the marginal cost of 90 per cent of the supply, as is shown by the chart facing p. 188 taken from the

Report of the United States Tariff Commission on the Costs of Production in the sugar industry, from which we also take the following apt quotation bearing on this subject.

Sugar production, it thus appears, is essentially an agricultural industry. Because of the varying degrees of fertility of land and varying advantages of location with respect to market, costs are permanently higher in some regions, or on some sites, than in others. The land which is most fertile and most favorably located cannot supply the total quantity demanded. The price is high enough to make it pay to cultivate land less fertile or less favorably located. There are always producers of such a grade or in such a location that their profits are not more than average or normal, producers for whom production barely pays. These are the high cost producers, called, for brevity, the marginal producers. The producers more advantageously situated continue to operate at low cost and receive the same price as the marginal producers; and they secure a larger profit. A study of the charts printed at the end of this report shows that in every locality and in every year the facts in the case of the sugar industry exemplify the results of the above analysis. There is a regular gradation of producers whose costs ascend like a flight of steps to the marginal producer. Further, there will always be in any given year a few producers who because of poor judgment, or drought, flood, fire, insect pests, or other misfortune will be shown as operating at a cost even higher than the marginal. Such a producer, for example, is obviously No. 68, Beet Sugar Industry, 1917–18 (Chart 111). His cost is $406.37 per ton. The average price of sugar for that year was only $120.40 per ton. He suffered a severe loss and clearly would not continue in business permanently at the same cost. Economic forces are always tending to eliminate such producers as show, over a series of years, a cost above the marginal cost, but in any one year the vicissitudes of time and chance will throw a few individuals temporarily into this class. The class is permanent; the individuals in it change.

## INFLUENCE OF DECREASING COST ON INDIVIDUAL SUPPLY PRICE

Many commodities are produced under conditions directly opposite to those referred to above; instead of the unit cost increasing with an increase in the supply, it decreases. In this case the unit price of any given amount will be based on the average cost to the producer, and the amount will be the smallest the producer will offer at any given price.

As each of the preceding units have cost the producer more than the last, he will evidently be unwilling to sell them at a price based on the cost of the last. If the cost of the 1,000th unit was 50 cents and each of the previous units have cost more; to sell the whole supply at 50 cents would entail a loss on every unit but the last. The producer must at least be assured of getting back his total cost, so that the lowest price he will be willing to supply any given number of units will be based, not on marginal cost, but on average cost.

Another point of contrast between a supply produced under increasing and one produced under decreasing cost, is that while the amounts of the former are maximum, those of the latter are minimum amounts. The price at which the sellers operating under decreasing cost, will supply a given amount is based on the average cost of production for that amount. Now as the average cost of a smaller quantity would be higher he would not be willing to supply it at a price based on the cost of the larger quantity. At any given price, therefore, the amount is the minimum that will be supplied at that price, that amount or more will be offered. To sell merely the minimum at any given price just repays the bare cost of production, but to sell a larger quantity means an extra profit, and moreover, the larger the amount, the lower the cost, and the bigger the profit. Here the way to fame and fortune lies along the great highway of large scale production, and the individual producer labors under a powerful incentive to increase his sales, a fact, the significance of which will appear later.

The supply schedule of a commodity produced under increasing cost is still further differentiated from one produced under decreasing cost, by the fact, that in the former, prices vary directly with amounts, an increase of amount being accompanied by an increase in price, whereas in the latter the opposite relation holds, an increase in amount being accompanied by a decrease in price.

### EXPLANATION OF LAW OF DECREASING COST

Manufactured commodities are largely produced under the law of decreasing cost. Transportation is also a good example

of an industry operating under this law. While the law of increasing cost arises because of the part which nature inevitably plays in production, that of decreasing cost springs from man's activities. That the unit cost decreases as the volume of production increases, is due to the advantages of large scale organization discussed in a previous chapter. An increased volume of production permits a more extensive use of machinery and a more profitable application of the principles of organization. These economies may be due directly to the increased efficiency of the individual organization or may arise indirectly as the result of large-scale organization in the industry as a whole or in its dependent industries. As an industry increases in size it will not only be able to produce more cheaply, due to the increased efficiency of its individual concerns, but will be enabled to purchase its machinery and materials at a lower cost on account of this same principle reducing their cost as they in turn come to be made in large quantities.

This law also has its limitations; there is a point in most industries beyond which increased production ceases to be accompanied by decreasing cost; where the economies of large scale organizations are exhausted and further increase is carried on either at constant or increasing cost. The location of this point will vary in different industries depending on the nature of the particular industry, on the extent to which plant and machinery can be used and the economies of large-scale production be taken advantage of. In supplying a local community with electricity it may hold true for the whole supply. In the textile industry the limit is more quickly reached than in the steel industry. In each branch of production there is an establishment of ideal size, in which the commodity is turned out at the lowest possible cost. In the realm of production efficiency sets bounds even to size.

## THE INFLUENCE OF DECREASING COST ON TOTAL SUPPLY PRICE

If the total supply were to be produced by one concern operating under decreasing cost, the lowest price at which they would supply any given amount would be determined by average cost.

This would be a case of monopoly, however, and will be treated later.

In any competitive industry wherein the supply is furnished by individual producers operating under the law of decreasing cost, the supply price will be based on the average costs of the marginal or high cost producers. Among the operating concerns will be some, more advantageously situated, more efficiently organized, with larger and better equipped plants operating at a low cost; others less advantageously situated, less efficient, or smaller plants, with higher costs. These latter will not continue to supply the existing demand at a price below their cost of production. The more efficient, on the other hand, will not sell below their less efficient competitors, so that the whole supply will be sold at a price based on the cost of the producers at the margin.

In an industry of decreasing cost, especially when cost descends rapidly, the individual producers being under a strong incentive to increased output, the supply tends to press on demand and occasionally outstrip it, provoking intense competition, which is apt to force price below the cost of production of the marginal concerns, to the peril of their existence. We will discuss this situation later; for the present it is sufficient to emphasize the fact that in the case of a commodity produced under decreasing cost, the supply price will be based on the average cost of the marginal concerns whose supply is necessary to satisfy the existing demand, and that it decreases as the supply increases. Many of the commodities we enjoy today, from shoes to automobiles, could not possibly be sold for their present prices, were they not produced in large quantities.

## CONSTANT COST

In some industries there is a tendency for cost to remain the same for a small or large output. The handicrafts of medieval times operated on this principle, and such industries as cigar making by hand and custom tailoring, are modern examples. There is also a tendency toward constant costs in some industries due to the counteracting influence of increasing and decreasing cost.

## INFLUENCE OF INCREASING AND DECREASING COSTS ON SUPPLY

Many commodities are produced partly under conditions of increasing and partly under decreasing costs. In the sugar industry for example, the cane is grown on plantations operating for the most part under increasing costs, whereas it is converted into sugar in factories under the law of decreasing cost. In the Hawaiian sugar industry for 1916–17, 42.2 per cent of the total cost of producing a ton of sugar was cane cost, while factory cost constituted 34.8 per cent of the total. The tendency toward decreasing cost in the manufacturing end of the Hawaiian sugar industry is shown in a striking manner by arranging the factories into three groups according to their size. The average cost per ton of sugar produced in the 13 factories of smallest output was $37.13; that of the 13 of medium output $33.55, while the 13 largest had a cost of $33.79. In the Hawaiian sugar industry the percentage of raw material cost to factory cost is higher than in other centers of the sugar industry, but the influence of large scale production in the sugar industry as a whole may be seen by glancing at the chart which shows, as a general rule, the *low cost* producers to be the *large* producers; in all the figures the wide rectangles are to the left, growing narrower toward the right as they increase in height.

The extent to which the price of the finished product will be influenced by either of these two opposing tendencies will depend on the relative proportions of raw materials to manufacturing cost. In those industries such as the flour industry in which the raw material cost forms the major portion of the total, the law of increasing cost will dominate; in such industries as watch-making in which the manufacturing cost predominates, the law of decreasing cost will rule, with the result that the more popular the commodity becomes, the lower the price at which it may be enjoyed.

In general these two laws, the one by increasing the cost of agricultural products, the other by reducing the cost of manufactured goods, oppose each other in influencing the supply prices of finished commodities. A growing manufacturing nation can only escape the tendency toward rising prices for its

raw materials, by importing them from newly opened lands in undeveloped countries. Thus did Great Britain by the repeal of her corn laws in 1846, open up a way of escape of her hard pressed population from high food prices by importing her food supply from Australia, Canada and the United States, and by her free trade policy has since been able to obtain the raw materials for her manufacturers at much lower cost than she could have produced them herself even if that were possible. In this tendency we see revealed one of the great underlying causes of the territorial expansions of the older nations.

## SUMMARY

Cost influences the supply prices of commodities by either increasing, decreasing or remaining constant, as the amount of their supply increases.

The law of increasing cost operates in agriculture resulting in a tendency toward an increase in the supply price of agricultural products with an increase in the quantity supplied.

The law of decreasing cost tends to reduce the supply price of manufactured commodities, as the volume of their production increases.

In both cases the total supply price tends to be based on the cost of the producers at the margin, but under decreasing cost there is a tendency toward over-supply with price falling below marginal cost.

## TEST QUESTIONS

1. In what three ways does cost influence supply?
2. What unit of the supply determines the supply price of a commodity under the law of increasing cost?
3. State the law of diminishing returns in reference to land.
4. Explain the effects of this law on the cost of the food supply of a nation as time goes on and the population increases.
5. What considerations must be taken into account in estimating the effects of the law?
6. What will the unit cost be based on in the case of an individual producer operating under the law of decreasing cost?
7. Explain the action of decreasing cost in an industry operating under the law of decreasing cost.

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## CHAPTER XVII

# INFLUENCE OF COST AND UTILITY ON PRICE

### RELATION OF DEMAND PRICE AND SUPPLY PRICE TO EQUILIBRIUM PRICE

Now that we have completed our survey of the demand and supply sides of the market, we are in a position to see the real nature of the equilibrium price. We saw before that the law of demand and supply tends to pick out a certain price, which as we said equates demand and supply, inasmuch as it is that price at which buyers and sellers are both willing to trade the same amount. In other words the interaction of demand and supply tends to pick out of the possible prices and amounts of the two schedules, the pairs that coincide. The equilibrium price is, therefore, the demand and supply price in one.

As the demand price it is that price at which buyers will purchase the whole of the given supply. It is based on the utility of the commodity to the marginal buyers.

As the supply price it is that price necessary to induce the sellers to supply the given amount, and is based on the cost of production of the marginal producers.

These two brought together in one focal point constitute the equilibrium price; the one price at which the two contending parties en masse are brought into agreement at their respective margins.

### THE EQUILIBRIUM PRICE IN THE LIGHT OF THE FORCES WHICH DETERMINE IT

When discussing the interaction of demand and supply we said it seemed as if two blind forces were forever seeking the price that would set them at rest. Whether above or below this point on the dial of value, prices always tend toward it, seem-

ingly impelled by some unseen force, as the steel needle of the compass is ever attracted to the north by the magnetism of the earth. We now see this actually to be the case; price movements are governed by forces coiled within the hearts of men, and the equilibrium price is in reality that price which is established by the balancing of the two opposing forces, desire and cost.

It is at the margins of demand and supply that these two forces exert their influence. The demand price is governed by the utility of the commodity to the buyers at the margin, the supply price by the cost of production to the marginal producers. The equilibrium price is that which just balances the cost of the commodity to the marginal producer and its utility to the marginal consumer.

Should the demand price be above the supply price it would mean that the utility of the commodity to the marginal buyers, measured in terms of money, exceeds the cost to the marginal producers, measured also in money. This state of affairs in which the price is above the cost of the marginal producers will stimulate production, supply will increase and prices fall.

Should the demand price be below the supply price it would signify that the utility of the commodity to the marginal consumers was less than the cost to the marginal producers. This condition will tend to discourage production, supply will decrease and prices rise.

Only when demand and supply prices coincide are the two forces of desire and cost balanced. Any change in either demand or supply upsetting the balance of these two forces sets them in motion and their interaction will again tend to force prices to the equilibrium point.

We are thus able to see behind the fluctuations of prices the forces that govern them; to see the reason for the statement of the business man that demand and supply determine prices. The equilibrium price is that price which desire and cost working through the minds of buyers and sellers tends to establish. It represents desire and cost brought into harmony in terms of money. Back of all prices and price changes everywhere, are these two elemental forces.

## VARIATIONS FROM MARKET PRICES

It is plain that the equilibrium point toward which the market price of a commodity sold under competitive conditions tends is not a fixed point. This could only be in a hypothetical state of society wherein there was no change. Furthermore, it should not be assumed that the law of supply and demand sets a rigid market price at which all sellers must and do dispose of their wares. This is very far from what actually occurs. An investigation of the market for almost any commodity will reveal considerable difference in the prices at which it is sold. While there will be a general or market price at which the bulk of the sales will be made, some concerns will be found selling above and others below, in the same market. The explanation of this is to be found in the leeway between the market price and the respective margins of cost and demand.

The market price at any one time will tend to approximate the cost of the marginal producers on the one hand and the price of the marginal consumers on the other. The more efficient producers with lower costs could sell if they wished at a lower price. Whether they will do so or not will depend on their price policy. To sell below the market is often thought to be a mistaken policy, bringing only destructive competition and lowered prices with little or no profit for any. Some new concerns, however, may sell below in order to secure sales and gain a foothold in an established industry. Some may do so in periods of depression to increase volume or because the lessened sales resistance allows of a less expensive method of selling. Other concerns prefer to sell at the market and secure their volume by intensive selling methods. Still others choose to sell above the market price. The market price is based on what will be paid by the least capable buyers at the margin of demand. There are many who would pay more and the sellers see to it that some of them do. This may be brought about by creating a belief in the minds of the buyers that the article is superior to that of their competitors or by using aggressive sales methods or it may be due to the inertia or indifference of buyers.

These individual differences in prices are accounted for partly

by the effects of the more farsighted sellers to adjust their prices to changes in the conditions of demand or supply. When costs increase as they did during the war some concerns will brave competition earlier than others by raising their prices and paving the way toward a higher market price. When scarcity in the supply and intensity of demand combine to make for a higher level of price as in the case of houses during the war and post-war period, some will take advantage of such a situation much sooner and to a greater extent than others and hasten the rise. When the tide changes and the demand begins to recede the cooler, shrewder heads who have been studying economic conditions quickly sense the change, lower their prices ahead of the crowd and connect with the new demand at the lower level.

If there be a sudden and drastic drop in demand, such as occurred in 1920, it may mean that the marginal demand price has dropped below the costs of the marginal producers who will be forced to lower their costs or be driven out of business. Many caught with stocks on hand, produced at the old high costs, were reluctant to sell them at a loss and held on hoping for a return of high prices. The consumer refused to buy at the existing high prices and demand continued falling. Those who analyzed the situation aright, who realized that the halcyon days of high prices were gone forever, got down to earth, quickly set about cutting their costs of operation, liquidated their high price stocks, and anticipated the inevitable fall in market prices by lowering the prices of their products below those of their competitors. This was not by any means an easy task especially for the manufacturers who sold their products to the ultimate consumer through the middlemen. It was of little avail for the manufacturer to lower his price unless the wholesaler and retailer followed suit. The consumer still held off and the manufacturer had to beat time with his plant half closed down for lack of orders. This does not mean that all retailers refused to lower their prices and all manufacturers did. On the contrary, many of the more progressive retailers being in closer contact with the buying public were among the first to sense the change, liquidated their high price stocks and brought what-

ever pressure they could to force lower prices from reluctant manufacturers. But in many cases the small retailer not so well versed in economic conditions as the large manufacturer and loath to tear himself away from the easy ways and big profits which the post-war period had allowed him to indulge in, stuck to his old stock and prices. Situated as he was at the neck of the bottle of distribution, his sluggishness caused those manufacturers who did reduce their prices quite a problem.

The bold action of the Interwoven Stocking Company in the early part of 1921 offers an interesting example of the manner in which some of the more progressive concerns successfully solved this problem and blazed a path to a newer and lower market price. The situation at the close of 1920 in the stocking industry was similar to that in many other lines. The bottom seemed to have dropped out of the market. The majority of factories were working at less than half capacity. The Interwoven people were convinced that the old high prices had gone forever and that prices were due to drop much lower. They believed that people would buy if the price were right, that there existed a demand at a lower price. They resolved to cut their prices to this level and avail themselves of the increased sales they had faith would be forthcoming. Moreover, they determined to do this at one bold strike, rather than by degrees. As Mr. Mettler, president of the company, put it:[1] "We figured that if a dog's tail had to be cut off you can't save hurting the dog by cutting it off little by little! We knew that by April we would have to cut our prices practically in half. We decided to make the full cut at once, reducing our 75 cents (at retail) numbers to 40 cents, our $1.50 numbers to 75 cents and our $2 line to $1.25." The reason was fully explained to the dealers and their cooperation secured. Three months was given them to get rid of their old stock before putting the new prices on the top tickets of the stocks.

This drastic action on the part of the Interwoven Company involved the writing off of $1,156,000 of inventory at one stroke of the pen and also making a price below their then costs which were based on part-time cost of production. The new price was

[1] *Printers' Ink.*

based on the lower costs of the anticipated full-time production that would accrue from the lowered price. The results fully justified their course for while most of their competitors were running on half time the Interwoven had one of the best years in its history.

## THE RELATIVE INFLUENCE OF UTILITY AND COST ON PRICES

In years gone by some vigorous disputes have been waged as to which determined value; utility or cost? Ricardo was the great champion of the hosts of cost while Jevons stands as the most famous exponent of utility as the determinant of value. Thus did these two great men attack the truth from opposite sides and we of the present are indebted to them for our broader viewpoint of the whole. Utility and cost act together in determining price. To discriminate between them and say that either is *the* determinant is like saying that one side of a pair of scales determines the weight. There is a sense in which utility is said to be the more fundamental, as it is the cause for the expenditure of cost, it takes the initiative. Demand is the draft that draws the fires of industry; it invokes supply; because a commodity is wanted it is made, otherwise it would not be produced. But it is just as true that industry will not furnish a commodity without cost, any more than a fire will continue to burn without fuel. The perennial argument as to which is the more important is in the main of academic interest. The question of practical import is: What is the relative power of the buyers and the sellers on price? And as this includes a view of the influence of both the forces at issue, we shall briefly discuss it pro and con.

## THE BUYER'S INFLUENCE ON PRICES

To many, no doubt, it seems as though a chemical analysis would be required to find a trace of the buyer's influence on recent high prices; and this practically approximates the case with some commodities sold under conditions of combination or monopoly. In competitive selling, however, both buyers and sellers take a hand in settling price. It is quite true that sellers

*directly* decide the price they will charge for their goods; the joker lies in the fact that the buyers decide the *amount* that will be sold. The sellers are in somewhat the same position in reference to the buyers in the market as Artemus Ward to the spirits in the sea, "I can call the spirits from the windy deep," said he, "but damn 'em they won't come." The sellers may charge whatever they please, but they are scarcely able to drag the buyers into their stores and force a purchase. The prices set by the sellers are subject to the law of demand; the higher the price the smaller the quantity sold. In order to sell their whole supply they must adjust the price to suit the marginal buyers, whose purchases determine the amount that will be bought. The buyer's influence, though indirectly exercised, plays a very decisive part in price determination.

In the interaction of *demand* and *supply* sometimes both are equally active in determining the price, sometimes either one may be the more active factor. In the case of a fixed supply with no reserve as to price, demand will be the active factor in settling the price. This has led to the statement that demand determines price. If one hundred units of a commodity were offered for sale on a market with no restriction as to price and the demand schedule showed that at a price of ten cents buyers were willing to purchase one hundred units, ten cents would be the highest price they would fetch. We might say, therefore, that the price was determined by demand; by the buyers. In so doing we take for granted the amount of the fixed supply, which had it been less would have resulted in a higher price, or more, in a lower. The amount of the supply being fixed, we ignore its influence and say that demand determines the price. Marshall, the English economist, has aptly likened demand and supply to the blades of a pair of scissors. If we hold one still we may say the cutting has been done by the other. In this sense only can we say that demand determines the price.

In considering the relative influence of demand and supply on prices, time is an important factor. The shorter the period taken into consideration the greater the tendency toward a fixed supply, due to the fact that over a short period the supply is limited by the existing factors of production. Price will be

at the mercy of demand; any sudden change in which will tend to raise or lower it. But given a period long enough to allow the factors of production to adjust themselves, supply will take a more active part in the price process by virtue of its control over the amount offered for sale. As a general rule the shorter the period of time, the more decisive will be the influence of demand.

While it is always true that buyers and sellers both have a share in price determination, it is well worth while noting that sometimes the one, sometimes the other, holds the whip-hand.

## THE INFLUENCE OF SELLERS ON PRICES

While it is self-evident that sellers cannot sell at any price they please, it is equally evident that buyers cannot buy at any price they please. Just as the selling price influences the amount that will be bought, so the price the buyers are willing to pay influences the amount they will be able to buy. In the same way as the sellers' prices are subject to the law of demand, the buyers' prices are subject to the laws of cost which govern the amount of the supply. The demand price for any given amount must be at least equal to the cost of the marginal producers, or they will not continue its production. In order to secure the amount they require, buyers must pay a price sufficient to induce the marginal producers to supply it.

The power of the seller over prices is exerted through his control over the amount produced. Under perfectly free competition, that is in the absence of combination or monopoly, this control is exerted solely through the cost of production. The amount of the supply is limited by the cost of the marginal producers. The efficiency of this control in limiting supply and maintaining price on an equality with marginal cost, depends on whether the commodity is produced under conditions of increasing or decreasing cost.

## RELATION OF COST TO SCARCITY AND VALUE

We will digress here for a moment to notice with more exactitude the relation of cost to value. In discussing value we found two primary causes, scarcity and utility; in discussing the prices

of the products of industry we have spoken of them as being determined by cost and utility. Is cost then a third cause of value on a plane with scarcity and utility?

The products of industry by very definition involve cost, which is the chief factor limiting their supply. In this they differ from natural products the supply of which is limited by nature. The values of both are directly determined by utility and scarcity, but in the case of industrial products cost enters the scene as a special cause of their scarcity. It bears the same relation to value as labor, the position of which we discussed on page 121. The cost of production theory of value is an outgrowth of the labor theory, both are supported by much the same arguments, both may be shown inadequate as explanations of value for the same reasons. Cost is a secondary cause of value, acting always through scarcity which with utility determines the value of everything. The vital part which cost plays as the cause of the scarcity, as the regulator of the supply of the products of industry sold under competition, justifies, however, the emphasis placed upon it.

## THE INFLUENCE OF DECREASING COST ON EQUILIBRIUM PRICE

In those industries in which the individual producers are operating under decreasing costs, there is a tendency to instability on the part of the equilibrium price.

Should the actual price be above the equilibrium, it would mean a price above marginal cost; this would stimulate production and price would fall. The ominous feature about price under decreasing cost, however, is that it is possessed of a tendency not to stop at the equilibrium but to keep on falling.

The equilibrium price of such a commodity it will be recalled, is based on the minimum output of the marginal producers. The temptation of larger profits from the lower cost of a larger output will be a constant stimulus to them as well as to the rest of the producers in the trade who are operating under decreasing cost to forge ahead and increase their volume of production. Supply thus spurred on will overtake demand and price will tend to fall.

Under increasing cost, if the price fell below the equilibrium and thus below marginal cost, the only course open to the marginal producers was to cut cost by reducing output; cost thus automatically reduced supply and the price rose. Under conditions of decreasing cost the situation is reversed. The way of escape to lower cost lies in the direction of increased volume. Cost thus acts to increase supply even when price is below the costs of the marginal producers.

This state of affairs leads to cut-throat competition. Some of the marginal producers in order to sell a larger volume at a lower cost will cut the price. Others must follow. As prices sink the weaker concerns are forced out of business. The large and efficient concerns and those able to make the changes necessary for volume production survive. For a while the supply may be reduced and price go up, but as long as any of the producers are operating under decreasing cost, supply will continue to press on demand and price will tend to fall below cost. Should the industry be one in which the point of decreasing cost is soon reached and is followed by increasing cost, this tendency will cease.

## RESULTING TREND TOWARD COMBINATION OR MONOPOLY

If the industry is one of large-scale production the course of evolution will inevitably set toward combination or monopoly, either by peaceful combination, or along the warpath of competition with its struggle for existence and survival of the fittest; or by both methods, as illustrated by events in the steel industry during the nineties. Uncontrolled competition in an industry of decreasing cost means cut-throat competition, rate wars, price below cost, an intense struggle for existence on the part of the marginal concerns with their elimination or absorption by their bigger competitors. The sole avenue of escape from the drastic action of demand and supply under decreasing cost is for the producers to regulate the supply by combined action. Here free competition ceases and combination begins.

If the looser forms of combination such as mere understandings arrived at through manufacturers' associations, gentlemen's

agreements and pools, are declared illegal or fail to accomplish their purpose, competition if given free rein will eventually destroy itself and evolve into combination or monopoly. A state of cut-throat competition and rate war, is never permanent; men get tired of the strain and strife. If carried to the bitter end such a struggle results either in the formation of some powerful monopolistic organization, able by virtue of its control over the supply to stabilize the price, as does the United States Steel Corporation the price of steel, or in the formation of several large concerns which by intercourse through trade associations are able to coöperate instead of compete in the regulation of supply.

Uncontrolled competition, then, tends to be replaced by some form of combination not only on account of a desire to escape the drastic consequences of the law of demand and supply under decreasing costs, but by the dual benefits to be derived on the one hand from the economies of large-scale organization, and on the other from the power over price which combination gives to the producers. The crux of the whole price question lies in the extent to which the producers are able to control the price by virtue of their ability to regulate the supply through combination or monopoly.

## SUMMARY

The law of demand and supply is based on the interaction of the two forces, desire and cost. The equilibrium price is simply the price which these forces tend to establish when left to work themselves out under conditions of free competition. It is that price which the free bargaining of buyers and sellers tends to fix, which brings them both into agreement, being equal to the costs of the marginal producers on the supply side and the utility of the commodity to the marginal buyers on the demand side.

In the case of a commodity produced under conditions of decreasing cost, there is a tendency for price to fall below marginal cost, due to the instability of supply and its tendency to overtake demand. Cost fails to limit the supply. Producers have thus been forced by the pressure of circumstances to combine for

their own protection. Uncontrolled competition which means unregulated supply has thus been replaced by combination which means regulated supply. The question which remains to be answered relates to the nature and extent of the control over price by combination and monopoly.

## TEST QUESTIONS

1. What is meant by "demand price"? "Supply price?" "Equilibrium price?"
2. What two forces determine the equilibrium price of a competitive market?
3. Under conditions of competition what influence do buyers have on prices?
4. How is the control of the seller exerted on price under competition?
5. Explain the tendency toward combination in an industry of decreasing cost.

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## CHAPTER XVIII

# THE INFLUENCE OF MONOPOLY ON PRICE

### NATURE OF MONOPOLY

Thus far in our study of the action of the law of demand and supply in determining price we have assumed that there is no concerted action on the part of buyers or sellers to control either the demand or the supply. Any control of either interferes with the free action of the law. Free and open competition implies independent action, all absence of agreement, on the part of buyers or sellers. Monopoly as the term is usually employed, implies a control over the supply by the sellers. Just as soon as competing producers are able by joint action to control supply and influence price monopoly power begins. Such control ranges from the indefinite yet effective regulation brought about by an understanding between competitors, to complete control over the whole supply by one sole producer. The central idea of monopoly is unified action in the control of supply. It is usually defined as such a control over the supply of a commodity as to enable the seller to fix the price.

### MONOPOLISTIC CONTROL ARISING THROUGH BUSINESS ASSOCIATIONS

The loosest form of united action on the part of competing sellers arises from their association in trade organizations of various kinds. The number of such associations is legion. They exist in every branch of industry from farming to retailing. There are associations of lumbermen, dairymen, and producemen, milk distributors, iron and steel producers, shoe manufacturers, clothiers, bankers, bakers, grocers, credit men, and so on, local, national, and international.

Their purpose is to promote and protect the interest of their respective trade or profession. They gather and disseminate

information of common value and discuss questions of common interest; and in this connection, of course, prices are by no means taboo.

An interesting example of such association is seen in the asbestos business, in which there are three organizations, the Asbestos Textile Manufacturers' Association, organized in 1915; the Asbestos Paper Manufacturers' Association, and the Asbestos Brake Lining Manufacturers' Association, organized in 1916. These have the same secretary and work on the same lines. They are loosely formed on advice of counsel, confirmed by a representative of the Federal Trade Commission; they have no constitution or by-laws, but are based upon a declaration of principles covered in the minutes of the first meeting as follows: "It was decided to organize a permanent association, for the purpose of standardizing methods of manufacture, methods of cost finding, and for the purpose of distributing among the members all information as to quotations, contracts, and actual bona fide sales which might lawfully and justly be published." The secretary states that "no effort is made to fix or control prices or in any other manner to stifle or influence trade. The whole object of the association is to place before each member at periodical intervals concise and accurate information as to the tendencies of supply and demand, prices, production, and so forth." This is an example of what is termed the "Open Price Idea" in association work. The secretary further states that before the organization of the association many of the men were competing each with the other without even being personally acquainted. Now that they meet monthly, old-time jealousies, suspicions and disagreements have disappeared and in their place have sprung up good feeling, mutual reliance and harmony of action; "general conditions have been so improved that you could not find a member who would for a moment consider giving up the *Coöperative Competition Idea.*"

There is not a shadow of a doubt but that such organizations are a benefit to their members, and are also productive of much good to their respective trades and to industry as a whole. There is also no doubt but that such organizations afford an opportunity for concerted action on the part of sellers in con-

trolling supply and regulating price. That such association, by which free-for-all competition is replaced by coöperative competition may give rise to understandings and agreements regarding price and place in the hands of the sellers a certain monopolistic power is well illustrated by events in the newsprint paper industry during the war when the balance between the supply of and the demand for paper was uncomfortably close. The Federal Trade Commission after a most careful investigation of that industry states in its report issued on March 3, 1917, that:

> By means of a trade association, organized ostensibly for a lawful purpose, conditions in the market were influenced in a very substantial degree, and in a manner which sustained a price which would not be possible under conditions of free competition. Concert of action was made possible through this association in the matter of discouraging new production of newsprint paper, in the division of customers, in the promotion of fear that the supply would not be equal to the demand, in disseminating propaganda justifying higher prices because of alleged higher costs, and in other ways. The increase in the prices charged are not justified by the increased costs of production.

The idea of coöperative competition is sound; it is the natural child of changed industrial conditions; it is supplanting individualistic competition throughout the whole of industry and rightly so. It should be clearly understood, however, that such coöperation on the part of sellers, places in their hands a *power over price that does not exist under free-for-all competition,* a power which by virtue of its very subtlety is by no means universally recognized, but which is perhaps more far-reaching in its effect on prices than that of the big monopolist who looms up more conspicuously in the popular mind and is on that account the more likely to be curbed.

## SPECIFIC AGREEMENTS AND POOLS

Closely akin to the unity of action by competitors arising from business association is that springing more directly from alliances formed for the distinct purpose of influencing prices. These alliances range from mere meetings of competitors with little or no special machinery for the execution of their purpose, such as

the famous Gary dinners, to the loose form of organization known as the pool. The form of agreement may be a mere understanding in regard to price, a "gentleman's agreement," or a formal contract involving a restriction of output, a division of territory, price fixing or division of profits. The testimony of Charles M. Schwab before the Industrial Commission is illuminating in regard to the extent of such practices. When asked if there had been pooling agreements in the steel industry he replied: "Yes, in all lines of business, not only in steel but in everything else. There were similar agreements, known as joint agreements to maintain prices. They have existed in all lines of business as long as I can remember."

The name, pool, has been used indiscriminately to apply to all forms of united action by competitors for the purpose of controlling supply or influencing price; strictly speaking, however, a pool involves the placing of a part of the receipts or profits into a common fund to be distributed among the members by agreement. The pool first came into prominence among the railroads, which adopted this method of joint action to prevent rate cutting and stifle competition. They have existed in manufacturing industries since 1860, though the great era of the pool proper was from 1870–1887. Railroad pools are illegal, and in manufacturing pooling agreements have usually been held to be contracts in restraint of trade and therefore against public policy. They are an unstable form of organization, their weakness lying in the fact that their contracts being unenforceable by law, it is hard to hold the contracting parties in line.

Pools and agreements in spite of their weakness and their disfavor in the eyes of the law have played an effective part in price control and, contrary to the opinion of some writers who treat them as relics of a by-gone age, they still flourish in great variety, especially in their more elusive forms. The recent report of the Federal Trade Commission on the meat packing industry reveals some interesting facts in this connection. It appears the first pool in that industry was brought to light through an investigation by a United States Senate committee, which in 1890 reported that there was an agreement between the then leading packers to refrain from competition; that there was collusion

with regard to fixing of prices, division of territory and business. These conditions were partly responsible for the passage of the Sherman Act in 1890. In 1912 it was admitted by Henry Veeder under oath that from May, 1893, to May, 1896, representatives of the leading packers met regularly every Tuesday afternoon in a suite of rooms leased in the name of Henry Veeder, who acted as secretary and statistician. At these meetings the territory was divided and the volume of business to be done by each packer was apportioned upon the basis of statistics compiled by Veeder, penalties being levied when any one of them exceeded his allotment. This "Veeder pool" was followed by other pools and supplemented by a policy of concentration and combination by the big packers, who absorbed many of the strong independents. As fast as one pool was broken or rendered impolitic by a government investigation another was formed. According to the commission,[1] there exists today a live stock pool which

> is not only an automatic regulator of the relative volume of business of each of the big five, but also secures substantial uniformity of prices paid for live stock and consequently the prices at which dressed meats are sold. In brief the prearranged division of live stock purchases forms the essential basis of a system by which the big packers are relieved of all fear of each other's competition, and, acting together are able to determine, not only what the live stock producers shall receive for their cattle and hogs but what the consumer shall pay for his meat.

## SELLING ORGANIZATIONS

Somewhat similar to the pool is the selling organization, formed by a number of competing producers for the purpose of marketing their joint product. This is a more compact form of organization very common in Germany but by no means rare in the United States. The best known examples are perhaps the fruit growers' exchanges. The stockholders of the exchange are the growers; the exchange acts as a selling agency, charging commission for its services. A good example of such an organization is the California Fruit Growers' Association, a non-profit

[1] Summary of the Report of Fed. Trade Comm. on Meat Packing Industry.

corporation under the laws of California, acting as a selling agency for over 6,500 fruit growers, who are organized into 115 local associations, each of which has its packing house where the fruit is assembled, pooled and packed for shipment. These local associations ship their fruit through seventeen district exchanges, which act under the direction of a central exchange. The central exchange is managed by a board of seven directors acting through a general manager. It looks after all matters relating to the selling of the fruit, has agents in all the principal markets of the states and Canada, secures information relative to the demand, conducts extensive advertising campaigns, and develops new markets.

These organizations are a good example of coöperative competition where coöperation was needed. Speaking generally, the farmers and growers have been slower to organize than the manufacturers or the middlemen to whom they sell, which has placed them at a disadvantage and resulted in their often being forced to sell at prices which have not brought them a fair return for their efforts. The Coöperative Marketing Association has enabled them to get their product more directly to the jobbers and grocers and to eliminate speculation. They have improved conditions and through their advertising have established brands, thus giving the public the assurance of standard quality. There is no doubt that they eliminate competition and influence prices, —stabilize them would be the better word. In fixing prices they must of necessity pay considerable attention to demand, which is elastic in the case of fruit. So far their influence has been beneficial to the producer and not harmful to the consumer, but in view of the rapid increase in these associations during the last five years, the fact should not be lost sight of that each is replacing free competition by an organized control over the supply of a commodity by virtue of which it is able to wield a powerful influence over price.

## COMBINATION

The various forms of organizations discussed so far have been loose in form and more or less ephemeral, while the fact that the united parties still retained their autonomy as producers, afforded

only an incomplete control over the supply; hence a more stable form, insuring a firmer grasp over supply, was sought. The famous "trust" was first tried, a union of separate corporations, each of which transferred its stock to a group of trustees who then controlled the constituent companies. The trust being declared illegal, the holding company was devised, which achieved the same purpose. The merger followed later. These two, which we have already described, secure perfect control over the constituent companies and complete unity of action. The extent of monopoly power wielded by one of these organizations will depend largely on the percentage of the supply of the whole industry controlled by it. The American Sugar Refining Company in 1892 controlled 90 per cent of the entire sugar refining business of the country. The whisky combination has controlled as high as 90 per cent of the entire production of spirits. The United States Steel Corporation in 1901 controlled about 60 per cent of the iron ore supply of the United States and about 65 per cent of the country's steel production, which percentage has been since reduced.

The degree of monopolistic control is not confined to the amount of output directly controlled by any one combination, but is reinforced by the ease with which a few combinations in any one industry can coöperate in the ways illustrated among themselves or with small independents. In the salmon packing industry for example, five [1] groups of companies control 51 per cent of the entire output and set the price at which the great majority of the packers dispose of their product. The "Big Five" in the meat packing industry are said to control [2] 70 per cent of the live stock slaughtered by all packers and butchers engaged in interstate commerce.

## DEGREES AND FORMS OF MONOPOLY CONTROL

In this analysis of the means by which unity of action is secured by competing producers in the control of supply and price, we have passed from the indirect to the direct, the loose to the compact, the incomplete to the complete. It has been a journey from

[1] Report of Fed. Trade Comm. on Canned Goods, Dec., 1918.
[2] Report of Fed. Trade Comm. on Meat Packing Industry, July 5, 1918.

competition to monopoly along the road of coöperation and combination. We have not attempted any elaborate or detailed account of the forms and extent of monopoly which is beyond our present aim, but sufficient has been said at least to suggest the presence and extent of monopolistic agencies in our industrial society and to give some idea of their nature. All monopolies do not by any means evolve out of competition; some spring direct from government grants, as patents, copyrights and franchises, which confer on the owner the sole right for a period to produce. Closely related to these is the private brand, a prevalent and powerful form of monopolistic control backed up by advertising.

## MONOPOLY POWER OVER PRICE ILLUSTRATED

The essence of monopoly is power to regulate supply so as to fix price. This is illustrated in the diagram Fig. 12. The demand

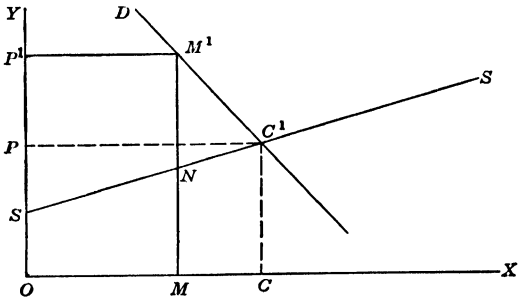



FIG. 12

and supply curves SS and DD indicate that under competitive conditions the amount OC would be produced at the price CC¹. The rising supply curve indicates that the commodity is produced under the law of increasing cost, the one price at which the whole would sell being based on the cost of the marginal producers. The combined profits of the competitive producers are measured by the triangular area PC¹S.

Should the producers get together in such a way as to be able to control the supply, they would be enabled to command a higher price under the same conditions of demand. By restrict-

ing the amount of the supply to OM they could command the price $MM^1$. This they might accomplish by raising the price to $MM^1$, which would enable them to dispose of OM units of the commodity at a profit represented by the area $P^1M^1NS$.

## LAW OF MONOPOLY PRICE

Monopoly price, therefore, will not necessarily be based on marginal cost, but will be that price which will bring the largest profit to the seller or the sellers. The amount sold under monopoly will not be limited automatically by marginal cost as under competition, but by virtue of the control over supply enjoyed by the monopolist, it will be the amount that will bring him the most profit.

## UNDER DECREASING COST

In the case of a commodity produced under decreasing cost, the monopolist in order to fix the price that will bring him the most profit must bear in mind that the higher the price, the fewer the sales, the higher the unit cost: and conversely the lower the price, the bigger the volume of sales, the lower the unit cost. He will seek by estimate or experiment that price which will bring him the largest net profit. In so doing he will keep his eye on gross receipts and total cost, the difference between which measure his gain. The following table illustrates such a case; under the assumed conditions the monopolist would derive the largest profit by selling the commodity at ten cents.

| Unit Price | Number of Sales | Unit Cost | Gross Receipts | Total Cost | Profit |
|---|---|---|---|---|---|
| $.50 | 100,000 | 15 | $50,000 | $15,000 | $35,000 |
| 30 | 170,000 | 12 | 59,500 | 20,400 | 39,100 |
| 25 | 300,000 | 10 | 75,000 | 30,000 | 45,000 |
| 15 | 800,000 | 7 | 120,000 | 56,000 | 64,000 |
| 12 | 1,500,000 | 5 | 180,000 | 75,000 | 105,000 |
| 10 | 3,000,000 | 4½ | 300,000 | 135,000 | 165,000 |
| 8 | 4,000,000 | 4¼ | 320,000 | 170,000 | 150,000 |
| 5 | 8,000,000 | 4 | 400,000 | 320,000 | 80,000 |

## TAPPING SEVERAL STRATA OF DEMAND

It is sometimes stated by economists that monopolists are able to sell their product at different prices while under competition the whole supply must be sold at one price. Theoretically this may be possible but in practice it is not common. The illustration is sometimes given of a branded good such as soap, being sold at several prices; a standard grade being put out at 10 cents; a price of 25 cents being charged for the same soap, with a dash of perfume, and a colored wrapper marked "Superfine." In such a case it is not the same product, however slight the difference may be, but a different grade of product; and in competition different grades fetch different prices even when these grades are purely imaginary, as in the case of grocers who have been known to sell coffee from the same bag at different prices by putting it in different bins marked at 18 cents, 25 cents and 35 cents.

It is, however, a common practice for monopolists to differentiate their product, as in the case of a branded good, and to sell at different prices by tapping several separate layers of demand, thus increasing their volume of sales and materially adding to their profits. To stick to our soap illustration, there is a large body of consumers who will not pay more than ten cents for a cake of soap. There is a second class of people perfectly willing to pay 25 cents for their favorite toilet article and still a fastidious third class, connoisseurs in soap as it were, who will blithely pay 50 cents for a perfumed artistically wrapped creation, with a smack of distinction. In other words there are several strata of demand for soap, and this is true of most products from condensed milk to automobiles.

## MONOPOLY POWER AND DEMAND

Monopoly power over price is much influenced by the conditions of demand. In general the more elastic the demand the more careful must the monopolist be in fixing the price; the more inelastic the demand the greater will be his power over the price.

In the case of a commodity sensitive to price changes, a slight rise in the price will be followed by a big cut in sales; on the

other hand a large increase in the volume of sales will be secured by a small reduction in price. As a rule it will not pay the monopolist to restrict unduly the supply of a commodity with an elastic demand; such restriction will make little difference in the price he will be able to get. If he is manufacturing a commodity subject to decreasing cost it will be to his interest to increase the supply, which he can do without being forced to lower price to any great extent. In this situation "it pays to advertise," a fact which monopolists are coming to realize much to their advantage.

For a commodity with an inelastic supply the conditions are reversed. The monopolist will be able to raise his price without much fear of curtailing his sales, while they will not increase to any great extent much if he lowers price. A restriction of the supply will now make possible a big increase in price, while on the other hand an increase of supply would cause a big drop in price. Here, then, there will be every inducement for the monopolist to limit output and raise price.

Conditions of inelastic demand offer a tempting field to the monopolist and furnish a rich harvest of monopoly profit. In the case of the necessities of life, such commodities as bread, coal, light and heat, and local transportation, especially where there are no available substitutes, the monopolist may have the consumer at his mercy and wield a dangerous power.

## LIMITATIONS TO MONOPOLY POWER

In our discussion of monopoly price we said that it was the price which would bring the monopolist the largest profit. This statement, to be correctly understood, needs to be qualified. Should the monopolist enjoy a complete control over supply it will be possible for him to fix the price calculated to bring the biggest profit. In actual practice, however, good business policy will usually dictate a more conservative course, because of the fear of three things, namely, competition, substitution and government control.

Excessive profits in any branch of industry attract capital and invite competition just as surely as sugar draws flies. Recent history shows that even in those industries, dominated by

the most powerful combines, competition is by no means dead even if denatured. The history of the sugar, whisky and steel industries demonstrates this. High prices also irritate the consumer and encourage substitution and there are few articles for which there are absolutely no substitutes. Finally, exorbitant prices attract the lightning of Governmental legislation. A lower price than the highest price acts as insurance against these hereditary foes of monopoly, and for purely business reasons it will usually pay the monopolist to adopt a policy of wise restraint. The United States Steel Corporation is a shining example of a concern which has followed such a course since its organization. Properly amended the law will read that monopoly price is that price which in the long run will bring the monopolist the maximum profit.

## MONOPOLY PRICE USUALLY HIGH PRICE

To say that monopoly always results in exorbitant prices would be an exaggeration of the facts. It is perfectly possible for monopoly price to be below competitive price, owing to the economies that may be attained by placing production under the control of one concern, as in the case of a local gas or electric supply. It may also be in the interest of the monopoly to set the price at a low figure as for instance when decreasing cost governs the production of a commodity the demand for which is elastic. Or the monopolist may have the interest of the public at heart and set as low a price as is consistent with a fair profit to himself. Making full allowance for these possibilities it is patent that as a general rule, the price of a commodity produced under conditions of monopoly will be higher than for that same commodity under conditions of free competition.

This is but a common-sense conclusion. There is no question of the power over price which monopoly brings. The history of competition is nothing but a history of the continuous striving after this power by fair means or foul. Ever since the Laissez Faire period of the nineteenth century there has been evidenced in commerce a constant and irrepressible trend toward monopoly power.

Moreover, the verdict of history is that monopoly price is

high price; it has at times meant exorbitant price as with the government monopolies of medieval England. Unbiased students of modern monopoly such as the late Van Hise, pronounce it to be higher than competitive price. A study of the evidence presented by the most exhaustive investigation of recent times, that made by the Industrial Commission appointed by Congress in 1898, into the nature of industrial combinations and their effect, cannot fail to lead an impartial observer to the conclusion that such combinations have had the effect of raising the prices of the commodities they control to a higher point, than would have been the case under competition. More recent investigations reinforce this conclusion and give some glaring instances of the abuse of this power.

## TEST QUESTIONS

1. What is the root idea of monopoly?
2. Explain the monopolistic effect on price of business associations.
3. What is a "pool"? What is the object of a pool or "gentleman's agreement"?
4. How might a "selling organization" exert a monopolistic influence on the price of a commodity?
5. What is the law of monopoly price?
6. What are the three limitations to monopoly power?
7. Is monopoly price necessarily the highest price?

## CHAPTER XIX

# COMPETITIVE PRICE; MONOPOLY PRICE; PRICE REGULATION AND THE LAW OF DEMAND AND SUPPLY

### THE LAW OF DEMAND AND SUPPLY UNDER COMPETITION

Our study of prices has involved a study of the law of demand and supply, with its twin underlying forces, desire and cost, from whose interaction the law derives its power. In order to gain a clear view of the nature of the law we first noticed its operation under conditions of perfectly free competition,—ideal conditions, which allow the free interaction of the underlying forces. Under such conditions an equilibrium price would be established, based on marginal cost and the utility to the marginal consumer.

But in actual life competition is never perfectly free. In our modern industrial system, the inequality of competitors, the immobility of the factors of production, particularly the high degree of specialization in labor and capital, interfere with freedom of motion and clog the wheels of competition. There is always friction in the practical operation of all forces, whether mechanical or human. Hence in stating the law of price under actual competitive conditions, we said that prices *tend* toward an equilibrium price. We have used the term tendency all through our explanation. When dealing with human forces it is, of course, impossible to measure them with the exactitude we have assumed, for instance, in the demand and supply schedules. But to make clear the action of the forces utility and cost, in determining price it is necessary to use definite figures. It should not be thought, however, that because these forces are incapable of exact measurement they do not work according to law. They most certainly do, and the tendencies we have

presented show the action of the law as it operates under conditions of ordinary competition, unhampered and free from any manipulation.

## THE LAW OF DEMAND AND SUPPLY AND MONOPOLY PRICE

In studying monopoly price we find the same law, the same forces, but now operating under different conditions, under conditions in which the forces on one side are organized and on the other unorganized. Monopoly is such a control of the supply side of the law as enables the monopolist to manipulate the law to suit himself. Monopoly is simply manipulation of the law of demand and supply by one of the interested parties.

It is often said in reference to the failure of competition to establish a fair price that "business is conducted in opposition to economic laws," meaning the law of demand and supply, a statement due, perhaps, to the over-emphasis which economists have sometimes given to this law as it operates under ideal conditions of free competition. The fact of the matter is that business today is conducted very much in accordance with the law of demand and supply. The law of demand and supply is buried deep in human nature and must always be reckoned with. It can, however, be regulated and controlled. And all the monopolist is doing is to control the law for his own benefit. Here lies the gist of the whole matter. All human achievements come by working in harmony with natural laws. The monopolist is wise in his day and generation, and just as he has by control of physical laws increased the product of his plants, so by his use of the law of demand and supply he has been able to increase the price of those products in the market.

It is equally possible for the manipulation to take place on the buyer's side by the control of demand. It has been said that "the husbandman has always been the dupe of the law of demand and supply." Here we have the reason; the farmer has heretofore played the game single handed; he has furnished the supply under conditions of individualistic competition for an organized demand. By means of the coöperative marketing association, he is fighting fire with fire. Both sides being organ-

ized a better equilibrium will be established and a fairer price obtained.

In the evidence gathered by the Federal Trade Commission referred to on page 208, the power of the big combination to influence price by virtue of its control over demand was clearly shown. When any company secures a monopoly of the manufacture of a commodity it has the producers of the raw material pretty much in its power and is liable to leave them little profit. This is exactly what the "Big Five" in the meat packing industry are accused of by the Federal Trade Commission,—of combined action in purchasing by means of which they are enabled to control the price of live stock. They [1] kill 70 per cent of the live stock slaughtered by all packers and butchers engaged in interstate commerce. The commission stated:

[2]Thus without any collusion beyond agreement to divide purchases, the price which the producer receives for his live stock is bound in the long run to be the *lowest price which will keep the producers raising cattle, hogs and sheep and sending them to the stock yard.*

Here we have an example of a double-actioned monopoly standing midway between the producers of the raw material on the one side, and the ultimate consumers on the other. It gets them going and coming as it were, and is enabled by its control of demand on the one side and supply on the other, to depress the price of cattle and to raise the price of meat. Of course the packers may not use this power; in fact they are vigorously denying it in an extensive and expensive advertising campaign to the public. The point that requires emphasis is the powerful possibility afforded by such a monopolistic position, which denotes the very acme of monopoly efficiency.

### THE UNORGANIZED, ULTIMATE CONSUMER

If the structure of our present industrial system has in some cases rendered competition passé, and in others undesirable; if coöperation and combination are essential for productive efficiency; and if such a situation inevitably means that the prices of many commodities are no longer governed by the free action of the good old law of demand and supply, as that law is gener-

[1] Summary Report of Fed. Trade Comm. Meat Packing Industry, p. 11.
[2] Summary Report of Fed. Trade Comm. Meat Packing Industry, p. 25.

ally understood by the public, but by the manipulation of that law by one of the interested parties who thereby yields a power over price that places the consuming public at his mercy; some regulation of that monopolistic power would seem absolutely essential for the protection of the unorganized, ultimate consumer. The importance of a low price to the consumer is seldom realized, while his interests at stake are to say the least, anything but zealously guarded. It is too often a case of what is everybody's business is nobody's business.

## THE LAW OF DEMAND AND SUPPLY AND "A FAIR AND REASONABLE PRICE"

We are brought face to face with the old question of a fair and reasonable price; fair to the producer, reasonable to the consumer. Competition in many cases fails to establish such a price and when competition is superseded by monopoly we have a prejudiced price. In this lies the weakness as well as the menace of monopoly price. Nothing so unfits a judge for his office as a personal interest in the case. The intense personal interest of the monopolist in the price over which he has the power, somewhat unfits him to be the judge in the case; his decision is apt to be biased. By its very nature monopoly price is not a fair price and moreover it has proved itself in many instances to be a very unfair price; hence, it has seemed desirable and in many cases absolutely necessary for the welfare of the consumer to take this mandatory power over price out of the hands of the monopolist, and vest it with some unbiased third party to ensure fair play to both producer and consumer.

## THE LAW OF DEMAND AND SUPPLY AND GOVERNMENTAL PRICE CONTROL

Governmental regulation of price does not involve the substitution of any new law of price. Any regulation of price must take into consideration the law of demand and supply and to be successful must work in harmony with it. Should the price be fixed too high, many consumers will be deprived of the commodity and demand will fall off. At the same time the high price will stimulate production and increase supply as under

competition, or monopoly. Should the price be fixed too low, demand will increase, but production will be discouraged and supply fall off. The price must be fixed in accordance with the law of demand and supply. Both the cost of production and the extent and intensity of consumer desire must be taken into consideration. Such a price must afford a fair profit to the marginal producers above their cost of production, and enable the marginal consumer to satisfy his wants at a reasonable figure. Here is where the accountants will come into the limelight, for price fixing necessitates an accurate knowledge of costs, the standardization of cost methods, and accessibility of cost information to the proper parties. Even a greater publicity regarding cost will go a long way toward insuring fair prices.

Government price control simply means regulation of the law of demand and supply by means of price control. There is nothing impractical or chimerical about it; it is already in successful operation in some fields, notably in the case of public utilities. An extension of it to many commodities, whose prices are still fondly believed to be determined by the unmanipulated law of demand and supply under competition would in all likelihood result in lower prices to consumers and still leave a fair profit for the sellers.

## THE THREE PRICES

1. *Competitive Price.*—Under conditions of competition prices of commodities tend by the interaction of demand and supply to correspond with the cost of the marginal producers and the utility to the marginal consumers.

2. *Monopoly Price.*—Under monopolistic conditions, by the manipulation of the law of demand and supply, the prices of commodities are those which in the long run bring the most profit to the monopolist.

3. *Price by Government Regulation.*—Under conditions of either competition, coöperation, or combination, by intelligent and impartial governmental regulation of the law of demand and supply through price control, the prices of commodities will be based on the cost of production plus a fair profit to the marginal producers, and their utility to the marginal consumers; insuring

an adequate supply of those commodities wanted by the public at a price fair to the producer and reasonable to the consumer.

It should be noted that governmental price regulation does not interfere with private initiative, or threaten the freedom of the agents of production, in which case it would be undesirable. Its function is not to curtail freedom but preserve it by a wise control. It can be applied alike to conditions of either competition, coöperation, or large-scale organzation which it does not aim to abolish but to control for the public benefit.

## TEST QUESTIONS

1. Explain monopoly as a manipulation of the law of supply and demand.
2. What is a "buyers' monopoly"?
3. What is the relation of the ultimate consumer to the law of supply and demand?
4. Why is not monopoly price likely to be a "fair and reasonable" price?
5. What is the danger of arbitrary price fixing?
6. What is a "fair and reasonable" price?

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# CHAPTER XX

# MONEY

## MONEY AND WEALTH

No discussion of exchange and value would be complete without some explanation of the one thing by means of which today all exchanges are effected and in terms of which all values are expressed.

It has been truly said that, "Our society is built with money for mortar; money is present in every joint of circumstances; it might be named the social atmosphere, since in society it is on that alone that men continue to live and only through that or chance that they can reach or affect one another." There is scarcely a want of civilized man but depends directly or indirectly on money for its fulfillment. It is the universal medium between desire and satisfaction; the golden master key of civilization, without which we may shiver, starve, or perish in the midst of plenty, possessing which all the rich stores of society's treasure troves lie at our disposal.

So closely allied to wealth is money that in the minds of many the two are synonymous. From serving as a means to wealth, money has become the symbol of wealth, and as a symbol it has usurped the place of the wealth it symbolizes; the idol has become the god. In like manner, because capital goods are valued in terms of money and are obtainable only in return for money, in the minds of millions whose eyes fail to pierce beneath the surface, money constitutes the capital wealth of the country. This commercial idolatry of money distorts the truth in two ways; first, by exaggerating the importance of money, second, by ignoring the real nature of the service it performs. In this chapter we will examine the nature of money and the part it plays in exchange.

## WHAT MONEY REALLY IS

Modern society produces its commodities under a system of division of labor; division of labor necessitates exchange; exchange brings up the problem of value; exchange is facilitated and value simplified by the use of money.

Without exchange division of labor would be impossible, and without money, exchange to the extent it is carried on today would be impracticable. Through the instrumentality of money society effects the myriad of exchanges on which its well-being depends.

Money, then, is in reality a tool; its use is to facilitate the exchange of commodities and services. It is a capital good, just as the locomotive is a capital good; and like the locomotive, it serves to transfer commodities from one place or person to another. The simplest and truest conception of money is that of a tool, the purpose of which is to effect the exchanges necessary in modern society for the production and distribution of wealth.

## THE FUNCTIONS OF MONEY

First and foremost, money acts as a medium of exchange. It is perhaps best defined as that thing which is generally acceptable as a medium of exchange and as a final payment for debt. Acting as a medium of exchange, it has become a standard of value. These are its two primary functions. As a result of these it also serves as a standard of deferred payments and a store of value, the former being particularly important in these days of long-time contracts. Such are the chief offices performed by money in its capacity as a tool for facilitating exchange.

## QUALITIES OF GOOD MONEY

To perform these functions efficiently, that which is to serve as money should be generally acceptable, stable in value, portable, readily recognizable, easily divisible, homogeneous, and durable.

Of necessity anything to become a medium of exchange must be generally acceptable. Tobacco, wampum, beads, or gold, each owed its election to the office of money first and foremost to its

being an object of general desire. The one reason why every man is not only willing but anxious to exchange his particular products or service for money is because he knows that everyone else who has products for exchange is likewise willing to accept money in lieu of them. Just as soon as a commodity loses this quality of general acceptability its usefulness as money ceases. This may happen even though it be issued by the government and declared legal tender for debt, as in the case of the greenbacks during the Civil War, which did not circulate as money in California for the simple reason that they were not acceptable to the people of that state, who preferred and used gold as money. The fundamental quality of a good money is general acceptability.

While theoretically it is not necessary that a commodity to serve as money should possess a value of its own apart from its use as money, in practice it has been found expedient to choose as money some commodity possessing a value independent of its monetary use. Pure paper money termed "Fiat Money," owing its value entirely to governmental decree and control over the supply, may serve as money, as did the greenbacks from the time of the Civil War to 1879. Such money, however, has seldom proved satisfactory, and the monetary experience of nations has shown time and time again that to be generally acceptable money should possess value in the world at large, a value of its own apart from its use as money.

Not only so, but it is highly essential, since money acts as a standard of value and of deferred payments, that its own value should not fluctuate. Stability of value is a prerequisite of paramount importance in the commodity that is to serve as money.

## THE SURVIVAL OF THE FITTEST

It is easy to see why, of the many commodities that have served as money, the precious metals alone have survived and why, of these two, gold has almost ousted silver from the field. Gold is of universal acceptability; it possesses value all the world over outside of its use as money, being highly prized for its beauty in the arts, much desired as a mark of social distinc-

tion, besides being in demand for more utilitarian purposes, such as dentistry. It possesses stability of value in a high degree, it is portable, easily recognized, and therefore not easily counterfeited. Unlike its predecessors, tobacco and wheat, it is of one grade. There is tobacco and tobacco, but gold is gold the world over. Lastly, it embodies value in about as imperishable a form as is possible; it will neither burn like paper, spoil like wheat, nor crush like a shell; an English gold sovereign, it has been estimated, would take eight thousand years to wear out.

## THE RELATION OF THE GOVERNMENT TO MONEY

While in ancient times or in new communities a commodity might come into use as a medium of exchange of its own accord and maintain its position by habit or custom, as did iron and copper among the ancients and wampum and tobacco among the American colonists, the right of issue and control of the money supply early became the prerogative of the monarch or government, and among modern nations the selection and regulation of money and the monetary system has become one of the most important of government functions.

This does not imply that money becomes money merely by virtue of government decree, or that the government is able to make anything money. As just explained, a commodity to serve as money must first be generally acceptable to the people; the sanction of the government clinches that acceptability; not only so, but it is doubtful, owing to the dangers surrounding the issue of money, whether a money whose issue was not controlled and safeguarded by the government would be generally acceptable to the people at large.

So vital is money to the welfare of the nation, so essential to the smooth running of the industrial system, which, based on division of labor, demands above all things the free and unhindered circulation of products finished or unfinished through the arteries of commerce, that it has been found wise to place the tools and machinery on which this all at bottom depends under the control of the government.

Hence in all modern nations the government chooses, regulates, and controls by law the money and the monetary system. The

state selects the commodity that is to serve as money, decides on the quantity of it that will constitute the monetary unit, the different coins into which it shall be coined, takes charge of the minting of these, declares them full legal tender for debt, which means that they must be accepted by creditors as legal payment for all debts expressed in terms of money. Thus the state protects the contract of exchange, one of the most common as well as important of all contracts. In addition, it supplements this standard money with other forms, decides on the extent to which they are to be legal tender, and regulates their supply according to the needs of trade.

## ADOPTING A STANDARD

In selecting a commodity to serve as its medium of exchange and standard of value, a country is said to "adopt a standard." Thus it is said that, "in 1816 Great Britain adopted the gold standards and that most countries since then have gone on a gold basis." Each country has decided that a certain weight of gold, to which it gives a name, shall constitute its standard unit of value, just as the French government decided that the cubic centimeter of water should constitute its unit of weight, termed a gram. Great Britain decided that its standard of value should be the sovereign and defined it as consisting of 123.27447 grains (7.98805 grams) of English standard gold or 113.0015 grains pure gold. The United States calls its unit of value the dollar and defines it as consisting of 25.8 grains of gold nine-tenths fine. In the same manner the Franc of France and the Mark of Germany signify certain weights of gold officially adopted by those countries as their standard units of value.

## COINAGE

In olden times the precious metals were actually weighed, and a pair of scales was part of a merchant's equipment. The names of many coins are in fact derived from the weights of the metals they once represented. The shekel, the talent, the mark, the franc, the pound, were all originally names of weights. The English "pound" sterling is derived from the Saxon pound of silver, the ancient standard of value of that sturdy race.

Later, the pieces of metal came to be stamped by the government, which saved the trouble of weighing and certified them to be of correct weight and of the proper fineness. Thus we have the coin which is in reality an ingot, the weight and fineness of which is certified by means of some manner of design, imprinted on its surface. The English sovereign, for instance, is a gold ingot stamped and guaranteed by the English government to contain 123.2744 grains of gold eleven-twelfths fine.

It is not even necessary that the standard unit itself should be made into a coin; it may serve merely as the basic unit of those coins which are issued. In the United States, for instance, no one dollar gold pieces are minted, and have not been since 1890, but the gold pieces that are coined are multiples of the dollar or unit, the ten dollar gold piece containing exactly ten times 25.8 grains of standard gold. Coinage today is simply a legal device for dividing the standard money metal into convenient units of certified weight and fineness.

## FREE COINAGE

While in olden times, the Seignior or Monarch made a handsome profit out of coining, called Seigniorage, most governments today make no profit; in fact many make no charge for the expense of coinage termed Brassage, but require merely a nominal fee for assaying and for the alloy used. This charge is so small that for all practical purposes we may say that most nations on a gold standard coin all gold brought to them free of charge. The United States, for example, stands ready to receive all gold bullion brought to its mints, returning to the bearers weight for weight of gold dollars.

## STANDARD MONEY

These coins are known as "standard money" in distinction from all other media of exchange of general acceptability which may be passing from hand to hand as money. For though a country adopts a certain weight of gold tc be its standard unit of value and final medium of exchange, and issues it in the form

of coins, it supplements this standard money by other media of exchange of general acceptability, all of which are multiples or sub-multiples of the standard unit, and all of which are convertible finally into standard money.

In the strictest sense a country on a gold standard has but one kind of money, namely, gold; all other media of exchange only partially perform the functions of money, all derive their value, and general acceptability from the fact that they are finally exchangeable for gold. This is the essential feature of the whole system; this is what is meant when it is said that a country is on a "gold basis." Apparently there are in each country several kinds of money, each as generally acceptable as a medium of exchange, in fact preferably acceptable to gold. The fact of the matter is that all these other media of exchange are only acceptable so long as they themselves are exchangeable for the real medium gold. Let this convertibility be once doubted, and their acceptability and value will shrink like a pricked balloon. The naked truth is that gold alone is money in the strictest and fullest sense and all other media of exchange which pass as money within the country are simply representatives or auxiliary means of rendering gold more efficient.

In any country on a gold standard, gold coin is known as standard money. Such money is the actual embodiment of the weight of gold officially selected to serve as the standard unit of value and final medium of exchange; all other money issued is expressed in terms of it or comparable to it and is finally convertible into it.

## SUPPLEMENTARY OR AUXILIARY MONEY

All other media of exchange of general acceptability, issued by the government or by banks under government supervision, act to conserve and augment gold, and may be termed supplementary or auxiliary money.

Such money may be classified under three heads: (1) Bullion Certificates; (2) Government or Bank Notes; (3) Token Money.

Bullion certificates, such as the United States gold certificates, are analogous to warehouse receipts certifying that a specified

amount of gold is deposited in the government vaults; they save wear and tear on gold and being more convenient are preferred in the great majority of transactions within the country to the gold coin itself to which the owners of the notes are entitled.

Government notes or bank notes are promises to pay standard money on demand. In Europe they are issued by banks; in the United States by both the government and banks. Their convertibility into gold is secured by a reserve of standard money; not a cent for cent reserve as with United States gold certificates, but one which will be ample to redeem all of the notes that are likely to be presented at any one time. As experience has demonstrated that but a fraction of the notes will ever be presented for redemption at one time, a large volume of notes may be issued against a comparatively small reserve of gold. Such notes are not only a substitute for gold but materially augment and increase the efficiency of gold, every gold dollar or sovereign in the vaults, having several notes or bills representing it in actual circulation.

Token money includes the various subsidiary coins of baser metal issued by every country to supply its need for small change. The value of the metal in such coins is less than their nominal value: they serve as very convenient tokens of inconveniently small amounts of gold. They are issued by the government in limited quantities according to the requirements of trade and are also convertible into gold.

There is probably no other one thing which the average citizen of the United States desires more and knows less about than the money of his country. For the sake of better acquaintance, we will briefly describe the various members of our monetary family.

## MONEY OF THE UNITED STATES

The following table taken from the report of the Secretary of the Treasury for the fiscal year ending June 30, 1921, lists the ten different kinds of money with their respective amounts, which constitute the monetary stock of the United States.

| Kinds | In Treasury, Mints and Fed. Reserve Banks | In Circulation | Total Stock |
|---|---|---|---|
| Gold coin and bullion, | $2,342,714,808 | $883,404,285 | $3,226,119,093 |
| Silver dollars, | 213,735,045 | 73,053,333 | 288,788,378 |
| Subsidiary silver, | 9,663,502 | 261,650,873 | 271,314,375 |
| Total metallic, | 2,566,113,355 | 1,220,108,491 | 3,783,221,846 |
| United States notes, | 4,031,479 | 342,649,537 | 346,681,016 |
| Federal Reserve notes, | 319,935,586 | 2,680,494,274 | 3,000,429,860 |
| Federal Reserve bank notes, | 2,422,848 | 148,349,552 | 150,772,400 |
| National bank notes, | 13,739,861 | 729,550,513 | 743,290,374 |
| Total notes, | 340,129,774 | 3,901,043,876 | 4,241,173,650 |
| Aggregate metallic and notes, | 2,906,243,129 | 5,121,152,367 | 8,027,395,496 |
| Gold certificates, | 343,674,220 | 452,174,709 | |
| Silver certificates, | 1,044,470 | 201,534,213 | |
| Treasury notes of 1890, | | 1,576,184 | |
| Aggregate, | | 5,776,437,473 | 8,027,395,496 |

## GOLD COIN AND BULLION

Of the 8,027 million dollars which constituted the monetary stock of the United States, at the close of the fiscal year 1921, over 3,226 millions consisted of gold coin and bullion. During the last forty years the country's stock of gold money has increased by leaps and bounds: in 1879 it was 245 million dollars, in 1900 it had grown to a billion, in 1910 to over a billion and a half, in 1916 to almost two billion and a half, while today it exceeds three billion and constitutes about one-third of the gold monetary stock of the world.

Less than half of this stock of gold is in the form of coins. The gold coinage of the United States consists of quarter eagles ($2½) half eagles ($5) eagles ($10) double eagles ($20), which are full legal tender for all debts public and private. The bullion referred to in the report consists of bars of gold, assayed of specified weight and stamped, which are more convenient than coin for export purposes and for reserves in the vaults.

More than one-half of this gold coin and bullion is in the possession of the government, part being held in the Treasury

in trust for Gold Certificates, part serving as reserve in the Treasury or Federal Reserve Banks, part belonging to the free fund of the United States Treasury. The remaining 883 million dollars said to be "in circulation" serve for the most part as a reserve in the vaults of banks throughout the country.

## GOLD CERTIFICATES

The Secretary of the Treasury is authorized to receive gold coin or bullion and to issue in exchange for the same, gold certificates in denominations of from $10 to $10,000. The net amount of such certificates outstanding June 30, 1918, was $1,026,631,669. The gold deposited for such certificates is held in trust in the treasury vaults, and may be claimed at any time by the owners of the certificates, which are but a convenient means of circulating this gold. These certificates are legal tender, are receivable by the government for all public dues, and may be counted by banks as part of their lawful reserve.

## SILVER DOLLARS

The enormous stock of silver dollars in the possession of the United States is a heritage from the past, resulting mainly from the large supplies of silver purchased under the Bland-Allison Act of 1878 and the Sherman Act of 1890. By the Pittman Act of April 23, 1918, which authorized the Secretary of the Treasury to melt and sell as bullion not in excess of 350 million standard silver dollars, the supply was temporarily reduced by $68,453,583, making the stock of silver dollars at the close of the fiscal year 1918, $499,515,930, of which but 77 million were in circulation, the remainder being held in the treasury. In 1921 the silver coins increased in volume by $32,390,020. The silver dollar contains 371¼ grs. of silver, the value of which is considerably less than a dollar. While these silver dollars are not directly redeemable in gold, it has always been the policy of the government to so redeem them and the act of 1900 which instructs the Secretary of the Treasury to maintain all forms of money at a parity with gold, insures their redemption in gold beyond question, and establishes them as token money with their value based on gold. They are full legal tender for all

payments public and private except for interest on government bonds.

### SILVER CERTIFICATES

Few of these clumsy silver dollars are in actual use, their circulation is secured by means of silver certificates, similar in nature and purpose to the gold certificates. These are issued for the most part in small denominations and have become the popular pocketbook money of the nation. They are not legal tender, but are receivable by the government in payment of all public dues and may be counted by banks as part of their lawful reserves.

### TREASURY NOTES

The Treasury notes originated from the Sherman Act of 1890, 156 million being issued by the government to pay for the silver purchased under that Act. Each note represents so much silver stored in the Treasury vaults. They are redeemable in either silver or gold and when so redeemed are cancelled, and if redeemed in gold, silver certificates are issued in their stead. These $1,576,184 notes are the sole survivors of a form of money that will soon become extinct. Treasury notes are legal tender except in payment of principal and interest of government bonds, and lawful money for bank reserves.

### SUBSIDIARY SILVER AND MINOR COINS

Half-dollars, quarters and dimes are coined by the government as the country needs them, and are shipped in exchange for other kinds of money or paid out over the counter, in the Treasury offices. The government of course makes a seigniorage on this coinage which in 1918 amounted to over thirteen million dollars. These coins are redeemable in lawful money and are legal tender for payments not exceeding $10.00.

Minor coins, one-cent pieces, and nickels, not mentioned in the report, are also coined and distributed in the same manner as subsidiary silver and are in great demand. They are redeemable in lawful money when presented in sums or multiples of $20. Over 81 million dollars' worth of these humble but hard-

working members of the monetary family was outstanding June 30, 1918.

### UNITED STATES NOTES (OR "GREENBACKS")

These were first issued by the government during the Civil War. The largest amount outstanding at any one time was $449,338,902 in 1864. By various acts of Congress authorizing the cancellation of these notes, the amount outstanding has been reduced to $346,681,016. This process of retirement was arrested by the Act of Congress of May 31, 1878, which ordered all redeemed notes to be reissued, and the outstanding amount has remained the same ever since. When first issued the country had suspended specie payments, so that these notes were to all intents and purposes Fiat Money pure and simple. By the Resumption Act of 1875, the Secretary of the Treasury was ordered to redeem these "promises to pay" in coin: by the Act of March 14, 1900, a special gold reserve of $150,000,000 was ordered set aside by the redemption of these and the remaining Treasury notes. They are issued in denominations as low as $1 and $2 but the majority are in the form of $5 and $10 bills. They are legal tender except for the payment of principal and interest of the public debt.

### NATIONAL BANK NOTES

These also date back to the Civil War. The National Banking System established in 1863 had as its twofold object, the marketing of government bonds, and the supplying of a safe and uniform national currency to replace the varied and insecure issues of the state banks. Any National Bank may issue these notes, the law requiring that such bank deposit with the Secretary of the Treasury government bonds of equal par value besides which each bank must deposit in the Treasury as a redemption fund, an amount of lawful money equal to five per cent of its note issue. These notes are redeemable on demand in lawful money both at the bank of issue and at the Treasury. They are neither legal tender nor lawful money, that is, they cannot be counted by banks as part of their reserves; they are receivable for all public dues, except duties on imports and may be paid out by

the government for all debts and demands except interest on the public debt and for redemption of the national currency.

### FEDERAL RESERVE BANK NOTES

Very similar to the National Bank Note is the Federal Reserve Bank Note created by the passage of the Federal Reserve Act of December 23, 1913. This act contemplated the retirement of the National Bank Notes and their replacement by similar notes issued by the Federal Reserve Banks. The National Banks are not forced, but may if they so desire, retire their notes within a period of twenty years dating from December 23, 1913, by filing an application with the Secretary of the Treasury to sell their bonds held by him in trust; which bonds may be bought by the Federal Reserve Bank but not by an amount exceeding $25,000,000 in any one year. Even if the National Bank should take full advantage of this opportunity, which so far they have not, it would be impossible to retire in the given period much more than a half of the $743,290,374 National Bank Notes outstanding at the close of the fiscal year 1918. At the same date the total stock of Federal reserve bank notes amounted to $150,772,400.

### FEDERAL RESERVE NOTES

The latest thing in money in the United States is the Federal Reserve Note from which great things are hoped on account of its ability to expand and contract in response to the needs of trade. There is no doubt as to the former of these powers, for its issue has increased with remarkable rapidity from $1,215,000 on November 20, 1914, to over two billion and a half on June 30, 1920. At the close of the fiscal year 1921 these notes decreased by $405,447,260.

These notes are obligations of the United States; they are issued at the discretion of the Federal Reserve Board to any Federal Reserve Bank upon the deposit of rediscounted commercial paper. They are secured by an equal amount of such paper, by a forty per cent gold reserve, not less than five per cent of which must be deposited with the Secretary of the Treasury for the redemption of the notes, they also constitute a

first lien on the assets of the issuing bank. They are redeemable in gold or lawful money at any Federal Reserve Bank or in gold at the Treasury. They are neither legal tender nor lawful money, but are receivable for all taxes, customs and other public dues.

## GOLD THE BASIS OF UNITED STATES MONETARY SYSTEM

One central fact emerges from a study of the monetary system of the United States, namely, that all forms of money issued are based on a certain weight of gold. This is nowhere more clearly brought out than in the words of the Gold Standard Act of March 14, 1900.

> Be it enacted, etc., that the dollar consisting of twenty-five and eight-tenths grains of gold nine-tenths fine, as established by section thirty-five hundred and eleven of the Revised Statutes of the United States, shall be the standard unit of value, and all forms of money issued or coined by the United States shall be maintained at a parity of value with this standard and it shall be the duty of the Secretary of the Treasury to maintain such parity.

This parity of value between all kinds of money and the standard of value is secured first through the interchangeability of gold coin and gold bullion by means of free coinage on the one hand, and the melting pot on the other. Should the value of the coin exceed the value of the bullion on the coin, gold by virtue of free coinage will flow into the mints, decreasing the supply of bullion till its value equals that of the coin. Should the value of the coin be less than that of its bullion content, coin will flow into the bullion market through the melting pot and the value of the bullion will decrease until they are again equal. Thus by the interchangeability of coin and bullion, gold coins are kept at an equality of value with gold. Further, by making all other forms of money redeemable in gold coin they are kept at a parity of value with gold coin and therefore with gold.

In the United States the unit medium of exchange which is universally acceptable in final payment of all debts both public and private is the dollar of 25.8 grains of gold nine-tenths fine. This is the unit to which all things exchanged for money

are compared and in terms of which their values are expressed. This weight of gold minted into coins constitutes the real money of the nation; all other forms of money being based on it, are subsidiary or supplementary to it.

## BIMETALLISM

A nation may select two metals to serve as standard money, in fact up to a hundred years ago, in most countries both silver and gold were standard money. Such countries are said to have a double or joint standard or to be on a bimetallic basis.

Bimetallism means the free coinage of both silver and gold, with both kinds of coin endowed with full legal tender power.

The monetary unit consists either of a certain weight of silver or a smaller weight of gold so selected that their values coincide. The first coinage law of the United States passed in 1792 defined the "Dollar or Units" each to be of the value of a Spanish milled dollar and to contain either 371 4/16 grains of pure silver or 24.75 grains of pure gold. There were thus two kinds of dollars in the States in 1792, gold and silver; value was measured by both or by either a certain weight of gold or a certain weight of silver, but as each of these was equal or supposed to be equal in value to the other, there was but one standard value, the joint value of the two.

The government in deciding on the two monetary units is said to establish a "ratio" between gold and silver, sometimes referred to as the "mint ratio." By ratio is meant the relation between the unit weights of the two metals. In 1792 Congress established a ratio between silver and gold of fifteen to one. The standard silver dollar of 371 4/16 grains was fifteen times the weight of the gold dollar of 24.75 grains; the United States mints coined both metals into dollars at the rate of fifteen ounces of silver to one of gold.

In determining the mint ratio the government ascertains the relative values of the two metals in the bullion market. If in the bullion market fifteen ounces of silver are equal in value to one ounce of gold, the weights of the two standard units are fixed, so that the silver unit is to the gold unit as fifteen to one. If the mint ratio is ascertained correctly the two standard coins will be

equal in value. Bimetallism means, then, two unit weights of metal so chosen as to be equal in value. The real standard of value is the joint value to which the values of the respective weights of metals coincide.

## THEORY AND PRACTICE

The theory of bimetallism is that the joint value will fluctuate less than the value of either metal alone. This is based on the assumption that when two metals are freely coined, if the value of one should increase in the bullion market, coins of that metal will be melted down and sold for bullion the price of which will then tend to sink; while on the other hand should the bullion price of one metal fall, the increased demand for it as money will tend to raise its value. Any fluctuations in the bullion value of either of the two metals due to changes in demand or supply would be counteracted by changes in the monetary demand for that metal, so that the market ratio would tend to correspond permanently to the mint ratio.

Though this might be possible in the case of universal bimetallism, or if the great nations of the world were to go on a bimetallic basis, past experience has demonstrated that the monetary demand of any one nation has been insufficient to counteract changes in value of one or other of the metals due to changes in supply. In practice the weakness of bimetallism has sprung from the fact that as soon as the market ratio varies from the fixed mint ratio, the equality of value between the two coins ceases, one is worth more as bullion and disappears from circulation.

Accordingly the monetary history of most countries shows that the bimetallic standard means an alternating standard, the metal which is undervalued going out of circulation, while the overvalued metal stays and becomes for the time the standard of value.

## GRESHAM'S LAW AND BIMETALLISM

This tendency is often spoken of as Gresham's Law, the usual statement of which is that poor or bad money drives out good. When coins are worth more as bullion than as money, they will

be either melted for use in the arts or exported. When two metals are in circulation together, that which is worth more as bullion than as money is said to be undervalued while that which is worth more as money than as bullion is spoken of as overvalued. People will seek to pay their debts with the poorer money and hoard, export or sell as bullion the other. Not only so but the metal undervalued as money will not be brought by miners to the mint, but will seek the bullion market when its value is greater. This is what happened in the United States after 1792, either the ratio of fifteen to one undervalued gold or the market ratio of the two metals changed after 1792, for one ounce of gold in the bullion market was worth 15½ ounces of silver; the mint ratio in effect made one ounce of gold equivalent to but fifteen ounces of silver, with the result that no gold was brought to the mints while that in circulation disappeared. After 1834 Congress changed the ratio to sixteen to one which undervalued silver as much as the previous ratio had gold, silver now disappeared and gold become the standard money in use. The history of other countries bears similar testimony to the alternating nature of the bimetallic standard.

## TEST QUESTIONS

1. What are the two primary functions of money?
2. Mention the chief qualities of a good money.
3. What is the relationship of a government to money?
4. What is meant by the phrase "adopting a standard"?
5. What is "standard" money?
6. What is "supplementary" money?
7. Name the ten kinds of money in the monetary system of the United States.
8. How are the various kinds of supplementary money in the United States kept at a parity with gold?
9. What is bimetallism?

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## CHAPTER XXI

# DEPOSIT CURRENCY AND BANKING

Thus far we have discussed standard money and those other media of exchange of general acceptability, based upon and supplementing it, commonly termed money. But there remains another medium, based upon money and supplementing it in its work of effecting exchanges to a greater extent than all the previously mentioned forms put together, namely—*deposit credits circulating in the form of checks.*

### WHY NOT CLASSED WITH MONEY

Though closely allied to the supplementary forms of money treated in the last chapter and often preferred to them as a means of payments as they are preferred to gold, it is not usually classed as a form of money, for the reason that it lacks the *general* acceptability enjoyed by these other media. That all these differ from the check in that they circulate freely from hand to hand without question, while the check, though just as acceptable to certain people and even preferable, is not so to everyone, but is limited by personal or local conditions, so that its *range* of acceptability is narrowed, will be evident to all. There are other differences, of course, but this, based on the fundamental requirements of a good money, accounts for the fact that economists do not classify circulating deposit credits as money but deposit currency. Currency is a wider term including all forms of circulating media of exchange.

### WHAT DEPOSIT CURRENCY REALLY IS

Though differing from the other forms of currency in respect to general acceptability, it is in many respects similar to them. It is issued in terms of standard money and serves to supplement it as a medium of exchange; it is based on gold ultimately so its

value, like that of the United States note, depends on its convertibility into standard money. It is true that it is a step further removed from its base than the United States note which is directly convertible, whereas a deposit is payable in legal tender money which in turn is exchangeable for the standard.

Like the United States note, it is not money but a promise to pay money. Both the United States note and the deposits are forms of credit, the one of the government, the other of the bank. There is still a greater similarity between the bank note and the deposit, both are in effect the bank's promises to pay money on demand, the chief difference being that the bank note passes directly from hand to hand while the deposit circulates by means of the check.

Deposit currency is in reality a form of circulating bank credit. Credit may be defined either as a promise to pay money or a right to the use of money. The record of this promise or right is termed a "credit instrument" such as a United States note or a promissory note which the business man signs when he borrows money from the bank. Both of these are written evidences of promises to pay money, both also constitute rights to money, claims on the promisers to money. These credit instruments may, as we have seen, be used to effect exchanges in place of actual money being as acceptable as the money they constitute a claim to. They vary greatly in the degree to which they possess the quality of acceptability. The personal note of an individual possesses a very narrow range of acceptability and is unfitted to become a medium of exchange, but that of a well known bank has a wider range and that of the United States government is so generally acceptable that its promises to pay are as good as money in any part of the country. A modern bank deposit is in effect the bank's promise to pay money on demand—a promise evidenced on the pass book of the bank's creditor. This deposit credit constitutes a claim on the bank for money which the depositor is able to transfer to others by means of a written order. The check is the instrument by which the depositor's claim on the bank is transferred to others; it is a means for the transfer of bank credit from one to another.

It is so generally acceptable as to be used as a medium of exchange. Deposit currency is thus a form of bank credit circulating by means of an order called a check.

## THE TWO WAYS IN WHICH DEPOSIT CREDIT ARISES

Deposit currency issues from the loans of the banks and its use as a medium of exchange is made possible by the mechanism of the banking system. The banking system of the country may be said to serve two purposes,—first, it provides a means for the collection of savings and their investment; second, it furnishes an elastic currency for the use of the business community. The first of these functions is performed largely by the savings banks and private banks, the second by the commercial banks which include national and state banks and trust companies. It is the latter group that gives rise to deposit currency, to understand the nature of which we need to see how demand deposits come into being in these institutions.

A deposit credit may arise either through an actual deposit of cash or as the result of a loan by the bank to the depositor. Originally the deposit involved, as the word suggests, an actual deposit of money; and the practice is still common, the personal accounts of salaried and professional men being of this class. But the great bulk of modern demand deposits come into existence as the outcome of loans made by the banks to business men. In the typical loan transaction the borrower signs a note promising to pay we will say $500 in sixty days from date, in exchange for the note the banker gives the borrower a deposit credit equal to the face value of the note minus interest at the current rate for the period of the loan. Whether the deposit credit springs from an actual deposit of cash or is the outcome of a loan, it exists in both cases as a credit on the books of the bank, a claim against the bank to pay money on demand.

## HOW THE BANKS ARE ABLE TO CREATE CREDIT

In opening up deposit accounts against which no actual deposit of cash has been made, the banks are sometimes said to create credit. We shall see how the banks are able, with a few strokes

of the pen, to create a currency that is preferred by the business community to money itself as a medium of exchange.

Now the commercial bank is a business institution, the chief function of which is to loan money and credit at a profit, but the great bulk of its loans today are made in the form of credit. The loaning of credit by banks has been practiced from time immemorial but the mechanism of the modern banking system has tremendously extended the banks' capacity to create this profitable and serviceable substitute for money. The ancient banker who received money on deposit was usually in business for himself and as all the money deposited with him would not be demanded at any one time, he soon developed the practice of using part of the funds in his own affairs, and loaning part out to others at interest and it is likely that at first he loaned out actual cash. It is evident that such a banker or money lender, if tied down to make loans in cash, would be limited in the amount of his loans by his total cash assets minus a reserve sufficient to pay the current demands of his depositors. Now it is easy to surmise how the more profitable practice of creating and lending credit arose. The ancient merchant who had deposited his moneys with the banker for safe keeping, would for convenience' sake when making a payment give his creditor his deposit receipt or an order on the banker for the money; such an order is the prototype of the modern check. The creditor instead of drawing out the cash would often prefer to leave it in the custody of the bank, receiving a deposit receipt in return, and make his payments in the same way. As this custom developed, and it did so at a very early date, borrowers of money would also come to prefer instead of actual cash, a deposit credit against which at their leisure they would draw orders that could be used in the payment of their debts. Instead of handing his borrower cash the banker now gave him a claim to cash payable on demand. He lent now not cash but his credit and as but a small part of these claims to money would normally be demanded at any one time, he was able to create a larger volume of claims than he possessed money. His loaning power was much increased. With the establishment of the custom of payment by check in the business world added to the clearing house mechanism of the modern banking system

for the offsetting of checks, the cash demands on modern banks are remarkably small, being in normal times less than 5 per cent of their deposits. Thus a bank's ability to create credit which can be loaned out at interest to business men, and which furnishes them with purchasing power, is tremendously increased.

To get a bird's-eye view of the modus operandi of this ingenious system let us return to our borrower who has exchanged his note for a deposit credit at the bank. He will be likely at first to draw heavily against his balance but as in the ordinary course of his affairs payments are made to him and deposited, he will increase his account in anticipation of the maturity of the note and when it is due he will most likely pay by check, thus closing the transaction. The average bank will have hundreds of borrowers and depositors carrying on these transactions in an endless series: while some are borrowing and drawing heavily on their accounts, others are depositing and preparing for the payment of their notes. The claims that are continuously being presented against the bank by its clients are thus largely cancelled by the continuously maturing claims of the bank on them.

Not only so, but the check which the depositor draws, will in most instances, never be paid in cash. The creditor to whom our depositor makes out his check will ordinarily deposit it in his bank. In the possession of this second bank it constitutes a claim on the first. In like manner another check drawn by a depositor of the second bank and deposited by his creditor into the first would constitute a claim on the second bank. At the "clearing house" these two banks would offset these two claims against each other, thus obviating the payment of any cash. The banking system is thus a mechanism within which these claims on the different banks are transformed into deposits in others and settled for the most part by cancellation. The net result is that the banks are able to create and maintain a large volume of deposit credit with but a relatively small use of cash.

## HOW BANK CREDIT SERVES AS A MEDIUM OF EXCHANGE

We have seen how the banks are able to create deposit credit through the agency of the check and the mechanism of the bank-

ing system, we will now, by a closer examination of that same mechanism, notice how deposit credit is substituted for money as a medium of exchange.

The deposit credit is a claim on the bank for the payment of cash on demand; a claim that may be transferred to another by means of an order termed a check. If, however, that other cashes his claim, taking the check to the banker for payment, it is evident that the deposit credit has merely postponed the payment of money and not dispensed with it. If Smith, a retail grocer, gives his wholesaler a check in payment for a consignment of sugar, and the wholesaler cashes the check at Smith's bank, no economy of money has been achieved. But as we have stated, the check in the majority of cases will be deposited in the payee's bank and settled by offset without the use of money; in which event the exchange of commodities will be effected by the check's acting as the medium of exchange in place of money.

In order to see how deposit credit circulating through check is able to achieve this remarkable economy of money, we will take the simplest case first of a buyer and seller having accounts in the same bank. Smith buys a barrel of apples from Brown, paying with a check which Brown deposits in the bank. This transaction involves a transfer of credit from Smith's account to Brown's through the instrumentality of the check. The bank debiting Smith's account and crediting Brown's with the amount of the check. The sale has been made and Brown paid without the passage of a penny,—a truly phantom transaction made with ghost-money, yet commercially sound and legally satisfactory. Were there but one bank in a community with which all citizens had accounts, no money would be required at all; purchases and sales could be made by checks and the different accounts debited or credited accordingly.

Were there two banks in the community, Smith belonging to one and Brown to the other, Smith's check when deposited would constitute a claim in the possession of Brown's bank on Smith's. Brown's bank would take Smith's check with other claims on the latter's bank and offset them against claims on it in the possession of Smith's bank, only the difference being paid in cash and not even that if a running balance were kept between the

two banks. Smith's check on being returned to his bank would be cancelled and his account debited, Brown's account would be credited and the exchange would be effected as before without the payment of money.

This process of offsetting claims is extended indefinitely in our modern banking system through the clearing house. In a community without a clearing house each bank would be obliged to send a messenger to those banks against which it had checks and collect or offset them. In a clearing house these messengers all meet at an appointed time, each presenting all the checks it holds on other banks and in turn receiving all those the other banks hold on it. A balance is then struck between the total claims of each bank on all the others, and the total claims of all the others on each individual. The balance is then received or paid by each bank to the Clearing House Association, in cash or by check, probably by a check on the Federal Reserve Bank of the district. In London the clearing house meets twice daily, the annual clearings run to over twenty billion pounds; the balances which are less than 5 per cent of the total clearings, are paid by checks on the Bank of England, so that literally billions of payments are made without the use of a single sovereign. The total clearings in the New York Clearing House for the week ending January 3, 1920, amounted to $4,387,455,948 and the total clearings of all the clearing houses of the United States for the same week exceeded nine billion dollars. The total clearings of the New York Clearing House for 1920 amounted to more than two hundred and fifty-two billion dollars, the balances being 9.99 per cent of the total. During the last sixty-five years in the New York Clearing House, the balances have averaged but 5.19 per cent of the clearings.

By means of the interconnections between banks the deposit credit is used to make payments to distant places. Banks have their correspondents in other cities with whom they maintain deposits and through whom they collect payments of checks drawn on those cities and on whom they draw drafts for their clients who wish to make out-of-town payments. The collection of out-of-town checks and the making of out-of-town payments has been much facilitated by the passage of the Federal Reserve

Act under which the Federal Reserve Banks are authorized to collect checks and drafts on member banks and on each other at par.

This remarkable mechanism of the banking system for the offsetting of claims one against another, enables deposit credit circulating through checks and drafts to effect millions of payments with but a minimum use of cash, thus furnishing the community with a cheap and convenient substitute for money as a medium of exchange.

## HOW DEPOSIT CURRENCY IS SECURED; THE CASH RESERVE

It might be well to note that the word "substitute" is here used in a limited sense; not meaning that deposit currency is able to displace money but to represent it, acting for it as a hand-to-hand medium of exchange. All credit instruments are claims to money; a United States note is a claim on the government for gold, a bank note or a check is in effect a claim on a bank for money; these claims to money are acceptable as media of exchange only so long as there is no doubt but that the money they lay claim to will be forthcoming as required. Under ordinary conditions such is the confidence of the public in the government and the banks that the credit instruments of either readily pass from hand to hand in lieu of the money they are entitled to; in consequence their ultimate dependence on standard money is apt to be overlooked and some over-sanguine souls are even lured into the belief that credit is a thing apart from money, fully capable of existing without it and able to completely supplant it. One might as well believe that a house can exist without a foundation. For our entire system of credit currency is based on gold. Witness today the sunken condition of European currencies due to the weakening of the gold foundation on which they rest. It should never be lost sight of that all forms of credit currency are promises to pay money and only circulate in place of money at par, because of the fact that the public has confidence that the money promised will be paid if demanded. A credit instrument occupies a rather paradoxical position. If the holder is satisfied that he can obtain the money,

he does not want it, but let him once doubt and he at once wants the money. This is particularly true of deposit credit. Let a rumor get abroad that a certain bank is shaky and its depositors will descend on it in a swarm demanding cash. Credit is based on confidence but that confidence is based in turn on ability to pay money and this ability must be assured. In the case of credit currency payable on demand, this assurance can only be secured by a cash reserve. We have seen how the supplementary forms of money issued by the government and the banks are secured by cash reserves, which assure their ready convertibility into standard money on demand. We will now notice how the convertibility of deposit currency into money is secured by bank reserves.

In a general way, of course, the deposit liabilities of a bank are secured by its assets, but as these deposits are subject to payment in legal tender money on demand, it is essential that part of its assets should consist of cash. As a bank makes its profit by loaning money and credit it naturally does not desire to keep any more cash in its vaults than is conservatively necessary to insure the prompt payments of its depositors' demands, which as we have seen are small in normal times in comparison to its deposits. To keep any more idle cash than is conservatively necessary is wasteful, entailing loss to the banker and to the business man needing capital. On the other hand there lies the danger, owing to the fact that the more loans the banker makes the larger his profits, that he will be tempted to extend his loans beyond the point of safety; be unable to meet an unusual demand for cash and become involved in ruin. No bank, no matter how strong, could stand a run on it, could pay all its deposits in cash if demanded at any one time. This does not mean that banks are insolvent, but that the banks' assets are not all cash or convertible into cash at a moment's notice. A large part of their assets will consist of the notes of business men, payable within thirty to ninety days. These are sound assets convertible into cash, but not immediately. The question resolves itself into the proportion of cash assets a bank should hold against demand liabilities.

In Europe generally the proportion of cash reserves to deposit

liabilities is left to the judgment of the bankers. The advantages of this system over that of a legal minimum are that it is in the first place more economical, in that it allows the banks to adjust their reserves to the temper of the times, reducing the amount of idle cash in periods of confidence, increasing them only as occasion warrants; second, that it is safer in that it throws the full responsibility for maintaining an adequate reserve on the banker who thus charged is constantly on the alert to strengthen his reserves in *anticipation* of an approaching storm, instead of relying on a rigid legal minimum, which though it may be in excess of requirements in ordinary times is insufficient in times of panic. In England, owing to the fact that the reserves are concentrated at one point, all the banks keeping the greater part of their cash reserves in the form of deposits with the Bank of England, the proportion of reserves to depositors is smaller than in any other country, usually less than 5 per cent.

In the United States it is customary to determine by law the minimum proportion of cash reserves to demand deposits. The purpose is to protect the public against an unsafe extension of loans on an insufficient reserve by compelling the banks to cease loaning when their cash reserve falls below the prescribed legal requirements. This acts as a check on careless or rash banking practice. In a young country where the banking system is not highly organized, where banking practice and banking ethics are still in the formative stage and that sound conservative judgment, on which finally the safety of any bank system depends, has not yet emerged from the fires of experience, legal restriction is without question desirable. And such no doubt has been the case within the United States in the past. Whether such restriction is still necessary is doubtful though the reserve requirement of the Federal Reserve Act suggests it is still expedient.

For the purpose of reserves we may divide the commercial banks of the United States into two groups, one consisting of the national banks and member banks of the Federal Reserve system, the other containing all banks outside of the national system, state banks including trust companies, the aggregate

demand deposits of which latter group in 1918 were about seven billion dollars. The reserves of this second group are determined by the laws of the different states, among which, to say the least, there is considerable variation, some being stringent and others remarkably lax. The legal minimum required runs from zero to 25 per cent, although 15 per cent is the most common requirement for demand deposits.

The Federal Reserve Act of 1913 while it reduced the existing reserve requirements of the individual banks of the national system, rendered them far more mobile and effective by creating a reserve organization with a high degree of centralization of control. Under the old national banking system the reserves of the banks throughout the country gravitated to the three central reserve cities, particularly New York. This local concentration of reserves lacked the one thing needful of concentration, namely centralization of control. The reserves were scattered among the big banks in the central reserve cities, each of which concerned chiefly with its own affairs, loaned these funds out on call to brokers. No one was responsible for their availability in anticipation of a demand for cash from the country at large. As a result when a panic arose the New York banks, themselves caught short of cash, called their loans and suspended payments. The banks throughout the country, unable to get their reserves deposited with the New York banks, likewise contracted their loans and disaster followed. In short, under the old system the reserves were scattered in separate banks, with the result that in times of danger no concerted plan of action was possible. Under the new Federal Reserve system the reserves are marshalled in twelve Central Reserve Banks, each of which is the center of control for its district; provision for concerted action between these district centers is provided through the agency of the Federal Reserve Board, so that while there is not the complete centralization afforded by the English system, there is a high degree of centralized control for the reserves of each district.

Under the Federal Reserve system the country banks are required to maintain a reserve of 7 per cent, banks in reserve cities 10 per cent and those in the central reserve cities, 13 per

cent. Part of these reserves are to be kept in the bank's vaults and part on deposit with the Federal Reserve Bank of its district. Each of these reserve banks is the reservoir for its district and as it is itself a bank of deposit, it is required to maintain a reserve of gold or lawful money equal to 35 per cent of its deposits, as well as the 40 per cent gold reserve against its notes in circulation not secured by gold or lawful money deposited with the Federal Reserve agent.

## REINFORCEMENT OF CASH RESERVES BY LIQUID ASSETS

Not only does sound banking demand an adequate cash reserve, but it is just as essential for a bank to keep its assets in a liquid state, by which is meant that they should be in such a form as to be readily convertible into cash. The assets of a national bank, aside from cash, are "loans and discounts," United States bonds, and other securities and bank property. Chief of these is the item, loans and discounts, which consist of promissory notes, trade acceptances and other evidences of claims against its borrowers that the banker has in his portfolio. It is by regulating the character of these loans and discounts that the banker is able to keep his assets liquid. From this point of view we may divide these loans into two classes, call and time loans.

In the big cities, particularly New York, the banks lend part of their spare funds to brokers. These loans are secured by collateral, stocks or bonds, deposited with the banker as security and repayable at any time at the call of the banker. This enables the banker to loan out his funds at interest and yet retain control of them. These loans constitute the most liquid of assets, being convertible into cash at a few hours' notice.

The great bulk of the loans made by commercial banks run from thirty to ninety days. The most common form is the promissory note referred to above. A new form in this country, though one which has been for years a favorite in Europe, is the "trade acceptance," which bids fair to increase in popularity here. A trade acceptance is a draft or bill of exchange drawn by the seller on the purchaser of goods, bearing on its face the purchaser's signature as evidence of acceptance, with the date and

place of payment. The seller or buyer takes this acceptance to the banker, who in exchange for it gives him a deposit credit equal to its face value, minus the interest charge for the period of the loan. Loans of this character are a favorite with bankers, secured as they are by two names, based on merchandise in transit and tying up the banker's funds for but a short time. Long-term loans, tying up, as they do, their funds for long periods, are not favored by commercial banks. Up to the passage of the Federal Reserve Act no national bank was allowed to loan money on the security of farm lands. The new act permits a national bank not in a central reserve city to make such loans, not to run longer than five years and not to exceed in volume 25 per cent of its capital and surplus or one-third of its time deposits.

How a bank is able to reinforce its cash reserve by keeping the bulk of its loan assets in such a form as to be convertible into cash at short notice will now be clear. Over against its demand liabilities it has its loans in such a form and arranged in such a way as to be coming due daily. Moreover, the banker is able to contract or expand them as his judgment dictates. In periods of confidence when business is good, when a smaller cash reserve is necessary and more loans demanded, he can extend his accomodations. When the storm signals of an approaching panic are flying, he is able to shorten sail by gradually contracting his loans, at the same time increasing his cash reserve. Here again the Federal Reserve Act has come to the rescue and given greater elasticity and mobility to bank credit than ever it had before, by "rediscounting" and the establishment of an open discount market.

By "rediscounting" is meant that the Federal Reserve Bank will discount the note or trade acceptance which the banker has discounted for the business man, loaning the banker money on it, as he has previously loaned money to the business man. Heretofore such a note must lie idle in the banker's portfolio until it came due; now he is able to borrow money on it. This law makes good commercial paper the banker's most liquid asset. In times of stress he can always obtain cash by taking his prime commercial paper to the Federal Reserve Bank and getting it

rediscounted. Also under the new law the Federal Reserve banks and the member banks are allowed under certain limitations to buy and sell bank acceptances and bills of exchange arising out of foreign and domestic trade. Any bank with funds to spare may buy such commercial paper and when in need of cash can sell it in the open market. Add to this the fact that the Federal Reserve Banks may, or may be required by the Federal Reserve Board to, rediscount each other's paper, making it possible for any one reserve bank in times of stress to obtain cash aid from the other reserve districts, and we have a reserve system which should afford ample protection and fully guarantee the convertibility of deposit currency into cash at all times.

## GROWTH AND PRESENT STRENGTH OF BANKING IN THE UNITED STATES

Some idea of the rapidity of growth in banking in the United States during the last fifty years is gained from the following chart, Fig. 11., which graphs in billions of dollars the individual deposits in National, State, savings, private banks, loan and trust companies in decades from 1870 to 1920. The increasing steepness of the curve well displays the remarkable recent rapidity of growth of banking practice in this country.

In 1890 the banking power of the United States was estimated by Mulhall to be $5,150,000,000; in 1920, as expressed by the aggregate of the capital, surplus, deposits, and circulating notes of its National, State and Federal Reserve Banks it had grown to $50,981,900,000. The total individual deposits in all banks in the United States in 1920 amounted to $37,683,600,000.

The resources of national banks in the seven-year period from June, 1913 to June, 1920, increased $11,159,817,000 which is more than the total increase which took place in the entire fifty years from the inauguration of the national banking system in 1863 to the year 1913.

All previous records were exceeded in 1920 in the number of depositors in national banks which according to the report of the comptroller of the currency numbered 20,520,177. There is now approximately one depositor in the national banks for every five of the population.

In immunity from failure the showing for the year 1920 was the best in forty years, with the sole exception of the fiscal year 1919. The total capital of the five small banks which failed during the year was $225,000 or seventeen one thousandths of 1 per cent of the total capital of all national banks. This per-

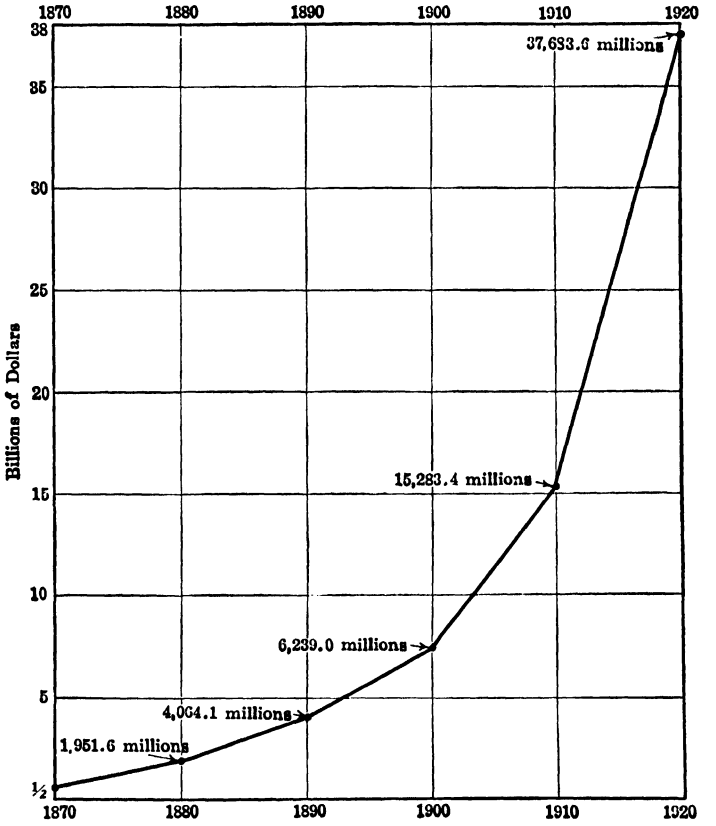



FIG. 13

centage is about sixteen times better than the average for the entire period of fifty-seven years from the inauguration of the system to the present.

An annual charge of two and one-half ten thousandths of 1 per cent of deposits would have been more than sufficient to have covered all losses, accruing to the depositors in national

banks for the six years preceding 1920. All deposits in national banks could thus be fully insured by payment of a premium of $25 per million and such a plan has been suggested by the comptroller of the currency.

The growth and present strength of the national banking system is well brought out in the following table:

## THE MONEY AND CURRENCY OF THE UNITED STATES

The relative quantities of standard money, supplementary money and deposit currency in the United States at the close of the fiscal year June, 1921, are pictured by the following diagram:

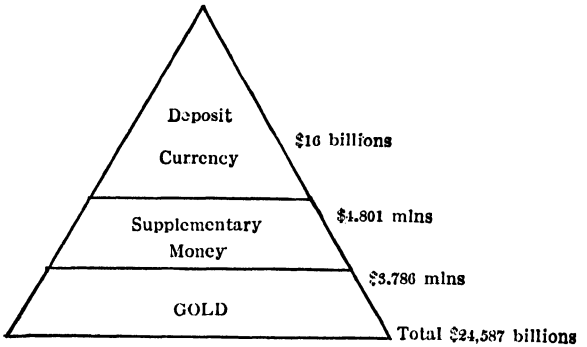



FIG. 14

The basis of our whole system of money and currency is the three billion odd dollars of gold, the standard money of the realm. Next comes the four and a half billion of supplementary money possessing the same general acceptability within the nation as a hand-to-hand medium of exchange as the gold into which it is directly convertible and on which its value depends. On the top of the whole is the [1]sixteen billion of bank credit circulating through checks, depending for its value on its convertibility into legal tender money, supplementing such money as that in turn supplements gold.

Not only in the workshop of the world has evolution replaced the tool by the machine, taking it out of man's hands and setting it in a mechanism wherein its power to produce is magnified.

[1]No satisfactory figures available for 1921. Based on estimate for 1920

(In thousands of dollars)

| Date | No. of banks | Total deposits | Loans and discounts | Reserve held | Excess reserve |
|---|---|---|---|---|---|
| Sept. 5, 1900 | 3,871 | 3,699,804 | 2,686,760 | 983,333 | 299,206 |
| Aug. 25, 1905 | 5,757 | 5,508,643 | 3,998,509 | 1,294,298 | 322,170 |
| Sept. 1, 1910 | 7,173 | 7,140,836 | 5,467,161 | 1,573,522 | 313,415 |
| Sept. 2, 1915 | 7,613 | 9,229,516 | 6,756,680 | 1,969,398 | 868,756 |
| Sept. 8, 1920 | 8,093 | 16,751,956 | 13,706,066 | 1,232,039 | 38,092 |

| Capital | Surplus and undivided profits | Circulation | Total resources | No. of banks | Date |
|---|---|---|---|---|---|
| 630,299 | 389,469 | 283,949 | 5,048,138 | 3,871 | Sept. 5, 1900 |
| 799,870 | 620,294 | 468,980 | 7,472,351 | 5,757 | Aug. 25, 1905 |
| 1,002,735 | 874,038 | 674,822 | 9,826,181 | 7,173 | Sept. 1, 1910 |
| 1,068,864 | 1,022,596 | 718,496 | 12,267,090 | 7,613 | Sept. 2, 1915 |
| 1,248,271 | 1,456,067 | 693,270 | 21,885,480 | 8,093 | Sept. 8, 1920 |

In the market place the same silent forces have been at work; money the tool of exchange no longer performs its task by hand. But as part of a marvelously ingenious mechanism, its power to affect those exchanges of capital and finished goods on which the well being of our society depends, has been tremendously augmented.

## TEST QUESTIONS

1. What is the distinction between deposit currency and the other kinds of currency discussed in the preceding chapter?
2. How does deposit currency originate?
3. How does deposit currency serve as a medium of exchange?
4. Show how checks are offset against one another in the clearing house.
5. How is deposit currency secured?
6. Explain how cash reserves are reinforced by liquid assets.
7. What is "rediscounting"?

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## CHAPTER XXII

# CHANGES IN THE VALUE OF MONEY OR THE LEVEL OF PRICES AND THEIR MEASUREMENT

### CHANGES IN THE VALUE OF MONEY AND PRICE LEVELS

We now come to a subject of intense practical importance and one which during the last few years has been of much public interest. We have before referred to the fact that the value of money, the standard of all other values, is itself subject to change and that its fluctuations vary inversely with changes in the level of prices. The term "value" is used here in a general sense denoting the abstract relationship existing between money and all other commodities. Strictly speaking, money has many values. No one commodity does for money what money does for all others in its capacity of a standard of value. In the economic world, there is one accepted measure of value for each and every commodity, one specific relation which denotes the general relation which each good bears to all others, which gauges its standing in the market, namely its money price. But no one other commodity serves as a measure of the value of money. Money has, of course, as many separate values as there are commodities offered for sale, the other side of every price quotation expresses a value of money. If wheat is quoted at $1 a bushel, the value of a dollar in terms of wheat is one bushel. But if wheat goes up to $1.25 a bushel though the value of money in terms of wheat has fallen, one dollar only commanding in exchange four-fifths of a bushel, it does not necessarily follow that the value of money in relation to all other commodities has fallen. The rise may and is usually taken to indicate an increase in the value of wheat. If, however, the prices of other commodities have gone up, the higher price of wheat may be

due to a fall in the value of money. In this case the value of wheat in reference to other commodities will remain the same but the value of money, the purchasing power of a dollar, will have shrunk. If all prices were to rise 25 per cent, it is evident that a dollar would only purchase four-fifths of what it would before, that is, its value would decrease one-fifth or 20 per cent. Changes in the value of money would thus be registered by inverse changes in the general level of prices. But prices never rise and fall alike. They are most chaotic in their changes; some fluctuate violently from day to day; others steadily rise or fall for long periods and some scarcely vary at all. But though some go up and some go down and others change but little, the *general level* of prices is always tending up or down. The problem is to measure these movements of the general level of prices, a problem which is solved by a device called an index number, the invention of an Italian by the name of Carli, in 1750.

## THE SELECTION OF COMMODITIES FOR AN INDEX NUMBER

An index number is simply a *summary* in some form of the price changes of a selected set of commodities, used as the name suggests, to indicate changes in the level of prices in general. It serves somewhat the same purpose as the water gauge of a boiler, the visible rise or fall of which denotes changes in the invisible level of the water within.

In constructing such an index the first consideration is to select a set of sample commodities, the price changes of which will fairly represent those of commodities as a whole. If all commodities fluctuated alike changes in the prices of a few selected at random would accurately reflect price changes as a whole. But as all commodities do not fluctuate alike and are not all of the same importance as elements of the general system of prices, the value of an index number as a reliable indicator of changes in the general price level will depend in the first place on whether it is based on a carefully chosen representative list of commodities.

Prices of commodities tend to move in groups. And it is the presence of these groups of commodities whose prices advance

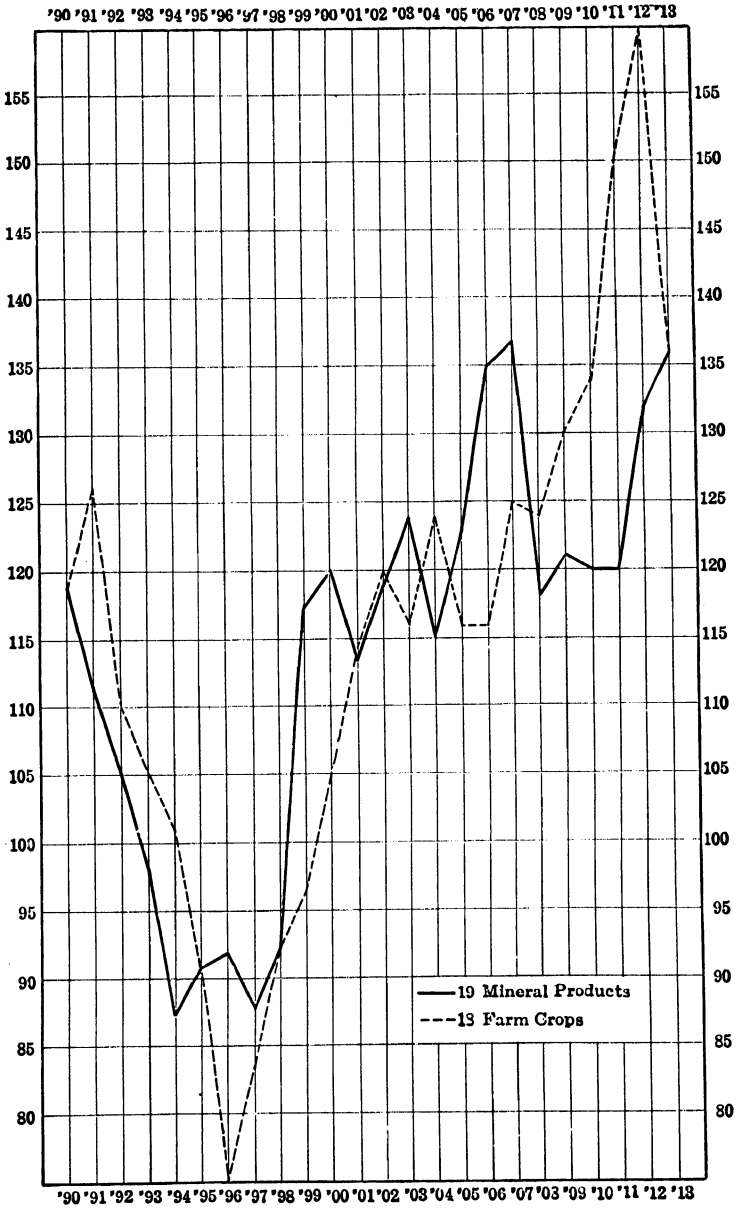



FIG. 15.—Index Numbers of the Prices of 19 Mineral Products and of 18 Farm Crops.

or fall in harmony, that constitutes a source of danger to index numbers. The prices of raw materials tend to move together and may be distinguished as a class from manufactured goods. Again raw materials may be subdivided into several groups of products with closely related prices, such as minerals, forest, animal and farm products. Manufactured goods may also be divided into two groups which behave quite differently, namely producers' goods and consumers' goods, the former including all articles bought for business use, the latter those purchased directly by consumers. Some of these groups are interrelated and at times move in unison, as in the case of raw materials and the partly finished or finished products made from them. Others differ widely in the degree in which they fluctuate or move in entirely opposite directions as the accompanying chart of farm and mineral products shows.

It is very evident then that an index number based on an undue quantity of any one or two of these groups will not represent prices as a whole and might by being confined to a particular clique grossly misrepresent them, a possibility that those who read index numbers published in the United States purporting to gauge changes in the general level of prices, might do well to bear in mind. Chart 16 on page 263 of two index numbers, the one based on miscellaneous commodities, the other on food products, bears testimony to this fact.

It will be noticed that the food index flatly contradicts the general commodity index in 1890–1892, 1900 and 1901, etc. Such contradictions are due chiefly to contrasts in those years between business conditions and harvest conditions. A food index made up for the most part of farm products, animal products and partly finished products produced from them, on account of its susceptibility to seasonal harvest conditions is very apt to give a wrong impression of prices in general.

## PRICE DATA

Just as important as selection of the commodities that go to make up the index is the securing of accurate price quotations; on these the reliability of the index numbers rests. As a rule wholesale market prices are chosen. Representative retail prices are difficult to obtain owing to local variations, though

several retail indexes are now published here and abroad. The price quotations for a particular date, such as the first of the week or month may be taken or an average price may be struck from a number of quotations.

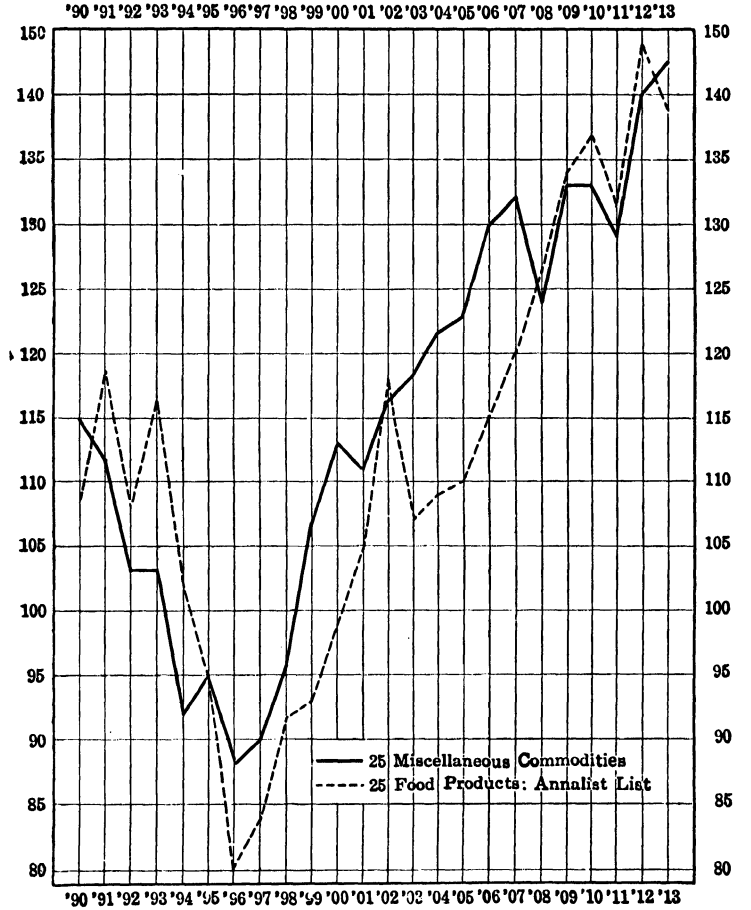



FIG. 16.—Index Numbers of the Prices of 25 Food Products and of 25 Miscellaneous Commodities.

## METHODS OF COMPUTING

Various methods are employed to manipulate these prices to gauge changes in the general price level. A simple illustration of each of the three chief methods will suffice to make clear the

nature of index numbers and enable us to read any one with some appreciation of its significance as well as its limitations.

The crudest method of all is to add the actual prices of the selected commodities for each period to be investigated and compare their sums. Let us assume that the prices of wheat, currants, opium and pig iron for 1900, 1901, and 1902 were as follows:

TABLE V.—AGGREGATE PRICES

| Commodity | Unit | 1900 | 1901 | 1902 |
|---|---|---|---|---|
| Wheat, | Bu. | .80 | .85 | 1.40 |
| Currants, | Lb. | .10 | .15 | .13 |
| Opium, | Lb. | 6.00 | 7.50 | 6.20 |
| Pig Iron, | Ton | 16.00 | 17.50 | 18.00 |
| Aggregate Prices, | | 22.90 | 26.00 | 25.75 |

A comparison of the "aggregate prices" shows that the cost of the four commodities rose in 1901 and fell slightly in 1902. This method of gauging changes in the general price level by adding the actual prices of such incongruous units as pounds, bushels, tons and ounces is subject to great inaccuracies. A relatively small change in a high priced unit such as opium exerts more influence on the total than a relatively great change in a low priced but important unit such as wheat. In the above table for example, the 22 per cent drop in opium exerts almost three times the influence on the aggregate price for 1901, as does the 69 per cent rise in wheat. And even if as it is sometimes done, the various units are all reduced to one quantity such as pounds, this distortion still exists.

To avoid these inaccuracies the actual prices are turned into "relative prices" on the basis of 100. By "relative price" is meant the percentage the actual price of a commodity at any period is of its actual price at a given period chosen as a base from which price fluctuations are to be measured. All prices of commodities at this base period will, therefore, be represented by 100, and all changes will be expressed as relatives of 100; a rise of 10 per cent being recorded as 110, a fall of 10 per cent

as 90. For example, if we take 1900 as the base year in the table above to find the relative price of wheat for 1901, we simply divide the actual price 85 cents by the base price 80 cents, multiply the quotient by 100 which gives us 106. The price of wheat in the base year will be represented by 100 and in 1901 by 106, showing a rise of 6 per cent in the price of wheat. The following table gives the relative prices of the four products using the year 1900 as the base period.

TABLE VI.—RELATIVE PRICES

| Commodities | Units | Base 1900 | 1901 | 1902 |
|---|---|---|---|---|
| Wheat, | Bu. | 100 | 106 | 175 |
| Currants, | Lb. | 100 | 150 | 130 |
| Opium, | Lb. | 100 | 125 | 103 |
| Pig Iron | Ton | 100 | 109 | 113 |
| Sums, | | 4)400 | 4)490 | 4)521 |
| Index Number (Arith. Average) | | 100 | 123 | 130 |

By adding these relative prices for each period and dividing by their number the final index number is found which is thus the simple arithmetical average of the relative prices of the commodities taken. In the above table 100 of course represents the average of prices in 1900, while the index numbers for 1901 and 1902 show there has been an average rise in the prices of all the commodities taken of 23 per cent and 30 per cent, respectively.

Other methods of averaging are sometimes employed. The geometric mean used by Jevons gives a more accurate average in that it protects the index number from being unduly influenced by extreme variations in the prices of a few articles; medians are sometimes preferred for the same reason. The most common method, however, is that of the simple arithmetic mean illustrated above.

In distinction to a "simple" index number based on the single price of each article included such as just described is a

"weighted" index number, wherein the price of each commodity is multiplied by some number to accord it, an influence on the result in proportion to its economic importance. There are many methods of "weighting;" to illustrate the principle, we will describe that used by the U. S. Bureau of Labor Statistics in computing the index now currently published in their monthly bulletin. According to this system, the economic importance of an article is expressed by the value of the total quantity exchanged in a given year. The index is constructed by multiplying the price of each article at each period by the estimated quantity exchanged and adding these weighted prices to obtain the aggregate weighted price or the total value in exchange of all the commodities at each period. The final index number which tells at a glance the percentage of rise or fall in the price level is obtained by dividing the weighted total of each period by the base total. The following table illustrates the process. Instead of using the exact figures, the assumed quantities and values of the articles entering into exchange are expressed in round millions.

TABLE VII.—WEIGHTED PRICES

| Commodity | Unit | Base 1900 | | | | 1901 | | | | 1902 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Price | Quantity exchanged used as weight | | Weighted price | Price | Quantity exchanged in 1900 weight | | Weighted price | Price | Quantity exchanged in 1900 weight | | Weighted price |
| | | | Millions | | Millions | | Millions | | Millions | | Millions | | Millions |
| Wheat, | Bu. | $.80× | 735 | = | $588 | $.85× | 735 | = | $624 | $1.40× | 735 | = | $1029 |
| Currants, | Lb. | .10× | 32 | = | 3 | .15× | 32 | = | 5 | .13× | 32 | = | 4 |
| Opium, | Lb. | 6.00× | 1 | = | 6 | 7.50× | 1 | = | 7 | 6.20× | 1 | = | 6 |
| Pig iron, | Ton | 16.00× | 8 | = | 128 | 17.50× | 8 | = | 140 | 18.00× | 8 | = | 144 |
| Aggregate weighted prices, | | | | | $725 | | | | $776 | | | | $1183 |
| Index numbers (relative prices 1900 base period), | | | | | 100 | | | | 107 | | | | 163 |

The object of weighting is to prevent the index number being unduly influenced by changes in the prices of unimportant commodities and to accord to the great staples a position on the

index equivalent to that which they occupy in the system of actual prices. It is obvious that opium and currants do not exert an influence on the general level of prices equal to that of wheat and iron. The simple index number in the year 1901, under the influence of currants and opium, soars way up while the following year tricked by a fall of the same insignificant pair, it fails to do justice to the rise in wheat and iron. The weighted index number corrects these maladjustments toning down the exaggerated rise in 1901, and by giving the great staples, wheat and iron, power in proportion to their economic importance, registers a more significant advance in the price level.

For the sake of making clear the principle, we have somewhat exaggerated the difference in the results obtained from the use of weighted and simple index numbers. When a larger number of commodities are taken the influence of extreme increases or decreases in the more unimportant commodities are apt to be lessened by one neutralizing the other: such an index tends to weight itself, though "haphazard" weighting of this character may, and often does, result in a viciously weighted index. Weighting is sometimes attained in a simple index number by causing an important commodity, such as wheat, to be represented indirectly several times by including two kinds of wheat, four of flour, bread, biscuits, etc. While actual tests made by comparing weighted and simple index numbers show a fairly close agreement, both pointing out equally well the general trend of prices, there seems to be a growing opinion among experts, both in this country and abroad, that an index number based on a large number of carefully selected commodities weighted in accordance with their economic importance will reflect changes in the general level of prices with greater accuracy; and such a conclusion seems sound.

## BIRD'S-EYE VIEW OF PRICE CHANGES IN UNITED STATES FROM 1840-1920

There are five Index Numbers of wholesale prices published currently in the United States; Dun's, Bradstreet's, Gibson's, The *N. Y. Times Annalist*, and that of the United States

Bureau of Labor Statistics, which is based on 297 quotations of 201 distinct commodities weighted as described above. Through the courtesy of the Bureau of Labor Statistics department, we present the following table of prices covering the years from 1840 to 1920. This index number is an amalgamation of that of the United States Senate Finance Committee, running from 1840 to 1890, with the current index of the Bureau of Labor Statistics which commences at the year 1890. The Senate Committee's, or Falkner's Index as it is sometimes termed, is a simple index based on the wholesale prices of over 223 articles. Both indexes have been reduced to a common base, prices in 1913 equalling 100, and are consolidated at the year 1890.

TABLE VIII.—INDEX NUMBER OF WHOLESALE PRICES 1840–1921

1913 = 100

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1840 | 103 | 1861 | 88 | 1882 | 95 | 1902 | 85 |
| 1841 | 102 | 1862 | 103 | 1883 | 93 | 1903 | 85 |
| 1842 | 95 | 1863 | 130 | 1884 | 87 | 1904 | 86 |
| 1843 | 89 | 1864 | 167 | 1885 | 82 | 1905 | 85 |
| 1844 | 89 | 1865 | 190 | 1886 | 81 | 1906 | 88 |
| 1845 | 90 | 1866 | 168 | 1887 | 81 | 1907 | 94 |
| 1846 | 93 | 1867 | 151 | 1888 | 83 | 1909 | 91 |
| 1847 | 93 | 1868 | 142 | 1889 | 83 | 1909 | 97 |
| 1848 | 89 | 1869 | 135 | 1890 | 81 | 1910 | 99 |
| 1849 | 87 | 1870 | 125 | 1891 | 81 | 1911 | 95 |
| 1850 | 90 | 1871 | 119 | 1892 | 75 | 1912 | 101 |
| 1851 | 93 | 1872 | 122 | 1893 | 77 | 1913 | 100 |
| 1852 | 90 | 1873 | 121 | 1894 | 69 | 1914 | 100 |
| 1853 | 96 | 1874 | 117 | 1895 | 69 | 1915 | 101 |
| 1854 | 99 | 1875 | 112 | 1896 | 66 | 1916 | 124 |
| 1855 | 99 | 1876 | 104 | 1897 | 66 | 1917 | 176 |
| 1856 | 99 | 1877 | 97 | 1898 | 69 | 1918 | 196 |
| 1857 | 99 | 1878 | 89 | 1899 | 74 | 1919 | 212 |
| 1858 | 89 | 1879 | 85 | 1900 | 80 | 1920 May | 272 |
| 1859 | 88 | 1880 | 94 | 1901 | 79 | 1921 | 153 |
| 1860 | 88 | 1881 | 93 | | | | |

The following chart presents this index number in graphic form and makes clear at a glance the upward and downward swings of prices during the last eighty years. The index number *indicates* that the general level of prices in May, 1920, was 172 per cent higher than in 1913, which would signify that the

value of money in the United States has depreciated 63 per cent, a dollar in 1920 being equivalent in purchasing power to 37 cents in 1913, so far as wholesale prices are concerned.

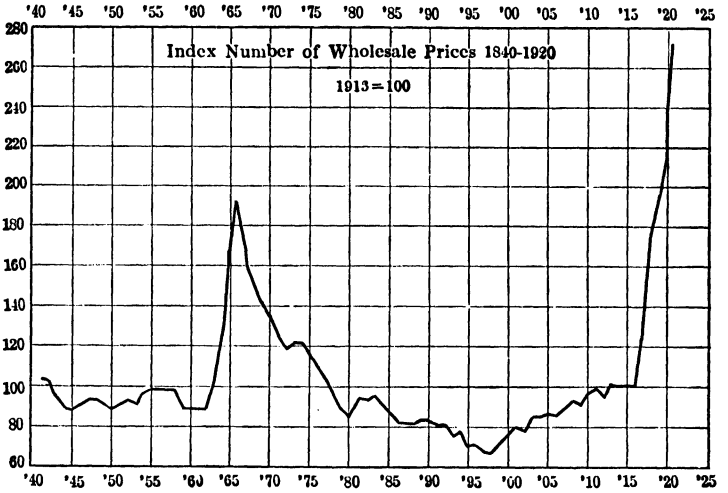



FIG. 17

The following tables and chart prepared by the U. S. Bureau of Labor Statistics, throw considerable light on changes in the cost of living from 1907-1920.

## RELATIVE RETAIL PRICES OF 22 ARTICLES OF FOOD

In Table IX the average monthly and yearly prices of 22 food articles are shown as relative prices, or percentages of the average prices for the year 1913. These relatives are computed by dividing the average price of each commodity for each month and each year by the average price of that commodity for 1913. Relative prices must be used with caution. For example, the relative price of pork chops in November, 1919, was 200, which means that the money price was 200 per cent of the money price in 1913, or, in other words, the price doubled. The relative price of pork chops in December, 1919, was 181, showing a drop of 19 points from 200, which is a decrease of only 9.5 per cent.

In the last column of this table are given index numbers showing the changes by months and years in the retail cost of the 22 food articles weighted according to the importance of each article in the consumption of the average family. Prices are obtained each month for 43 food articles, but only 22 of these are included in the retail food price

## TABLE IX.—RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1907 TO DECEMBER, 1920

[Average for year 1913 = 100]

| Year and month | Sirloin steak | Round steak | Rib roast | Chuck roast | Plate beef | Pork chops | Bacon | Ham | Lard | Hens | Eggs | Butter | Cheese | Milk | Bread | Flour | Corn meal | Rice | Potatoes | Sugar | Coffee | Tea | 22 weighted articles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1907 | 71 | 68 | 76 | ... | ... | 74 | 74 | 76 | 81 | 81 | 84 | 85 | ... | 87 | ... | 95 | 88 | ... | ... | 105 | ... | ... | 82 |
| 1908 | 73 | 71 | 78 | ... | ... | 76 | 77 | 78 | 80 | 83 | 86 | 86 | ... | 90 | ... | 102 | 92 | ... | 111 | 108 | ... | ... | 84 |
| 1909 | 77 | 74 | 81 | ... | ... | 83 | 83 | 82 | 90 | 89 | 93 | 90 | ... | 91 | ... | 109 | 94 | ... | 112 | 107 | ... | ... | 89 |
| 1910 | 80 | 78 | 85 | ... | ... | 92 | 95 | 91 | 104 | 94 | 98 | 94 | ... | 95 | ... | 108 | 95 | ... | 101 | 109 | ... | .. | 93 |
| 1911 | 81 | 79 | 85 | ... | ... | 85 | 91 | 89 | 88 | 91 | 93 | 88 | ... | 96 | ... | 103 | 94 | ... | 130 | 111 | ... | .. | 92 |
| 1912 | 91 | 89 | 94 | ... | ... | 91 | 91 | 91 | 94 | 93 | 99 | 98 | ... | 97 | ... | 115 | 102 | ... | 132 | 115 | ... | ... | 98 |
| **1913: Av. for year** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |
| January | 94 | 92 | 95 | 93 | 92 | 89 | 94 | 93 | 97 | 95 | 108 | 107 | 100 | 100 | 100 | 100 | 99 | 99 | 91 | 106 | 100 | 100 | 98 |
| February | 94 | 93 | 95 | 93 | 93 | 90 | 95 | 94 | 98 | 97 | 91 | 108 | 100 | 100 | 100 | 100 | 98 | 99 | 90 | 100 | 100 | 100 | 97 |
| March | 97 | 96 | 98 | 98 | 98 | 97 | 97 | 97 | 99 | 100 | 77 | 108 | 100 | 100 | 100 | 100 | 98 | 99 | 88 | 99 | 100 | 100 | 97 |
| April | 101 | 99 | 101 | 101 | 101 | 103 | 99 | 99 | 100 | 104 | 73 | 106 | 100 | 100 | 100 | 100 | 98 | 99 | 87 | 98 | 100 | 100 | 98 |
| May | 101 | 100 | 101 | 101 | 101 | 100 | 100 | 99 | 100 | 104 | 76 | 94 | 99 | 99 | 100 | 101 | 98 | 99 | 91 | 97 | 100 | 100 | 97 |
| June | 102 | 101 | 102 | 102 | 101 | 99 | 101 | 102 | 100 | 103 | 81 | 92 | 99 | 99 | 100 | 101 | 98 | 99 | 104 | 97 | 100 | 100 | 98 |
| July | 104 | 104 | 102 | 103 | 101 | 103 | 104 | 104 | 101 | 102 | 87 | 91 | 99 | 99 | 100 | 101 | 98 | 100 | 110 | 100 | 100 | 100 | 100 |
| August | 104 | 104 | 102 | 103 | 101 | 104 | 105 | 106 | 102 | 101 | 96 | 92 | 100 | 99 | 100 | 100 | 100 | 100 | 109 | 102 | 100 | 100 | 101 |
| September | 103 | 104 | 101 | 103 | 102 | 108 | 104 | 104 | 102 | 101 | 109 | 98 | 100 | 100 | 100 | 100 | 102 | 100 | 110 | 104 | 100 | 100 | 102 |
| October | 101 | 104 | 101 | 103 | 102 | 107 | 103 | 102 | 101 | 100 | 120 | 100 | 101 | 101 | 100 | 99 | 103 | 100 | 106 | 101 | 100 | 100 | 104 |
| November | 100 | 102 | 100 | 102 | 102 | 102 | 101 | 100 | 101 | 97 | 144 | 101 | 102 | 102 | 100 | 99 | 104 | 100 | 107 | 99 | 100 | 100 | 105 |
| December | 99 | 101 | 100 | 101 | 102 | 97 | 99 | 99 | 100 | 98 | 138 | 104 | 102 | 102 | 100 | 99 | 104 | 100 | 106 | 98 | 100 | 100 | 104 |
| **1914: Av. for year** | **102** | **106** | **103** | **104** | **104** | **105** | **102** | **102** | **99** | **102** | **102** | **94** | **104** | **100** | **112** | **104** | **205** | **101** | **108** | **108** | **100** | **100** | **102** |
| January | 99 | 102 | 100 | 102 | 102 | 99 | 98 | 98 | 100 | 100 | 126 | 104 | 104 | 102 | 110 | 98 | 104 | 100 | 108 | 95 | 99 | 100 | 104 |
| February | 99 | 102 | 101 | 103 | 102 | 100 | 98 | 99 | 99 | 104 | 106 | 93 | 104 | 102 | 110 | 99 | 103 | 100 | 108 | 94 | 99 | 100 | 101 |
| March | 100 | 103 | 101 | 102 | 102 | 100 | 99 | 99 | 99 | 105 | 90 | 92 | 105 | 101 | 110 | 99 | 103 | 100 | 107 | 93 | 100 | 100 | 99 |
| April | 100 | 103 | 102 | 103 | 102 | 103 | 99 | 99 | 99 | 108 | 74 | 86 | 104 | 100 | 110 | 99 | 103 | 100 | 105 | 91 | 100 | 100 | 97 |
| May | 102 | 105 | 102 | 103 | 103 | 106 | 99 | 99 | 98 | 106 | 77 | 85 | 103 | 100 | 110 | 99 | 103 | 100 | 112 | 91 | 100 | 101 | 98 |
| June | 103 | 106 | 103 | 104 | 103 | 103 | 100 | 100 | 97 | 103 | 82 | 88 | 103 | 100 | 100 | 99 | 103 | 100 | 132 | 93 | 100 | 101 | 99 |
| July | 106 | 109 | 105 | 106 | 104 | 106 | 101 | 103 | 97 | 103 | 87 | 89 | 103 | 100 | 110 | 98 | 103 | 101 | 155 | 95 | 99 | 101 | 102 |
| August | 110 | 113 | 108 | 109 | 107 | 119 | 107 | 108 | 99 | 104 | 96 | 94 | 103 | 100 | 112 | 106 | 105 | 101 | 111 | 143 | 100 | 101 | 107 |
| September | 107 | 110 | 105 | 108 | 107 | 113 | 108 | 108 | 99 | 103 | 107 | 98 | 104 | 100 | 114 | 113 | 109 | 101 | 105 | 145 | 100 | 101 | 107 |
| October | 103 | 107 | 104 | 106 | 106 | 110 | 106 | 105 | 98 | 100 | 113 | 98 | 104 | 101 | 114 | 111 | 109 | 101 | 89 | 132 | 99 | 101 | 105 |
| November | 100 | 105 | 103 | 104 | 105 | 104 | 104 | 102 | 99 | 97 | 131 | 103 | 104 | 101 | 114 | 112 | 109 | 101 | 83 | 113 | 99 | 101 | 105 |
| December | 101 | 103 | 101 | 103 | 103 | 93 | 103 | 100 | 97 | 94 | 139 | 103 | 104 | 101 | 116 | 113 | 107 | 101 | 84 | 110 | 99 | 101 | 105 |

TABLE IX.—RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1907 TO DECEMBER, 1920—*Continued*

[Average for year 1913 = 100]

| Year and month | Sirloin steak | Round steak | Rib roast | Chuck roast | Plate beef | Pork chops | Bacon | Ham | Lard | Hens | Eggs | Butter | Cheese | Milk | Bread | Flour | Corn meal | Rice | Potatoes | Sugar | Coffee | Tea | 22 weighted articles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1915: Av. for year** | **101** | **103** | **101** | **101** | **100** | **96** | **100** | **97** | **93** | **97** | **99** | **93** | **105** | **99** | **124** | **126** | **198** | **104** | **89** | **120** | **101** | **100** | **101** |
| January | 100 | 102 | 101 | 101 | 102 | 88 | 101 | 98 | 97 | 85 | 129 | 101 | 105 | 101 | 120 | 124 | 109 | 104 | 85 | 110 | 101 | 100 | 103 |
| February | 98 | 100 | 100 | 99 | 101 | 85 | 99 | 96 | 97 | 97 | 98 | 98 | 106 | 100 | 126 | 138 | 110 | 104 | 84 | 118 | 101 | 100 | 101 |
| March | 97 | 99 | 99 | 98 | 100 | 85 | 98 | 95 | 96 | 99 | 74 | 94 | 106 | 99 | 126 | 136 | 110 | 104 | 82 | 120 | 101 | 100 | 98 |
| April | 99 | 100 | 100 | 99 | 100 | 94 | 98 | 94 | 96 | 100 | 95 | 94 | 105 | 99 | 126 | 137 | 109 | 104 | 86 | 12[illegible] | 101 | 100 | 98 |
| May | 101 | 103 | 101 | 101 | 101 | 99 | 98 | 95 | 96 | 101 | 76 | 91 | 106 | 98 | 128 | 139 | 109 | 104 | 89 | 124 | 101 | 100 | 100 |
| June | 103 | 105 | 103 | 103 | 101 | 98 | 98 | 97 | 95 | 98 | 78 | 90 | 106 | 98 | 128 | 130 | 109 | 104 | 99 | 126 | 101 | 100 | 100 |
| July | 105 | 107 | 104 | 103 | 101 | 100 | 100 | 98 | 93 | 97 | 81 | 90 | 105 | 98 | 126 | 125 | 108 | 104 | 85 | 127 | 101 | 100 | 100 |
| August | 104 | 107 | 104 | 103 | 101 | 103 | 100 | 98 | 89 | 97 | 88 | 88 | 103 | 99 | 126 | 124 | 108 | 104 | 82 | 123 | 101 | 100 | 100 |
| September | 104 | 106 | 103 | 102 | 101 | 107 | 100 | 97 | 88 | 97 | 101 | 88 | 103 | 99 | 124 | 117 | 108 | 104 | 79 | 118 | 100 | 100 | 100 |
| October | 103 | 104 | 102 | 101 | 99 | 110 | 101 | 99 | 91 | 97 | 117 | 92 | 104 | 100 | 124 | 113 | 103 | 104 | 94 | 111 | 100 | 100 | 103 |
| November | 101 | 102 | 101 | 99 | 98 | 99 | 101 | 100 | 92 | 95 | 133 | 95 | 105 | 100 | 122 | 113 | 107 | 104 | 97 | 119 | 100 | 100 | 104 |
| December | 99 | 101 | 100 | 99 | 98 | 87 | 101 | 100 | 92 | 95 | 135 | 101 | 107 | 100 | 122 | 114 | 107 | 104 | 106 | 124 | 100 | 100 | 105 |
| **1916: Av. for year** | **108** | **110** | **107** | **107** | **106** | **108** | **106** | **109** | **111** | **111** | **109** | **103** | **117** | **102** | **130** | **135** | **113** | **105** | **159** | **146** | **100** | **100** | **114** |
| January | 101 | 102 | 101 | 99 | 99 | 89 | 101 | 101 | 93 | 101 | 123 | 100 | 110 | 100 | 122 | 120 | 107 | 105 | 136 | 123 | 100 | 100 | 107 |
| February | 101 | 102 | 102 | 99 | 100 | 92 | 101 | 102 | 94 | 104 | 101 | 99 | 112 | 100 | 124 | 125 | 108 | 104 | 141 | 125 | 100 | 100 | 106 |
| March | 104 | 104 | 104 | 103 | 102 | 104 | 103 | 104 | 96 | 107 | 82 | 105 | 113 | 100 | 124 | 120 | 107 | 104 | 140 | 137 | 100 | 100 | 107 |
| April | 106 | 108 | 106 | 106 | 105 | 107 | 104 | 107 | 100 | 111 | 79 | 108 | 113 | 99 | 124 | 119 | 108 | 104 | 138 | 145 | 100 | 100 | 109 |
| May | 109 | 112 | 110 | 109 | 107 | 109 | 105 | 109 | 106 | 113 | 82 | 97 | 112 | 99 | 124 | 119 | 108 | 104 | 140 | 156 | 100 | 100 | 109 |
| June | 113 | 117 | 113 | 113 | 111 | 110 | 107 | 110 | 108 | 114 | 87 | 95 | 111 | 99 | 124 | 117 | 108 | 105 | 167 | 158 | 100 | 100 | 112 |
| July | 113 | 116 | 112 | 112 | 109 | 111 | 107 | 111 | 110 | 113 | 93 | 93 | 110 | 100 | 124 | 116 | 108 | 105 | 134 | 160 | 100 | 100 | 111 |
| August | 112 | 115 | 111 | 110 | 107 | 116 | 108 | 111 | 111 | 112 | 105 | 95 | 111 | 101 | 126 | 134 | 110 | 105 | 141 | 155 | 100 | 100 | 113 |
| September | 111 | 115 | 110 | 110 | 107 | 125 | 110 | 114 | 118 | 113 | 120 | 102 | 116 | 102 | 136 | 148 | 113 | 105 | 161 | 141 | 100 | 100 | 118 |
| October | 108 | 111 | 108 | 108 | 106 | 118 | 110 | 114 | 123 | 114 | 132 | 109 | 122 | 105 | 144 | 155 | 117 | 105 | 165 | 149 | 100 | 100 | 121 |
| November | 106 | 108 | 106 | 107 | 106 | 111 | 111 | 114 | 135 | 112 | 149 | 114 | 132 | 109 | 150 | 174 | 126 | 105 | 198 | 157 | 100 | 100 | 126 |
| December | 106 | 107 | 106 | 106 | 106 | 106 | 110 | 114 | 137 | 112 | 154 | 118 | 140 | 112 | 138 | 167 | 131 | 105 | 198 | 151 | 100 | 100 | 126 |
| **1917: Av. for year** | **124** | **130** | **126** | **131** | **130** | **152** | **152** | **142** | **175** | **134** | **139** | **127** | **150** | **125** | **164** | **211** | **192** | **119** | **253** | **169** | **101** | **107** | **146** |
| January | 109 | 111 | 109 | 109 | 108 | 113 | 110 | 114 | 136 | 119 | 158 | 118 | 141 | 112 | 140 | 171 | 132 | 105 | 225 | 146 | 100 | 100 | 128 |
| February | 113 | 117 | 114 | 116 | 116 | 125 | 114 | 118 | 138 | 126 | 147 | 122 | 142 | 112 | 142 | 171 | 136 | 104 | 290 | 148 | 100 | 100 | 133 |
| March | 116 | 119 | 118 | 128 | 121 | 133 | 123 | 125 | 151 | 129 | 101 | 121 | 146 | 112 | 144 | 174 | 137 | 104 | 297 | 160 | 101 | 101 | 133 |

TABLE IX.—RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1907 TO DECEMBER, 1920—*Continued*

[Average for year 1913 = 100]

| Year and month | Sirloin steak | Round steak | Rib roast | Chuck roast | Plate beef | Pork chops | Bacon | Ham | Lard | Hens | Eggs | Butter | Cheese | Milk | Bread | Flour | Corn meal | Rice | Potatoes | Sugar | Coffee | Tea | 22 weighted articles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1917: Av. for year (Con.)** | | | | | | | | | | | | | | | | | | | | | | | |
| April | 125 | 130 | 127 | 131 | 132 | 146 | 141 | 136 | 167 | 136 | 112 | 133 | 150 | 114 | 150 | 206 | 154 | 108 | 339 | 175 | 101 | 101 | 145 |
| May | 127 | 133 | 130 | 134 | 135 | 146 | 155 | 144 | 176 | 138 | 116 | 122 | 153 | 117 | 168 | 266 | 178 | 121 | 352 | 283 | 101 | 103 | 151 |
| June | 129 | 135 | 132 | 137 | 137 | 148 | 158 | 145 | 177 | 136 | 119 | 123 | 153 | 119 | 170 | 246 | 182 | 125 | 366 | 170 | 101 | 104 | 152 |
| July | 129 | 137 | 130 | 137 | 136 | 151 | 159 | 147 | 174 | 131 | 122 | 120 | 149 | 125 | 176 | 220 | 195 | 123 | 246 | 166 | 103 | 110 | 146 |
| August | 130 | 138 | 129 | 136 | 134 | 164 | 160 | 147 | 176 | 131 | 134 | 124 | 148 | 128 | 182 | 229 | 219 | 122 | 206 | 181 | 102 | 111 | 149 |
| September | 131 | 133 | 131 | 137 | 135 | 185 | 164 | 152 | 188 | 142 | 152 | 129 | 152 | 132 | 176 | 223 | 272 | 124 | 172 | 179 | 102 | 112 | 153 |
| October | 130 | 138 | 130 | 136 | 136 | 185 | 178 | 159 | 198 | 146 | 166 | 133 | 158 | 143 | 176 | 214 | 232 | 128 | 178 | 177 | 102 | 113 | 157 |
| November | 124 | 133 | 127 | 132 | 134 | 165 | 179 | 159 | 207 | 138 | 168 | 138 | 156 | 144 | 176 | 208 | 235 | 131 | 183 | 174 | 102 | 114 | 155 |
| December | 126 | 134 | 128 | 134 | 134 | 161 | 181 | 161 | 211 | 143 | 184 | 142 | 156 | 147 | 166 | 205 | 235 | 133 | 178 | 172 | 102 | 114 | 157 |
| **1918: Av. for year** | **153** | **165** | **155** | **166** | **170** | **186** | **196** | **178** | **211** | **177** | **165** | **151** | **162** | **156** | **175** | **203** | **227** | **148** | **188** | **176** | **102** | **110** | **167** |
| January | 129 | 137 | 130 | 138 | 142 | 163 | 180 | 162 | 208 | 154 | 195 | 148 | 156 | 151 | 168 | 200 | 233 | 134 | 188 | 173 | 102 | 115 | 160 |
| February | 132 | 141 | 133 | 142 | 146 | 160 | 179 | 163 | 209 | 170 | 182 | 151 | 158 | 151 | 170 | 200 | 233 | 236 | 188 | 193 | 102 | 112 | 161 |
| March | 133 | 143 | 135 | 145 | 150 | 161 | 181 | 164 | 210 | (1) | 128 | 144 | 159 | 151 | 171 | 200 | 240 | 138 | 147 | 167 | 102 | 113 | 154 |
| April | 144 | 155 | 148 | 159 | 164 | 170 | 183 | 166 | 209 | (1) | 123 | 132 | 154 | 148 | 175 | 200 | 237 | 139 | 129 | 165 | 101 | 117 | 154 |
| May | 157 | 170 | 161 | 174 | 181 | 175 | 187 | 170 | 208 | 178 | 123 | 133 | 151 | 148 | 177 | 200 | 233 | 141 | 129 | 165 | 101 | 117 | 158 |
| June | 168 | 182 | 159 | 184 | 188 | 177 | 191 | 173 | 206 | 177 | 123 | 133 | 150 | 146 | 179 | 203 | 223 | 144 | 171 | 165 | 101 | 119 | 163 |
| July | 166 | 181 | 168 | 182 | 185 | 180 | 194 | 181 | 206 | 178 | 142 | 137 | 152 | 148 | 179 | 203 | 223 | 148 | 229 | 167 | 101 | 120 | 167 |
| August | 163 | 178 | 165 | 177 | 179 | 201 | 200 | 180 | 209 | 181 | 155 | 141 | 157 | 153 | 177 | 206 | 227 | 154 | 229 | 169 | 101 | 121 | 171 |
| September | 164 | 178 | 165 | 178 | 181 | 220 | 208 | 193 | 213 | 185 | 170 | 155 | 163 | 161 | 177 | 206 | 230 | 157 | 229 | 175 | 102 | 122 | 178 |
| October | 161 | 175 | 163 | 174 | 178 | 216 | 214 | 193 | 216 | 183 | 186 | 170 | 174 | 166 | 175 | 203 | 227 | 161 | 206 | 193 | 102 | 124 | 181 |
| November | 159 | 173 | 162 | 172 | 175 | 206 | 216 | 195 | 216 | 185 | 215 | 174 | 184 | 173 | 175 | 203 | 217 | 161 | 194 | 196 | 103 | 125 | 183 |
| December | 159 | 171 | 161 | 171 | 174 | 197 | 217 | 198 | 216 | 180 | 235 | 190 | 193 | 176 | 175 | 203 | 213 | 160 | 188 | 196 | 109 | 124 | 187 |
| **1919: Av. for year** | **164** | **174** | **164** | **169** | **167** | **201** | **205** | **209** | **134** | **193** | **182** | **177** | **193** | **174** | **179** | **218** | **213** | **174** | **224** | **205** | **145** | **129** | **186** |
| January | 162 | 175 | 165 | 175 | 181 | 193 | 217 | 199 | 211 | 188 | 218 | 184 | 201 | 175 | 175 | 200 | 207 | 159 | 188 | 196 | 117 | 127 | 185 |
| February | 162 | 174 | 165 | 174 | 181 | 180 | 205 | 193 | 203 | 186 | 147 | 149 | 185 | 174 | 175 | 203 | 200 | 164 | 182 | 195 | 123 | 126 | 172 |
| March | 165 | 177 | 169 | 178 | 183 | 184 | 203 | 191 | 211 | 193 | 140 | 174 | 183 | 172 | 175 | 206 | 197 | 154 | 171 | 193 | 126 | 129 | 175 |
| April | 172 | 182 | 175 | 184 | 187 | 197 | 212 | 197 | 223 | 202 | 143 | 186 | 190 | 169 | 175 | 218 | 200 | 154 | 182 | 193 | 129 | 128 | 182 |
| May | 175 | 187 | 178 | 186 | 186 | 205 | 210 | 203 | 246 | 204 | 154 | 177 | 191 | 167 | 175 | 227 | 207 | 154 | 194 | 193 | 136 | 128 | 185 |
| June | 170 | 181 | 171 | 176 | 174 | 202 | 212 | 205 | 254 | 200 | 155 | 165 | 192 | 167 | 177 | 227 | 210 | 159 | 224 | 193 | 143 | 129 | 184 |

TABLE IX.—RELATIVE RETAIL PRICES OF THE PRINCIPAL ARTICLES OF FOOD IN THE UNITED STATES, 1907 TO DECEMBER, 1920—*Concluded*

[Average cost for 1913 = 100]

| Year and month | Sirloin steak | Round steak | Rib roast | Chuck roast | Plate beef | Pork chops | Bacon | Ham | Lard | Hens | Eggs | Butter | Cheese | Milk | Bread | Flour | Corn meal | Rice | Potatoes | Sugar | Coffee | Tea | 22 weighted articles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1919: Av. for year (Con.)** | | | | | | | | | | | | | | | | | | | | | | | |
| July | 171 | 183 | 169 | 173 | 168 | 220 | 215 | 211 | 266 | 197 | 164 | 164 | 195 | 169 | 179 | 227 | 217 | 168 | 282 | 198 | 155 | 130 | 190 |
| August | 166 | 177 | 164 | 166 | 160 | 223 | 214 | 212 | 266 | 196 | 174 | 167 | 197 | 174 | 180 | 224 | 220 | 178 | 294 | 202 | 160 | 130 | 192 |
| September | 161 | 170 | 158 | 158 | 150 | 219 | 206 | 205 | 242 | 194 | 183 | 172 | 195 | 176 | 180 | 221 | 223 | 190 | 253 | 200 | 164 | 130 | 188 |
| October | 157 | 165 | 155 | 153 | 145 | 211 | 196 | 195 | 228 | 189 | 209 | 186 | 192 | 180 | 180 | 221 | 220 | 199 | 224 | 207 | 163 | 131 | 189 |
| November | 155 | 162 | 153 | 151 | 143 | 200 | 189 | 188 | 231 | 184 | 235 | 197 | 195 | 184 | 182 | 224 | 220 | 202 | 229 | 227 | 164 | 131 | 192 |
| December | 154 | 161 | 153 | 152 | 143 | 181 | 186 | 186 | 221 | 184 | 261 | 204 | 196 | 188 | 182 | 233 | 220 | 202 | 253 | 264 | 164 | 127 | 197 |
| **1920: Av. for year** | **172** | **177** | **168** | **164** | **151** | **201** | **194** | **206** | **187** | **210** | **197** | **183** | **188** | **188** | **205** | **245** | **217** | **200** | **371** | **353** | **158** | **135** | **203** |
| January | 159 | 166 | 159 | 158 | 152 | 178 | 186 | 187 | 215 | 197 | 240 | 194 | 196 | 187 | 195 | 245 | 220 | 208 | 318 | 324 | 165 | 132 | 201 |
| February | 160 | 167 | 159 | 157 | 152 | 180 | 186 | 188 | 204 | 210 | 199 | 190 | 196 | 188 | 198 | 245 | 217 | 210 | 353 | 342 | 165 | 131 | 200 |
| March | 161 | 168 | 161 | 157 | 150 | 186 | 186 | 190 | 192 | 215 | 161 | 196 | 194 | 187 | 200 | 242 | 217 | 211 | 400 | 340 | 165 | 135 | 200 |
| April | 170 | 179 | 169 | 166 | 157 | 206 | 191 | 199 | 191 | 224 | 153 | 199 | 194 | 183 | 200 | 245 | 217 | 214 | 535 | 367 | 165 | 135 | 211 |
| May | 171 | 179 | 169 | 166 | 155 | 202 | 195 | 206 | 189 | 221 | 153 | 187 | 194 | 182 | 205 | 264 | 223 | 215 | 565 | 462 | 165 | 136 | 215 |
| June | 182 | 191 | 176 | 174 | 157 | 194 | 200 | 215 | 185 | 216 | 155 | 175 | 189 | 182 | 211 | 267 | 230 | 215 | 606 | 485 | 165 | 136 | 219 |
| July | 192 | 202 | 181 | 179 | 158 | 208 | 203 | 222 | 184 | 211 | 166 | 177 | 186 | 188 | 213 | 264 | 233 | 214 | 524 | 482 | 165 | 137 | 219 |
| August | 186 | 196 | 176 | 172 | 154 | 219 | 203 | 223 | 177 | 212 | 184 | 175 | 183 | 191 | 213 | 255 | 230 | 210 | 294 | 416 | 162 | 137 | 207 |
| September | 185 | 193 | 175 | 170 | 152 | 238 | 202 | 224 | 177 | 214 | 206 | 179 | 184 | 193 | 213 | 252 | 227 | 202 | 229 | 333 | 153 | 137 | 203 |
| October | 177 | 188 | 168 | 162 | 147 | 238 | 202 | 222 | 185 | 207 | 234 | 180 | 184 | 194 | 211 | 236 | 213 | 185 | 200 | 253 | 146 | 133 | 198 |
| November | 171 | 178 | 165 | 158 | 146 | 210 | 196 | 212 | 183 | 201 | 250 | 181 | 180 | 194 | 207 | 221 | 197 | 163 | 194 | 235 | 139 | 135 | 193 |
| December | 156 | 160 | 152 | 145 | 136 | 157 | 176 | 186 | 162 | 189 | 268 | 162 | 176 | 189 | 193 | 200 | 183 | 152 | 188 | 191 | 133 | 133 | 178 |

[1] No hens sold in this month by order of Food Administration.

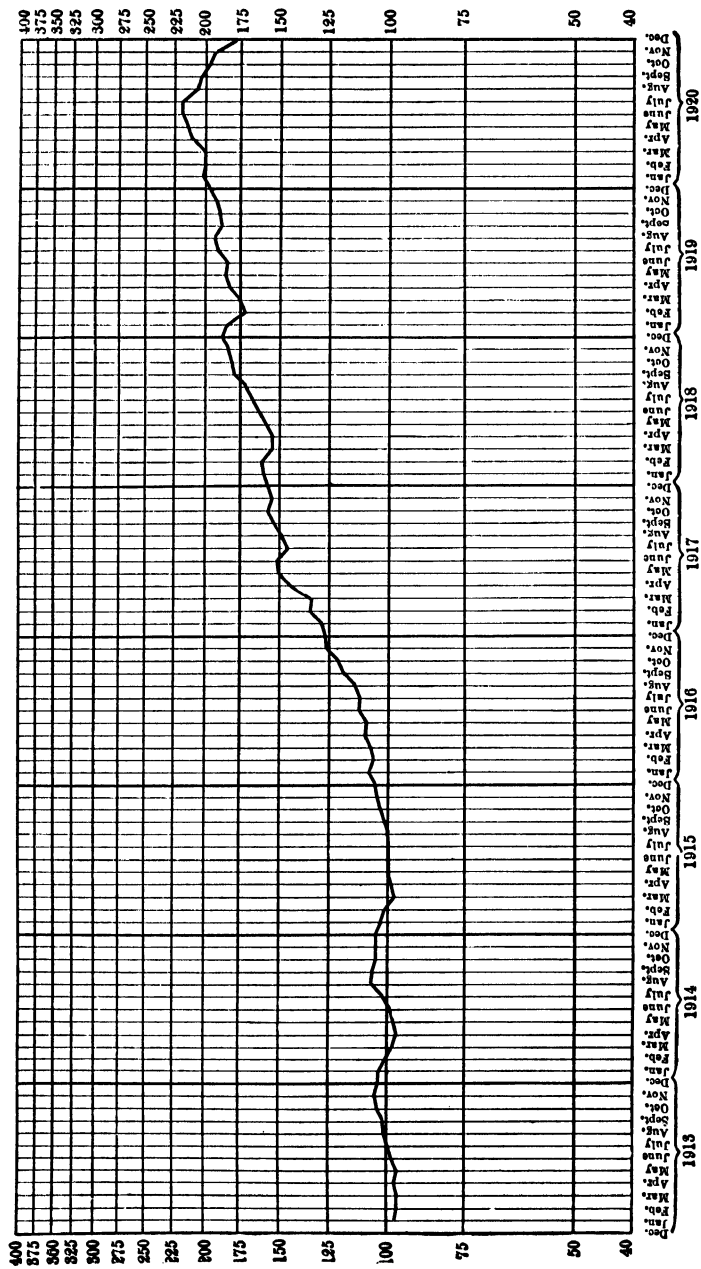



FIG. 18.—TREND IN RETAIL COST OF 22 FOOD ARTICLES, COMBINED, FOR THE UNITED STATES, BY MONTHS, JANUARY, 1913, TO DECEMBER, 1920

index, because the amounts consumed by the average family have been obtained as yet for only these 22 food articles. These articles comprise about two-thirds of the entire food budget of the average family and reflect with great accuracy changes in the cost of the food budget. The figure representing the cost of these 22 food articles was 193 in November and 178 in December. This shows that during the month from November to December there was a decrease of 8 per cent.

The curve shown in the chart pictures more readily to the eye the changes in the cost of the family market basket and the trend in the cost of the food budget than do the index numbers given in the table. The decrease in the cost of these articles since July brings the curve down in December to the point where it was in September, 1918. The chart has been drawn on the logarithmic scale, because the percentages of increase or decrease are more accurately shown than on the arithmetic scale.*

## TEST QUESTIONS

1. What is an index number?
2. Why would an index number based on farm products not be satisfactory as an indication of rises and falls in the general level of prices?
3. Construct an index number based on the relative prices of six commodities, using 1913 as the base year.
4. What is a *weighted* index?
5. In what year did wholesale prices reach the top of their rise after the world war?

* *Monthly Labor Review,* February, 1921.

# CHAPTER XXIII

# CAUSES AND EFFECTS OF PRICE CHANGES AND FOREIGN EXCHANGE

## CAUSES OF CHANGES IN THE VALUE OF MONEY OR LEVEL OF PRICES

In order to gain an insight into the causes of price changes, the first point to notice is that they are the resultant of two distinct groups of forces. A price is an expression of the exchange relation existing between two things, money and a commodity. An index number or relative price expresses a change in the relation that exists between money and commodities in general, and such a change may be brought about by causes directly affecting money or by those influencing commodities; or by the combined action of both.

The value of money is determined as is the value of all other things, by the supply of it in relation to the demand for it. Now the demand for money arises from the commodities that are to be exchanged. At any given price level an increase in the number of commodities to be exchanged involves an increase in the demand for money. Changes in the value of money or the level of prices will, therefore, be brought about by causes on the one hand that operate to increase or decrease the supply of money and on the other by causes increasing or decreasing the volume of trade or the number of exchanges to be transacted through the agency of money.

## INFLUENCE OF THE SUPPLY OF MONEY ON THE PRICE LEVEL

In considering the supply of money, we must take into account not only the quantity of money, namely gold, but also the amount of supplementary money and deposit currency, changes in the quantities of which are in effect equivalent to changes in

the supply of money. An increase in deposit currency, for instance, since it affects exchanges as readily as money itself, will be tantamount to a decrease in the demand for money or from our present point of view, to any increase in the supply of money. We must also allow for the rapidity of circulation of money and currency. It is evident that if in a given period ten million exchanges are to be made at a dollar a piece, ten million dollars will be required if each dollar is used only once, but if each dollar is used five times, two million dollars will suffice to do the work. In any given day, week or month in actual life, the same money is being used several times over. The average number of times money is used in a given period is termed its rate of turnover or rapidity of circulation. An increase in its rapidity of circulation is thus equivalent to an increase in its supply.

The quantity theory of money, a veritable bone of contention among economists, stated in its strictest form, asserts that the value of money, other things being equal, varies in a ratio exactly inverse to its supply: "Supply" meaning the quantity of standard money or gold. The number of "other things," however, is so large and their likelihood of remaining equal so unlikely that a broader statement is perhaps more apt to be descriptive of actual facts. If all exchanges in a country were made with gold and the price level were suddenly doubled so that two-cent stamps cost four, nickle articles a dime and so on, it would be true that everybody would need just twice as much money to make the same purchases. Such a doubling of prices could not possibly occur without a doubling of the money supply. In the same manner were the money supply of the country suddenly doubled, prices would rise a hundred per cent; or were the quantity of money to be reduced one-half, to effect the same number of exchanges, prices must be reduced one-half. In actual affairs, however, an increase in the supply of gold does not affect prices in the simple and direct way indicated above, but in a roundabout and indirect manner, by wending is way into circulation or swelling the reserves of the banks, their capacity to loan and finally increasing the currency. In the meantime "other things" may intervene, exaggerating or nullifying its effects; a development of the banking system by

extending the use of credit or a business boom by expanding credit may magnify its results; a contraction of credit or an increase in the volume of trade due to industrial progress may negative it. A more moderate statement that squares with the facts would be that an increase in the supply of money or any increase in the currency tends to decrease the value of money or raise the level of prices.

The effect of an increase of gold on prices is clearly seen in the general rise in prices that took place the world over following the gold discoveries in 1848 and 1849 in Australia and California; discoveries which increased the annual output of gold from $40,000,000 in 1850 to $150,000,000 in 1853. Saurbeck's index registers a rise in the period between 1852 and 1873 of 38 per cent in English prices. In this country of course the rise was accentuated by causes affecting the other side of the price equation, due to the influence of the Civil War on commodities. A second period which illustrates the effect not only of an increase in gold, but also of a more than proportionate increase in the quantity of the other forms of currency based on gold, dates from 1896 when the price levels of the great nations of the world advanced in unison. In the early nineties gold production took another sudden leap ahead, the world's output, increasing from 200 tons in 1890, to 700 in 1910. In addition to the increased supply of gold, particularly in the United States, the rapid strides made in the development of the banking and credit systems resulted in an increase of credit currency based on gold, especially in the form of deposit currency. In spite of the extension of trade occurring in these periods the net result was a world-wide increase in prices.

## DEMAND FOR MONEY OR THE VOLUME OF TRADE

Quite apart from causes which influence prices on the money side are those which affect them from the commodity side. At any given price level, an increase in the volume of exchanges to be transacted will tend to lower prices by increasing the demand for money; conversely a falling off in the volume of trade or the total number of exchange transactions is the product of the number of commodities multiplied by their rate of turn-

over. Many and varied are the influences that play upon the volume of trade. Chief among those tending to increase the number of exchanges and lower prices are science, invention, development of transportation, labor saving machinery, division of labor, improved processes of production and organization and increases in the population. On the other side we have wars, monopoly, high tariffs, strikes, etc.

The fall of prices that occurred among the great nations of the world between 1873 and 1896, is generally conceded to have been caused by the fact that the volume of trade stimulated by the remarkable advance of industrial progress, increased at a more rapid rate than did the supply of money. The late abnormal rise in the price levels the world over was due to just the opposite situation,—to the shortage of commodities following in the train of the world war with its destruction of wealth and withdrawal of labor from the usual channels of production, accompanied also as in most wars by an artificial expansion of credit.

To sum up, there are two direct causes of price changes, the supply of money or the total volume of currency and the total number of commodities to be exchanged or the volume of trade. All forces influencing prices may be divided into two groups according as they work through one or the other of the above. Action and reaction occur between these two causes; an increase in the supply of money for instance may and usually does result in an increase in trade; and action and reaction may take place between these two causes and the result. The supply of money and the volume of trade may both be influenced by changes in the price level, the result in its turn becoming the cause.

## EFFECTS OF CHANGES IN THE VALUE OF MONEY OR PRICES

While it matters little whether prices are permanently high or low, the difference involving merely a greater or fewer number of counters with which to effect the exchanges of wealth *rising* or *falling* prices are of considerable moment. Any change in the standard which serves as a measure of values is bound

to result in disturbing effects. And though such changes in normal times may take place but slowly, the modern set toward long time production and long term contracts renders them particularly undesirable. In a period of rising prices the debtor gains at the expense of the creditor, for though he pays the stipulated sum of money, his creditor receives less purchasing power, or value in turn of commodities. In this situation, landlords whose land is let on long leases, holders of mortgages or bonds, depositors in banks who withdraw their money after a number of years, are the losers. A man who in January, 1920, drew $100 out of a savings bank in which he had deposited it in 1913, would receive a sum of money equivalent in purchasing power to about $40 of his original deposit. In periods of falling prices the reverse is true, the creditors gain at the expense of the debtors.

But the most disturbing effects of price changes occur in the field of distribution, where they play fast and loose with the incomes of the people, enriching some and impoverishing others.

A rise in the price level is detrimental to all who derive their incomes from fixed interest securities and to those in business whose expenses increase with the rise in prices, but who are unable to increase their charges such as railways, street car companies and public utility concerns. Wage earners as a class suffer, as wages do not advance as rapidly as prices. Among wage earners, those whose remuneration is fixed by law or custom such as teachers and government employees, and the salaried class generally whose stipends are relatively stable, are the worst sufferers. On the other hand falling prices usually mean an increase in the real wages of the workers, as they display as a class more stubbornness in resisting a cut than skill in securing an advance. Business men as a class benefit by rising prices, which to them are synonymous with rising profits. Raw materials are usually contracted for in advance and a rise in the price of the finished product means an extra profit. As the wages of labor lag behind commodity prices, those entrepreneurs whose costs consist for the most part of wages, reap the largest profits; labor's loss is their gain. When prices are advancing all along the line, particularly if there is an acute

shortage of commodities such as existed during the post-war period, the game is largely in the hands of the entrepreneurs and judging by the income tax returns, they did not neglect their opportunity.

A period of falling prices is, for reasons reverse to the above, apt to entail losses to the business class generally. There is no doubt that business men the world over hate falling prices, though as far as the country at large is concerned a period of falling prices due to industrial progress may mean the greatest good for the greatest number. The psychological effect, however, of a rise in the price level on the entrepreneur class, stimulating business enterprise as it no doubt does, benefits the whole community even though the builders do feather their own nests first.

## FOREIGN EXCHANGE

While the buying and selling of commodities within a country is carried on in terms of the standard money of the realm, trade between one nation and another may be transacted in terms of the money of either and involves an exchange of the money of the one in terms of the money of the other. If an American importer buys a bill of goods from a London merchant the purchase might be made in terms of dollars or pounds, though custom and convenience both favor the latter. Let us suppose the bill amounts to £1,000. Our importer could actually ship sufficient American gold dollars or bullion to be coined into one thousand sovereigns in London and thus discharge his debt. Owing to the expense and inconvenience he will be more likely to purchase from his banker a draft on London for £1,000, that is, a claim to the payment of pounds sterling in London which he mails to his English creditor. Such a transaction, strictly speaking, consists of the exchange of a claim to American dollars payable in the United States for a claim to English pounds payable in England. By "foreign exchange" is meant the exchange of the money of one country for that of another.

## THE PAR RATE OF EXCHANGE AND THE GOLD POINTS

The question is how many dollars should the American pay for the £1,000, or what determines the rate of exchange between

the two moneys? Were it merely a matter of exchanging gold dollars for gold sovereigns the answer would be easy, for there is 4.866 times the quantity of fine gold in an English pound sterling as in an American dollar. One sovereign, as the English coin is called, would be worth $4.866, and one thousand would be worth $4,866 plus. But the American dollars lie on one side of the Atlantic, the sovereigns on the other, and to ship them across costs both in time and money. The importer will prefer to purchase a draft, providing the rate or price per pound sterling does not exceed $4.866 plus what it would cost him to ship the actual gold which includes freight, insurance, loss of interest in transit, etc., amounting to, perhaps, two cents on each pound sterling. Should, however, the price of "sterling exchange" rise above this point of $4.866, importers and others having debts to pay in London will find it cheaper to ship gold.

Likewise, if the rate falls below $4.866 the "par of exchange" as it is termed, by an amount exceeding the cost of transportation, exporters and others having claims against Englishmen entitling them to the payment of pounds sterling in London will find it cheaper to have the gold coins shipped over here and turned into American dollars, than to sell their claims at such a low rate. Suppose, for instance, an American exporter has sold a bill of goods to an English concern for £1,000. He might in the usual course draw a draft or bill of exchange as it is termed on his English customer for £1,000, which he would sell to his banker at the current rate. But should the rate for such bills of exchange be below $4.846 plus, it would pay him to have the actual gold shipped over, for after deducting the cost of transportation, etc., which would amount to about $20, he would receive $4,846.

These two points in the rate of foreign exchange above or below which it becomes profitable to ship gold are termed the "gold points" or "specie points." In normal times the rate of exchange will not rise above or fall below them. In actual affairs the shipping of bullion is not likely to be done by exporters but by international bankers and bullion dealers who make a practice of buying and selling drafts and bills of ex-

change on foreign countries. As the rate rises or falls above or below the gold points it becomes profitable for them to ship bullion across the Atlantic. By shipping gold, they are able to establish their balances in London at a cost of $4.886 plus per pound sterling. If they are able to sell drafts on these balances in New York, say at $4.89, they make a profit. Consequently, if the rate of exchange were to rise above $4.886 plus, there would arise an unlimited supply of sterling bills, competition among the sellers to dispose of them at that price would be so keen that the rate of exchange would fall below the upper gold point.

Should the rate fall below $4.846, bankers in New York would buy up all the bills possible, send them across, ship back the gold to which they entitle, and have it coined into American dollars at the rate of $4.866 plus, per pound sterling. Deducting the cost of transportation, they would net $4.846 for each pound sterling. If they could buy sterling bills on London at the rate of $4.83 plus and realize on them at the rate of $4.84 plus, there would arise an unlimited demand for sterling exchange and the rate would rise. The gold points will, of course, vary with freight charges, insurance and interest rates.

## WHAT DETERMINES THE ACTUAL RATE OF FOREIGN EXCHANGE

We have still to discover what causes the fluctuations of the rate exchange from day to day, between the gold points. In general, it may be said that the rate at which the money of our country will exchange for that of another is determined by the demand for it in relation to the supply of it. The demand depends on the indebtedness of all other countries to it; the supply on its indebtedness to all other countries, so that the relation between demand and supply will depend on the relative indebtedness of the given nation to the rest of the world. Should the country in question be selling more to foreign countries than it is buying from them, the demand for its money will exceed the supply and the rate of exchange will rise in its favor; and vice versa.

If, for example, the United States is buying heavily from

Great Britain, there will arise an urgent demand on the part of American importers and others, for drafts and bills of exchange on London with which to pay their debts and the rate of sterling exchange in New York will rise. On the other hand, should the United States be selling to Great Britain more than she is buying from Great Britain, there will be a larger supply of bills of exchange in the possession of exporters who have claims on Englishmen to sell than there will be a demand by importers to purchase such bills, and in consequence, the rate would fall.

The rate of sterling exchange, however, does not depend solely on the relative indebtedness of Great Britain and the United States, but on their indebtedness to other countries and vice versa. Great Britain may be importing more from the United States than she is exporting to the States. But in turn, the United States may be importing more from Brazil than she is exporting to Brazil; while Brazil's imports from Great Britain may exceed her exports. As a result of the first condition, there would arise in New York an excess of sterling bills on London which, however, would be counterbalanced by the demand from American importers of coffee from Brazil for sterling bills with which to pay their Brazilian creditors. In Brazil these bills would be readily purchased by importers to remit to London in payment of the manufactured goods they buy from Great Britain. Thus the rate for pounds sterling in New York is influenced not only by Great Britain's trade with the United States but by her trade with Brazil and likewise with all other foreign countries.

Furthermore, in considering the indebtedness of a country, account must be taken not only of its recorded exports and imports but of its "invisible" exports and imports. Part of the trade between nations consists not only of physical commodities but of bonds and stocks, interest and dividend payments, insurance, banking and transportation. In normal times the United States exports more to Great Britain than she imports, as far as material commodities are concerned, but Great Britain performs certain services for which the United States must pay, and which help to swell the invisible imports and thus increase

the demand for pounds sterling in terms of which they must be paid. For example, the bulk of American freight is carried in British ships; London in her position of international banker renders services for which Americans among others must pay; large sums are remitted annually to British owners of American bonds and stocks in the form of interest and dividends; millions are paid in insurance premiums to British companies; services are rendered to American tourists abroad whose letters of credit add to the demand for sterling exchange; all help to swell the invisible indebtedness of the States to Great Britain. Apparently the "balance of trade" may be against a country, that is the recorded imports may exceed the exports when in reality the invisible exports may tip the scales in her favor.

## INFLUENCE OF THE MOVEMENT OF GOLD AND CHANGES IN THE PRICE LEVEL

Though for short periods the total exports of a country may be either greater or less than its imports, in the long run there are world forces at work that tend to make them equal. If a country continues buying from foreign countries more than it is selling, the rate at which its money exchanges for that of other countries will fall, till finally the lower gold point will be passed and gold will be exported. By virtue of the connection between the quantity of gold and the price level within the country, the lessening of the gold supply will result in a lowering of prices, while the price level of the countries to which the gold has been shipped will tend to be raised. This dual condition will discourage imports and stimulate exports and the exchange rate will rise. In the case of a country exporting more than it is importing just the opposite effect will result. Gold will finally be imported, prices will rise, the higher prices within the country will attract imports, the comparatively lower prices outside will discourage exports, and the balance of trade will again be restored.

Foreign trade is in essence similar to domestic and consists of an exchange of commodities and services between nations. Payment is effected through the agency of international bankers by offsetting contrary claims through the medium of the draft

or bill of exchange. In a given nation, exporters and others in the possession of claims against foreign countries sell these claims to importers who use them to cancel claims which other nations have against them. When the exports and imports of a country are equal, these claims exactly offset each other. When they are not equal, one nation will have more claims on other nations than they have on it, and gold must eventually be shipped in settlement, and gold by its influence on the price level tends automatically to rectify the inequality in the balance of trade, so that the ebb and flow of the tides of international trade are impelled by fundamental laws. Trade between nations as between individuals must be based on an exchange of commodities and services, no one nation can permanently sell to other nations more than it buys, a fair exchange the law ever seeks. An understanding of this law makes clear the fallacy involved in the theory of a "favorable balance of trade." According to this theory it is thought that a nation should sell to other nations more than it buys from them. It will then have a continual stream of money flowing into it as a result of the balance in its favor and will thus be permanently enriched at the expense of others. Such a situation, however, is a permanent impossibility; it contains within itself the seeds of its own destruction, for the continuous flow of money into the country by its action on the price level will inevitably check exports, stimulate imports and the favorable balance will vanish.

## THE DISCOUNT RATE AND THE RATE OF FOREIGN EXCHANGE

An important factor influencing the supply of foreign bills and the exchange rate is the prevailing rate of interest. Capital flows to those centers where the price for its use is highest. Should interest rates be high in New York, international bankers in foreign countries will transfer their loanable funds there. The cheapest way to increase their balances in New York is to draw drafts on London. These drafts drawn for the purpose of creating funds in New York, are termed "Finance Bills." A London banker instructs his New York correspondent to draw on him. The drafts thus created are sold in New York to importers or

others having debts to pay abroad, and the proceeds are loaned at the high rate of interest prevailing. This, of course, tends to increase the supply of sterling bills and thus lower the exchange rate. Should this condition continue, the rate may drop below the lower specie point and gold be imported. Therefore, the placing of the discount rate of a country in the hands of a central power, such as for years has been the case in Great Britain and is now by the Federal Reserve Act in the United States, enables a nation to control in a measure its gold supply. In the past when gold has flowed out of England in such a degree as to endanger the reserves of her monetary system, the Bank of England has merely raised the discount rate, capital has been attracted, the exchange rate lowered and the importation of gold followed.

## WHEN BULLION IS NOT OBTAINABLE

While under normal conditions the rate of exchange between two countries will stay within the specie points, should there be an embargo placed on the shipment of bullion or should bullion for any reason be unobtainable in one country, there is no limit to which the exchange rate may not go. Suppose that Russia has placed an embargo on the exportation of bullion and a Russian importer has purchased a bill of cotton goods from Manchester for which he has contracted to pay £1,000. Debarred from exporting bullion, his only course, outside of shipping commodities and selling them in Great Britain for sovereigns, is to purchase with his paper roubles a sterling bill in Petrograd, from a banker or exporter who has a claim on someone in London to the payment of pounds sterling. Should imports exceed exports, as would likely be the case, he might have difficulty in obtaining a bill at all, the demand would exceed the supply and the price of sterling bills might rise to any height. Such has been the case with some European countries since the war, when the rate of exchange for their currencies in pounds sterling or American dollars has risen sky high. When the free movement of gold or specie is interfered with between nations the rate of foreign exchange is determined entirely by supply and demand and may fall or rise to any height.

In the case of a country with a depreciated currency or in which there is a premium on gold, the rate of exchange will fluctuate in proportion to the premium on gold. To find the specie points there must be added or subtracted from the par rate in addition to the expenses of shipment the premium on bullion. For example, if the currency of a country owing to an excessive issue of paper money had depreciated 50 per cent so that a dollar bill was only worth one-half a gold dollar, it would take two paper dollars to purchase one gold dollar. Therefore, an importer who had £100 to pay in London; as an alternative to purchasing a draft would have to pay 973 paper dollars for the 486 gold dollars with which to discharge his debt, plus the cost of shipment. The upper specie point would be around $9.75. Similarly an exporter having a claim calling for the payment of £100 in London would not be willing to sell for much less than 970, for by importing the one hundred pounds sterling he could obtain 973 paper dollars which after deducting the expenses would net him around $790. The rate of exchange then for a country with a depreciated currency will tend to differ from the ordinary rate in proportion to the premium on gold.

## TEST QUESTIONS

1. Under what two heads can causes affecting changes in the general level of prices be grouped?
2. What is the quantity theory of money?
3. What must be taken into consideration in estimating the quantity of money?
4. What factors tend to increase the demand for money?
5. Explain the effect of rising and falling prices on creditors and debtors; on profits and wages.
6. What is the "par of exchange"?
7. Why will the rate of sterling exchange in normal times not rise above or fall below the "gold points"?
8. Where does the demand for sterling exchange spring from?
9. Where does the supply of sterling exchange spring from?
10. How does the interest rate influence the rate of exchange?

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# PART IV

# ANALYSIS OF THE FOUR FORMS OF INCOME AND FACTORS DETERMINING THEIR AMOUNTS

## CHAPTER XXIV

# THE DISTRIBUTION OF WEALTH

The term "distribution" in economics refers to the division of the "net dividend" or "national income," among the agents of production by whose coöperation it is produced. This net product proceeds in a continuous flow from the channels of industry and constitutes the net addition made to the wealth of the nation.

## A SURVEY OF THE FACTS RESPECTING THE INCOME OF THE UNITED STATES AND ITS DISTRIBUTION

The estimation of the net income of a nation is a task of no mean order, and however much care is used, the figures will be liable to some error. There have been several independent estimates made recently in the United States which, considering the magnitude of the figure, show surprisingly close results. Perhaps the most exhaustive and thorough is that recently conducted under the auspices of the National Bureau of Economic Research by Mr. King and Mr. Knauth.[1] Two separate estimates were made, one by sources of production by Mr. King, who ascertained the value product of all industries. The value product of an industry is the excess of the value of its output over the costs of the materials it consumes, including depreciation and depletion of resources. The second estimate made by Mr. Knauth was by incomes received and was based primarily on income tax returns, supplemented by other data on tax-exempt income, such as the income of certain classes of tax-exempt bonds, salaries of state officials, rental values of homes occupied by owners, food and fuel produced and consumed directly by farmers. These two independent estimates which, when completed, differed only by a maximum variation of less than 7 per cent in any one year, were then carefully checked against each other and

[1] "Income in the United States." For a complete analysis the reader is referred to this valuable and interesting work.

made the basis for the final estimate. According to the final figures, the national income and the per capita income of the United States for the years 1913–18 were as follows:

| | National income in billions | Per capita income in dollars per annum |
|---|---|---|
| 1913 | $34.4 | $354 |
| 1914 | 33.2 | 335 |
| 1915 | 36.0 | 358 |
| 1916 | 45.4 | 446 |
| 1917 | 53.9 | 523 |
| 1918 | 61.0 | 586 |

## THE PROBLEM OF DISTRIBUTION

Owing to the remarkable progress in the arts of industry following the industrial revolution, the wealth of the great nations of the world has been tremendously augmented during the last hundred years. Yet at no time has there been more dissatisfaction evinced concerning the division of that wealth. There always has been and probably always will be more or less discontent among individuals over this division, but recently class consciousness fostered by organization, on the side of both capital and labor, has led to clashes of arms that have made even thrones tremble and whole nations cower. It appears that while from the social point of view we have been fairly successful in the production of wealth, we have not yet satisfactorily solved the problem of its distribution. There is no doubt but that the major part of the industrial unrest in this and other countries arises from a more or less vague sense of discontentment over the division of the proceeds of industry. Each class suspects that the other is getting a larger share than its due. Many thoughtful people feel that a more equitable division would be desirable. But as to just what is wrong and how it should be remedied, there is considerable confusion of opinion. Some blame individual greed, others our economic system, which they would either remodel or rebuild along many and dubious lines; few really understand our present system and have any clear idea of just how distribution is determined under it or the laws and principles operating within that govern the shares of the individual members and classes.

By analyzing separately the net income of the more highly organized industries of mining, large-scale manufacturing and land transportation which produce one-third of the national income and wherein the different forms of income are more definitely specified and accounted for, the bureau has been able to furnish some very suggestive facts in reference to the distribution of wealth between "labor and capital." The net income of these industries is split into two parts, that going to hired labor in the form of wages and salaries on the one hand and that going to the owners of property as rent interest and profits on the other. In most years 69–72 per cent goes to employees, including salaried officials, while 31–28 per cent goes to the owners in interest, rents and profits. In 1913 wages and salaries amounted to 8,651 million dollars, or 72 per cent of the total net income, while rents, interest and profits equaled 3,359 million dollars, or 28 per cent of the total. In 1918 the former rose to 17,472 million dollars, or 77 per cent of the total, while the latter were 5,124 million dollars, or 22 per cent of the net income.

Another interesting question is very decisively answered by this analysis, namely, what is the percentage of the total pay roll going to salaried officials. It was ascertained that 92 per cent of the total payments to employees went to the rank and file of manual and clerical workers, which leaves only 8 per cent for salaried officials.

In 1918 the average annual earnings of employees normally engaged in the various industries of the nation ranged from $590 in agriculture to $1,590 in water transportation, while the average for all industries was $1,078.

In its analysis of the distribution among individuals, the bureau draws the dividing line between those whose incomes are above or below $2,000. This division, it is suggested, serves as well as any other arbitrary line to distinguish between the modestly well-off, who are able to afford at least the comforts and conveniences of life, and those who can scarcely be called well-to do. In 1910 only one in twenty-five of those gainfully employed enjoyed incomes exceeding $2,000 a year. This number increased with war times, and probable rose to one and a half out of every ten. The fact remains that in this, the wealthiest

country of the world, the great majority are not well-to-do. Of all those engaged in gainful occupations in 1918, 86 per cent earn less than $2,000 per annum. This 86 per cent possess 60 per cent of the national income, while the 14 per cent of those fortunate ones whose incomes exceed $2,000 a year enjoy 40 per cent of the total wealth produced.

In view of the wild statements frequently made in connection with the unequal division of wealth, the impartial and careful analysis made by the bureau into the distribution of the nation's income among classes and individuals is particularly valuable. A little more than half of the net income is paid as wages and salaries to hired labor. This, the bureau points out, is not synonymous with the "share of labor." It would be practically impossible to ascertain, for instance, in the case of agriculture what part of the net products of the numerous small farmers should be attributed to their labor, what should be set down as interest on their capital, etc. It is possible to secure fairly accurate statistics on wages and salaries and so find the relative share of the net income of an industry paid to hired labor. This varies in different industries with the degree of organization and the relative quantities of labor and capital employed. It ranges from one-eighth in farming to three-fourths in mining and manufacturing. In farming the percentage of wages is small, owing to the fact that the farmer and his family perform a large part of their own work. In banking the percentage of net income received in the form of wages is also small on account of the small proportion of labor employed to capital. In mining and manufacturing, where a larger percentage of labor is employed, about three-fourths of the net value produced goes to the workers in salaries and wages. The percentage for industry as a whole is held down by the low percentage of wages paid in farming. The figures also bring out the fact that the share of the net product going to hired labor varies from year to year according to business conditions. It fell with the sudden rise in prices in 1914–16, but rose again with the advance in wages in 1917–18. In 1918 the workers secured a larger share of the net product of industry than in 1909, but not so large as in 1913. The value of housewives' services is not included in

the above. Such an estimate must be a matter of conjecture. The bureau estimates that, roughly, the value of these services in 1918 approximated fifteen billion dollars.

The bulk of the large increase in income during the war was due to the rise in prices. The actual growth of the national income is seen better when the figures are reduced to pre-war purchasing power and express the value of the incomes of succeeding years in terms of the price level of 1913.

| | National income in billions | Per capita income in dollars |
|---|---|---|
| 1913 | $34.4 | $354 |
| 1914 | 33.0 | 333 |
| 1915 | 35.2 | 350 |
| 1916 | 40.7 | 400 |
| 1917 | 40.8 | 396 |
| 1918 | 38.8 | 372 |

A comparison made with other nations shows that the United States leads the world in both the size of its national income and the per capita income of its people. In 1914 the figures for the leading nations were as follows:

| Country | Source of estimates | National income millions of dollars | Per capita income dollars | Grade of accuracy |
|---|---|---|---|---|
| United States, | National Bureau of Economic Research | $33,200 | $335 | I |
| United Kingdom, | Bowley, Stamp | 10,950 | 243 | I |
| Germany, | Helfferich | 10,460 | 146 | I |
| France, | Pupin | 7,300 | 185 | II |
| Italy, | | 3,890 | 112 | IV |
| Japan, | | 1,580 | 29 | III |

Grade I signifies estimate not likely to be inaccurate to a greater extent than 10 per cent.

Grade II signifies estimate not likely to be inaccurate to a greater extent than 20 per cent.

Grade III signifies estimate not likely to be inaccurate to a greater extent than 30 per cent.

Grade IV signifies estimate not likely to be inaccurate to a greater extent than 40 per cent.

The term "distribution" suggests an arbitrary division of the proceeds of industry, and such a course is conceivable. Under a

system of Socialism, both the production and distribution of wealth might be directed by the state, with the shares of the different producers apportioned according to the dictates of the government. In the opinion of some, this would result in a more equitable distribution of the nation's wealth among those who have helped to produce it. Various theories of distribution have been put forth, either purporting to explain existing conditions or ideal states, but in the world as it is, the distribution of wealth, though modified by law or custom, by individual preference or organized interests, is determined by the laws of value. These laws never cease to act, and in modern society all economic remunerations are governed by them.

Each individual receives his share of the net product of the nation's industry in the form of rent, wages, interest or profits. Any one individual's income may consist of one or more of these. They are, in effect, prices paid for the use of the factors of production to their respective owners. The extent of any one individual's income will depend on the exchange value of the services he renders to production as land-owner, laborer, capitalist or entrepreneur. The value of any factor of production, whether it be a piece of land, the services of a clerk or a machine, is governed by the law of supply and demand, as is the value of a consumption good. This great law is the key that unlocks the problem of the distribution of wealth. A complete explanation of the division of wealth among the individual members of society will involve an investigation into the conditions of supply and demand for each of the factors of production. First, however, we will stop to notice a new principle influencing the demand for the factors of production.

## PRODUCTIVITY OR THE VALUE OF A FACTOR OF PRODUCTION IN RELATION TO THE JOINT PRODUCT

Although the demand for land, labor and capital is derived ultimately from the valuable commodities which are produced by means of them, it proceeds directly from the entrepreneurs who coördinate these other factors in productive enterprises. By virtue of their ownership and control of business organizations,

this class becomes the employer of the other classes. What considerations, then, govern their demand?

The desire of a consumer for a consumption good is based on the satisfaction of a personal want. But a business man desires a piece of land, a machine, or the services of a laborer for the purpose of making a commodity or service for sale at a profit. Hence while the value of a consumption good to a customer depends on the intensity of the desire it satisfies, that of a production good to a business man depends on the extent to which it aids him in the making of his product, or, as it is usually termed, its "productivity." The question then arises as to how the concern is able to tell just how productive any particular unit is. The product is the joint product of a number of widely different units,—machines, money, men, etc. Is it possible to determine definitely what part of a joint result is due to any given unit?

The only practical method of measuring the contribution of any given unit to a joint result is to find out how much that result is increased by its presence or decreased by its absence. The variation in the joint product is, of course, the resultant of all the coöperating units, but as it depends on the presence or absence of the particular unit, being added when it is present and missing when it is absent, in a real sense it is due to that unit and may be said to measure its productivity. As the primary purpose of every business is to make a profit, the value of the aid rendered by any particular member will hinge on the extent to which it reduces the joint costs or increases the value of the joint product, or both. A purchasing agent, for example, may be valuable not only because he facilitates production by having the proper quantity and quality of materials on hand at the proper time, but because of the amount he saves by watching market conditions and purchasing at the lowest figure. A plant manager may increase the volume of production or decrease the unit cost, or both. In many cases, of course, the work of individual units is so indirect and far removed from the finished product that their contribution to the general result must always remain a matter of estimate. But whether a matter of estimate

or exact measurement, it is this contribution to the general result that is the basis of the evaluation of any given productive unit to a business concern.

This is the principle determining the demand of the individual employer. The highest price he will be willing to pay will be governed by the additional value added to his product over and above the extra cost. In the case of a machine, allowance would have to be made for maintenance, repairs, and interest on the capital if the purchase money is to be borrowed. The increase in the value of the total product after deducting these extra costs would mark the outside limit of the demand price. Just as the consumer balances the money cost with the satisfaction he expects to derive from the use of the article, so does the entrepreneur weigh the cost of the productive factor with the value it will add to his product. And this added value marks the outside limit of his demand price.

## THE LAW OF DIMINISHING PRODUCTIVITY

When a number of similar units of any factor of production are successively added to a business enterprise the additions made to the product, even though they may increase at first, finally grow smaller as the supply of units is increased. This is a general law that holds true of any joint result obtained by the combination of a number of different factors, when the amount of those factors may be varied. By keeping all but one fixed and varying the quantities of that one, the resultant variations in the joint product will finally begin to diminish. We have already referred to one phase of this law under the name of the law of "diminishing returns." In that case the fixed factor was land, while labor and capital were massed as the variable. The law operates just as surely when labor and capital are fixed and the quantity of land is varied. And though it applies to all kinds of business organizations, perhaps its operation has been laid bare in the business of farming as much as anywhere, owing to the numerous experiments that have been conducted to ascertain more exactly the value of labor or fertilizers to crops. In these experiments all of the factors acting on the crop are kept constant but one, and the variations due to this one are

accurately measured. Take, for example, the following experiment carried on at the famous Rothamsted Experimental Farm in England to determine the value of nitrogen to the growing of wheat:

| Plot | Manures per acre | Product per acre *bushels* | Increase for each add'l 43 lbs. Nitrogen *bushels* |
|---|---|---|---|
| A | Minerals alone | 18.3 | .... |
| B | Plus 43 lbs. Nitrogen | 28.6 | 10.3 |
| C | Plus 86 | 37.1 | 8.5 |
| D | Plus 129 | 39.0 | 1.9 |
| E | Plus 172 | 39.5 | 0.5 |

The fourth column shows the number of bushels of wheat added to the joint product by each additional dose of nitrogen and gives unmistakable evidence of the operation of the law of diminishing productivity in the successively smaller additions made to the joint product. Other experiments in intensive cultivation, extra plowing, harrowing, etc., show that additional units of labor and capital fall under the same law.

Such experiments enable the farmer to make a more economical combination of his factors of production, to judge better the relative amounts of each it is best to use. In increasing his crops, he is guided in deciding whether to rent more land or cultivate intensively by applying more fertilizers or hiring more labor. The effect on the farmers' demand is readily seen. The practical effect of all these experiments is to show more exactly the value of different quantities of fertilizer, of capital, or of labor, or the precise quantity of any one it is profitable to use.

## MARGINAL PRODUCTIVITY AND INDIVIDUAL DEMAND

The demand of a producer for a number of similar units of a factor of production is governed by marginal productivity in the same manner as that of a consumer is by marginal utility. Suppose the following table contains the result of an experiment carried out on a farm of one hundred acres. What would determine the highest price the farmer would pay per unit for any given quantity he would purchase at any given price?

| Acre | Fert. units | Total product | Incr. for each add'l unit | Value at $1 bu. | Increase at $1.50 bu. |
|---|---|---|---|---|---|
| A | .. | 11 | .. | | |
| B | 1 | 19 | 8 | $ 8.00 | $12.00 |
| C | 2 | 29 | 10 | $10.00 | $15.00 |
| D | 3 | 38 | 9 | $ 9.00 | $13.50 |
| E | 4 | 44 | 6 | $ 6.00 | $ 9.00 |
| F | 5 | 49 | 4 | $ 4.00 | $ 6.00 |

The value of fertilizer to a farmer depends on the value it adds to his crops. But the value added depends on the quantity used; each added unit resulting in a smaller increase of product. Column 5 gives the value of the increase for each additional unit of fertilizer when wheat is selling at $1 a bushel. The larger the quantity he purchases, the smaller he will pay for each unit. He would not be willing to give, for instance, more than $9 per unit for a supply of three units. Were the price any higher, it would not pay him to use three, as the third unit only adds $9 to his crop. He would only use two; to induce him to purchase three, the price must be $9 or lower. To tempt him to invest in four units, the price must be $6 or less, as the fourth adds but $6 to the value of his crop. The outside price he would pay for a supply of four units would be $6, or for three units $9. In each case the price he would pay per unit is determined by the value added to the crop by the least productive unit of the quantity.

Or if we assume the price to be fixed, as it is of course in the case of fertilizer or other capital goods, we see the quantity he would purchase is likewise determined by a comparison of the cost with the value added to his product by the marginal unit. If fertilizer is $6 a unit, he will not hesitate to apply three per acre. He would break even on the fourth. The outside limit of his demand would be four, and it would be decided by his comparing the value added by the fourth unit to the price. Just as in the case of the consumer, it is the least productive unit that signals the buyer to stop.

Should the price of wheat go up to $1.50, the productivity and hence the value of fertilizer will also be increased. Though each unit does not add more bushels, it does add more value to the

total product. The farmer could now afford to pay a higher price for four units or use a larger quantity at the old price of $6.

## MARGINAL PRODUCTIVITY AND TOTAL DEMAND

The total demand for any particular kind of production good or service is the sum of the individual demands for it and depends on marginal productivity. Suppose that four farmers, A, B, C, and D, find that consecutive units of labor or capital make the following increases to the total values of their crops:

| | A | B | C | D |
|---|---|---|---|---|
| First, | $8 | $7 | $6 | $8 |
| Second, | $10 | $9 | $8 | $7 |
| Third, | $9 | $8 | $6 | $5 |
| Fourth, | $6 | $5 | $4 | $3 |

If the unit price of the productive factor were $5, A would take four, B's outside limit would be four, C would employ but three, and the largest quantity D could be induced to hire would be three, making a total demand for 14 units. This is the largest quantity that would be bought at that price and also the highest price at which the whole supply of 14 would be disposed of. At any higher price B and C would refuse to purchase their last units. They are the buyers of the margin whose purchase is necessary to clear the whole supply, and the marginal productivity of the productive factor to them determines the highest price at which the supply would be purchased in toto.

## PRACTICAL IMPORTANCE OF MARGINAL PRODUCTIVITY

In order to make clear the operation of the law of diminishing productivity and the principle of marginal productivity, we have assumed an exactness which is not everywhere found in actual affairs. But while it is not always possible to segregate a single kind of production good or service and measure the resultant variations in the joint product, wherever this is feasible this law is seen to be in operation, and the principle of marginal productivity will be found to govern demand. Every business concern seeks the most economical combination of its productive

units. In so doing it will employ each particular class up to that point where the increase in product due to the last unit just covers the additional cost. In every-day practice business concerns are constantly comparing the relative values of different kinds of productive factors, deciding on the advisability of more machines or more men, or whether it would not be better to install a particular kind of machine or hire a particular man, or fire him. The actual form in which this principle is applied by them is in buying or hiring one or more or one less units of land, labor or capital. The practical question is: Will it pay? And this depends on what will be gained or lost by one more or one less unit, which unit is the marginal unit.

The entrepreneur class is the direct source of the demand for the factors of production and the judge of the value of their services. This judgment may be based on exact figures, or it may be a matter of opinion. Modern cost and efficiency systems, personnel work, psychological analyses of the man and the job, are all helping to determine more exactly the value of the individual unit to the concern, but there is still lamentable ignorance in this respect. But whether it is a matter of estimate or capable of exact measurement, the only practical test for the value of any unit of a factor of production to industry is what is added to the sum total of wealth by its presence or lost by its absence. This is a truth that has many practical applications to every-day business life.

## MARGINAL PRODUCTIVITY AND THE LAW OF SUPPLY AND DEMAND

It is sometimes said that the value of a factor of production is determined by its productivity. This is an exaggeration somewhat akin to the cost theory, or the utility theory, each of which seeks to explain value from one side only; to exalt one of the two primary causes at the expense of the other. The two fundamental causes of value are scarcity and utility. In the case of the products of industry, cost enters as a secondary cause governing scarcity. We also find in the case of the factors of production a secondary cause productivity, which determines their utility to the entrepreneur and through that their value to him.

One set of causes acts on the supply side, the other on the demand side, and the market value is determined not by either one, but by *the interaction of both.* In this chapter we have been examining the action of one cause operating on the demand side. But to prevent undue emphasis, we must not forget the other side of the equation. The exchange values of the factors of production, rent, wages, interest and profits, are governed just as much by scarcity and cost as by utility and productivity. These, acting through the law of supply and demand, co-determine the prices of all production goods and services under conditions of free competition.

## TEST QUESTIONS

1. What law governs the share of wealth received by each factor of production under our economic system?
2. What principle determines the demand of the employer for any factor of production?
3. Give an illustration of the law of diminishing productivity.
4. What is meant by marginal productivity?
5. To what does the equilibrium price of a factor of production tend to correspond?

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# CHAPTER XXV

# RENT

## ECONOMIC RENT

By rent is meant in economics that share of the net product of industry assigned to owners of land or natural resources for the part these play in production. In ordinary parlance rent stands not only for the use of land, but also for the capital invested in it. The rent of a farm or store includes a return for the use of buildings and improvements as well as the land. This usage, like all popular terminology, has a very practical basis. For capital invested in land becomes more or less merged with the land itself and tends to have its value determined in much the same manner as that of land. Indeed, once capital is applied to land in the form of improvements, their values become so fused, especially after a period of time has elapsed, that it is scarcely possible to differentiate between them; to tell, for instance, what part of the product of a well-cared-for farm is due to ditching, draining, fertilizing, etc., and what to the original soil. For the purpose of economic theory there are good reasons for distinguishing between the two kinds of income, as, indeed, there often are in business where the term "ground rent" is used to differentiate the payment made for the use of the site. The dual return popularly called rent is referred to in economics as commercial rent. A knowledge of the operation of law of demand and supply in determining the value of land is essential if we wish to understand how the values of commercial rents are determined in every-day life.

## DEMAND FOR LAND BASED ON SURPLUS PRODUCTIVITY

Land is in demand as a factor of production because by its use a product is able to be produced at a profit. The use of land

involves a cost; unless the value of the product exceeds this cost, it is evident that no one will be willing to pay for the privilege of working the land. The part that nature plays in production is to furnish the raw materials, but even though she furnishes these free of charge, the use of them in production involves a cost. To go back to the naked facts of existence, man depends for the wherewithal to live on the products he obtains by his labor on the soil. No matter who owns the soil, he cannot exact a share of the joint product of his land and another's labor if that joint product is insufficient to support the laborer. Even slaves must be fed, and no matter what system of distribution prevails, the land must first provide subsistence for the laborer or he ceases to exist. The laborer thus has a preferred claim on the product by virtue of the laws of nature. This is, however, getting down to the very bone of existence. In civilized countries man is not satisfied with a bare bone existence. With the aid of science, capital and organization, he has tremendously increased the productivity of his labor and in return for the effort and sacrifice involved he demands a decent living. He must at least receive this or he will not work. This constitutes his supply price, based on his costs, which must be received out of the price of the product to maintain an adequate supply of his labor. Whatever is paid to the owner of the land must be over and above this minimum necessary to maintain labor. Now, this is looking at production as if it comprised only two factors, and at bottom it does. All wealth is produced by man and nature. The other two factors are the result of man's effort and sacrifice and therefore involve cost. Labor, capital and organization each has its supply price, which must be paid to call into being an adequate supply. Each of these factors, then, has a preferred claim on the joint product which in the long run must be paid or its supply diminishes. Land having no cost, has no supply price, no minimum on which its supply depends. Viewed in this fundamental light, the productivity of land is in the nature of a surplus; the share of the product imputable to land is that which remains after a portion equivalent to the costs of the other factors has been taken from the total product. Hence the

demand price for land is the difference between the price of the joint product and the supply prices of the other factors.

Now, it is obvious that land varies in productivity. In the United States at the present time there is some land so sterile that it does not repay cultivation, some that just repays working, and other that brings in a rich return. Land that just repays the cost of working it is said to be on the margin of cultivation and is called no-rent land. Now, it is at the margin of production that the supply prices of the other factors of production are set. Here the price of the produce just equals the costs of the producers. As a greater product is able to be raised by the same producers for the same outlay on better land, these superior lands yield a surplus over cost, which surplus the owner of the land is able to exact as rent. The highest price that will be paid for the use of any given piece of land is the difference between what a given quantity of the productive factors is able to produce on it and what the same factors are able to procure on marginal land.

## CAUSES OF PRODUCTIVITY

The two chief causes of differences in the productivity of land are fertility and location. Fertility, of course, is used in its broadest sense to include not only the quality of the soil, but the advantages of climate. The rich, alluvial soils of the Mississippi Valley, the light tobacco loams of Lancaster County, Pennsylvania, yield a richer product and command a higher rent than less favored lands. The kind of crop or the character of its minerals have a similar influence on value of land. Location is as important as fertility, but in a different way. Fertility increases the gross product, location, so far as agricultural land is concerned, decreases the cost of operation. Good roads, proximity to markets, rail or water transportation are all important factors in farming. Of two one-hundred acre farms yielding twenty bushels to the acre, if it costs five cents a bushel to take the product of one to the market and ten cents to take that of the other, the location of the former will be worth $100 to the owner.

The values of farms, mines and timber lands are all affected

by location, but it is over factory and store sites that it exerts its peculiar powers. In the case of factory sites, the suitability of the land for building and the quality of the water are considerations, but the chief factors are accessibility of: (1) Raw materials; (2) markets; (3) sources of power; (4) labor supply; (5) loanable capital. In deciding on the location of their plants, business concerns consider carefully these factors; the proper combination gives them a big advantage over less favorably situated concerns; the lack of any one, if competition becomes keen, may spell ruin. Because certain districts possess the most effective combination of these for particular trades, huge industrial centers spring up, and land becomes exceedingly valuable. Pittsburgh became the center of the steel industry on account of its proximity to raw materials and fuel, and also to its strategic position between the markets of the east and west. Nearby in the Connellsville Valley lies the finest bed of coking coal in the world. From deep down in the bowels of its surrounding hills nature has furnished it until very recently lavish supplies of natural gas, the purest of fuels. Its ore it no longer obtains from the Alleghenies, but from the Lake Superior region, which today is the chief source of supply for the whole country. Cheap water and good rail transport facilities still enable Pittsburgh to secure the ore for its hungry blast furnaces at reasonable rates. The influence of raw materials on location is seen in the erection by the United States Steel Corporation of their mammoth plant at Gary, where by virtue of its position on the lake front it secures its ore supplies by water from the nearby ore fields and its coal and coke also by cheap water haul after it has been brought by rail to Lake Erie ports. Proximity to cheap power, which means lower cost, has increased the value of land about Niagara Falls and made that famous natural sight the center of a thriving manufacturing community.

But it is in store and city sites that we see the supreme importance of location. Here the influence of fertility is nil, while that of location is absolute. Which neighborhood, which street, even which side of a street a store locates on sometimes means the difference between success and failure. Crowds have their peculiarities, their favorite corners and walks; crowds mean

sales, and on sales stores live. Fabulous rents are paid for particularly choice positions; a busy corner may command several thousand dollars a year more than the same amount of space in the middle of the block. Car stops and other points of vantage are eagerly bid for. The pure productivity of space on crowded city thoroughfares has only recently been realized in this country. One of the most interesting signs of this is the tiny storelet with its few feet of window space and the interior just big enough for the owner to stand behind the counter and a customer in front. The amount of money that filters into these diminutive stores and others bordering city streets from the stream of human life ceaselessly flowing by makes the gold deposited in the beds of Alaskan rivers pale by comparison. Big rents are paid to secure big volume of sales; a big volume of sales means lower cost, lower cost means bigger profit. The unit margin of profit may be small, but the total profit considerable. One of the most important causes of lower costs and bigger profits is quicker turnover. This is one advantage of the Tiny Tim type of store mentioned above, which turns its capital over much more quickly than the average. The rapid turnover of some of the big chains, such as the American Cigar Stores Company, has opened the eyes of retail merchants as to the possibilities in this direction; and this, combined with the educational work done by some of the big wholesalers, such as Armour & Company, is enabling even the small retailer to grasp the advantage of bigger volume and quicker turnover.

Location sometimes means prestige. Fashionable thoroughfares like Fifth Avenue, New York, or Bond Street, London, furnish an exclusive trade. Often the same hat will fetch a higher price in an exclusive establishment on Fifth Avenue than in the common garden variety of store on Sixth Avenue. As a general rule, though, higher rents do not mean higher prices. The small retailer in a back street who claims to sell at a lower price because he pays a lower rent or does not advertise is usually mistaken. Store sites in busy places act in the same manner as advertising to reduce costs by increasing sales. The attractive store site, like rich farm land, brings an advantage to its user over less favored situations; competition among store-

keepers for the superior sites enables the owners to exact the difference or part of it as rent. Rent thus appears as a gain to owner of the property, due to its superiority over less fortunately situated locations, and the rent paid tends to equalize the advantages of different sites to the users. We say tends, because, as a general rule, the better sites yield more in proportion to the rent paid. Not all the superior productivity is absorbed by the landlord in every case, though this is the tendency.

## UNIQUE CONDITIONS OF SUPPLY

But rent is influenced just as much by scarcity as by productivity. No matter how productive land is, if there is a superabundance of it no rent would be paid for its use. Among the four factors of production land is unique in the fact that the absolute supply of it is limited by nature. Each of the other factors is capable of increase and normally does increase, but the surface of the earth is eternally fixed. The population of a country tends to grow, but its extent of the earth's surface is fixed by its geographical boundaries.

But even this evident truism needs to be modified, for while the absolute supply of land within a nation may be fixed, the available supply at any given time is capable of increase. Transportation is the boon by means of which the country has been able to open up new supplies of reserve lands. All during the nineteenth century as the railroads reached out across this vast continent, new lands and resources were continually being opened up. Trolley systems and interurban electrics are doing the same thing for the cities today, bringing new land into use or old land into more productive use, as they radiate from the dense centers of populated cities into the open country. But though this should be borne in mind in discussing the nature of rent, on account of its very practical bearing on land values, the unique character of the supply of land in reference to its absolute limitation by nature should also be clearly grasped, as it exercises in the long run considerable influence on the distribution of national income.

The fact already referred to that land has no supply price based on cost, is of vital importance to the nation at large. The

productive powers of the other agents are stimulated or retarded by the payments they receive, it being generally true that any increase in the marginal rates of wages, interest or profits tends to increase the activity and supply of their respective factors, while any decrease lessens them. The fact that the supply of land is independent of the price paid to its owners, being neither increased by an increase in rent nor decreased by a lowering of the payments received by landowners, is one of the foundation stones of Henry George's famous "single tax," and has an important bearing on taxation.

## NATURE OF RENT ILLUSTRATED

How rent arises and its nature as a surplus above the returns to the other factors at the margin of production may be

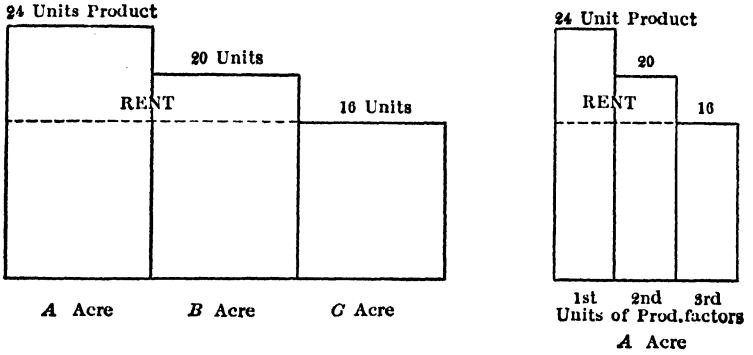



FIG. 19

illustrated by assuming that in a given community there are three grades of land which when cultivated with a given quantity of the other factors yield 24, 20 and 16 units of product, respectively. In the diagram, Fig. 19, the lines A, B and C represent acres of the three grades and the rectangles the returns they make to the same investment.

In pioneer days there would be land for everybody and to spare, so that even the best land could be had free. Those arcadian times soon pass, and the most desirable ground becomes occupied and newcomers are forced upon inferior land. Those who own and cultivate their own land on grade A now

obtain four units per acre more than those producing on B land for the same investment. Those who cultivate A lands as tenants will be willing to pay up to four units of product as rent. They have the alternative of going onto free land at B, which produces but 20 units. By staying where they are and paying four units as rent they get a return of 20 units for their investment. The owners of grade A will not be able to raise the rent above four units or tenants will move to free land. If they charge any less than four, their tenants would be receiving a return over and above what could be obtained on free land, competition for the use of A land would then raise the rent. There will be a tendency for the rent to be fixed at four units of product, which is the difference between what the given factors of production could earn at the margin of production on free land and what they could produce on superior land A.

As there is more land of grade B than is required, no rent would be paid, but with the growth of the community, land at B would finally be occupied and land at C would come into use. Owners of A lands would now be able to exact eight units from their tenants and owners of B four units, which in each case is the excess product which the same factors of production could obtain by use of the superior land over what they could earn at the margin on C land. In the course of time, as the community develops and more and more land is brought into use, the tendency will be for the margin of production to be lowered and rents to be raised. Under actual conditions, the process, of course, will not be so evenly graded; part of the new lands made available may be more productive than some in use formerly, as was the case last century in the states when transportation transferred the margin of cultivation from the rocky New England states to the broad, rich lands of the middle west. The development of agricultural science and machinery may also tend to counteract the fall in the margin. The preceding account, however, illustrates the trend of events in relation to land over long periods of time.

In the above illustration we have assumed that as the community developed the expanding population would be employed and fed by opening up new land and that each grade of land would be cultivated with equal intensiveness. This, of course,

would not be the case. As the industries of the country grew, the increasing supplies of labor and capital would be applied more intensively to the better grades, and the extra product would be obtained by intensive as well as extensive cultivation. These two processes would proceed side by side and would both result in a higher cost per unit of product or a lower return to equal units of labor and capital.

Suppose that by applying a second unit of productive factors on A land, that is, by doubling the investment, the total production is increased by 20 units. It would then be immaterial, so far as the return in product is concerned, whether the extra productive factors were employed intensively on A or extensively on B. If we assume that a third unit applied to A would still further increase the product by 16 units, it is evident that it would not pay to cultivate A so intensively as this while free land at B yields a return of 20 units. At a later period, however, when the community is forced to have recourse to inferior land at C, which only yields 16 units, it will pay to cultivate A more intensively by applying a third unit. Figure 19 represents A so cultivated. The return to the marginal dose of labor and capital on A is 16 units, the same yielded at the extensive margin on C land. Intensive and extensive cultivation will thus proceed simultaneously, and the tendency will be for each grade of land to be cultivated to that point where the returns to the marginal dose of the productive factors employed on it correspond with that which the same factor would produce on marginal land.

The rent for an acre of A land will tend to correspond to the surplus product the productive factors employed on it produce over and above the return they obtain at the margin on C land. The producers have the alternative of going on to free land at C or cultivating B land more intensively; in either case they would net 16 units of product each, or 48 in all. The owner of A land will be able to secure the surplus due to the superiority of his land, as rent. In Fig. 19 the area above the dotted line measures the rent of an acre of A land under intensive cultivation. In both cases the rent is the surplus product over and above that which the productive factors earn

at the margin of cultivation, and as it is at the margin that the normal returns to the factors are set, rent appears as the surplus product over and above the normal rates of the other factors.

We have assumed that the normal returns to the other factors of production are determined at the extensive margin of cultivation by the return they obtain on free land. We could as easily have measured them from the intensive margin by the return to the last or least productive unit employed. In the old countries there is little, if any, free land, and for many purposes in the states the land at the margin, the poorest land in use for the particular purpose, is not free land, but commands a rent. Rent would arise, however, and would still be a surplus over and above the normal returns to the factors employed if there were only one kind of land, providing that were scarce. As the demand for the product of the land grew, it would be obtained by more intensive cultivation. More and more labor and capital would be massed on the land. The price of the product would be determined by the cost of the most expensive portion, that raised in this case at the intensive margin. This price must remunerate the labor and capital employed at the margin and represents the normal rate of return to these factors. Those units employed above the margin produce a bigger product, which, as it is sold at the same price, affords a surplus over its cost. This surplus over and above the normal rates to the factors employed on the land would go to the owners as rent. As more and more product was required, it would be obtained by a more intensive cultivation of the land. The margin of cultivation would be lowered and rents raised. The price of the extra product would be raised or the standard of living of the workers lowered.

## THE TENDENCY FOR THE VALUE OF LAND TO RISE IN THE LONG RUN

The fact that land is distinguished from its partners in production, in that it does not possess a supply price based on cost, gives those partners a preferred claim on the joint product. The equilibrium prices of the other factors can never sink perma-

nently below their casts, which acts as minimum; while that of land may fall to zero. But this is only looking at one side of a fact. A supply price based on cost is like a double-edged sword in the hands of the law of value; it cuts in two directions. It may sever the price of land altogether, should the joint product be insufficient to satisfy the minimum claims of the other factors, but it just as surely shears their prices off when they rise above their respective costs. Just as in the case of a commodity, a price much above cost acts as a stimulus on the supply, the increased supply lowers the price; so that in the long run the equilibrium price tends to correspond with its cost of production. The same tendency is true for wages, interest and profits. Thus, if the earnings of any class of labor rise above normal, a compensatory action increases the supply of that kind of labor, and wages will fall, just as profits above the ordinary in any particular line of business after a while disappear for the same reason. The dynamic connection between the earnings of labor, capital and organization and their supplies acts as an automatic check on their rise. But for rent there is no such check; high rents do not increase the supply of land and establish a new and lower equilibrium price. There is no limit to the share of the joint product that may go to land except the minimum that must be paid to the other factors. And the conditions are such that in the long run the tendency is for land to exact a larger relative share; to press down on the minima of the other factors and exact an ever-growing surplus for its owners.

The situation may be summed up as follows: The price of each of the four factors of production is determined by the relation between the supply of it and the demand for it. The supply of land is limited, that of each of the others tends to increase. The increase in the supplies of the others means an increase in the demand for land. In the course of time land thus becomes relatively scarce and its value inevitably tends to rise. This, like all general statements, needs to be qualified. The available supply of land may be subject to increase. Over short periods the supplies of the other factors may also be incapable of increase. Competition is not perfectly free. Science and invention may delay this tendency, but in due course of time, as the

history of the older nations show, it inevitably asserts itself. The margin of production tends to fall, and the returns to the other factors to be lowered, while the surplus going to the owners of land tends to increase; a larger proportionate share of the national income thus flows into the pockets of the landlords; land values rise.

## THE ETHICS OF RENT

This brings us to the ethical aspect of the rent question. The owners of land have been accused of reaping where they have not sown, and rent has been described as a parasite form of income, in that it is due to the labor of others and not to any productive effort on the part of those who receive it. In the strictest theoretical sense this may be true. Economic rent is the return paid for the land; the income from improvements to the land by the owner are classed as interest. All wealth is the result of the application of man's productive efforts to land. To labor, to create and save capital, to organize enterprises, involves effort and sacrifice. Wages, interest and profits are payments made in return for productive effort or sacrifice on the part of those who receive them. The landlord receives a return for the productivity of his land, not for any productive effort on his own part, except it be that of collecting the rent. It is true that rent, from the viewpoint of society, is a surplus over and above the cost of production paid to the owners of land. But so long as a country allows private ownership of land, those who own the land have a right to exact a rent for their land from those who wish to use it also for the purposes of private profit. It is also true that the majority of those who own land have paid for it with money they have earned by their own productive effort. And that each of the other individual producers has been paid for the part he has played. If land were nationalized, rent would still exist, only it would be paid to the nation. It has been suggested that private property in land should be abolished. But while it might be a wise and just plan for a new community to retain possession of the land, rent it and use that rent for the common good, it would plainly be unjust as well as unwise to confiscate the real estate of an old

country or the income from it, which, in most cases, represents a return on an investment made by the owner, similar to an investment of capital.

The most practical question relating to land has to do with the increase in land values due to the tendency for rents to increase as a country develops. This increased valuation was termed the "unearned increment" by John Stuart Mill and has ever since gone by that descriptive title. The value of a piece of real estate depends on the income it will bring to its owner, and its selling value is found by capitalizing the rent that may be obtained for it at the current rate of interest. The value of real estate increases with the rise in rents. Rents rise as the productivity of the land increases. The increase in land values that inevitably occurs as a country develops is due not to the owners of the land, but to the general progress of society. City lots, especially, owe their high rents and values to social causes, to the growth of cities, the development of trade and transportation and the activities of the community as a whole. Manhattan Island was purchased from the Indians by Peter Minuit for the Dutch in 1626 for 60 guilders, about $24, or $100 in modern value worth of pots, pans, axe-heads, blankets and beads. Lots purchased by John Jacob Astor a hundred years ago on the same island for a few thousand dollars are today worth millions. As an alternative to the nationalization of the land, it has been proposed that the increase in land values not due to the exertions of the proprietors but to the progress of society should be secured by taxation. One of the many difficulties in the execution of this plan is that the values of land and improvements are so intertwined that it is exceedingly hard to distinguish between them. The question of taxation requires separate treatment beyond the scope of present space; enough has been said to show the close practical relation that exists between the nature of rent and taxation.

## TEST QUESTIONS

1. Explain the difference between "economic" and "commercial" rent.
2. In what sense is rent a surplus form of income?

3. What are the two chief causes of the productivity of agricultural land?
4. What factors govern the location of factory sites?
5. How does location influence the value of store sites?
6. How does the supply of land differ from that of the other factors of production?
7. Why as a country grows will land values tend to increase?
8. Is it right to say that ordinary "commercial rent" is unearned?

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## CHAPTER XXVI

# WAGES—FACTORS ON THE DEMAND SIDE

### PECULIAR IMPORTANCE

The share of the joint product of industry assigned to men for their labor is known as wages. The term, labor, includes all mental and manual power expended in the satisfaction of economic wants, from ditch-digging to managing a billion-dollar corporation. All remunerations for personal services such as salaries or fees are included under the head of wages. When men are in business for themselves, the share of the joint product assignable to their own labor strictly speaking, may be more or less merged with the other shares, rent, interest or profit. Many farmers and small tradesmen do not clearly differentiate between profits, interest and wages.

Yet in a vital sense, wages differ from rent, interest and profits, in that the latter are derived from productive property, but the source of the former is man himself. Wages are paid for the personal services of human beings, whereas rent and interest are paid for the use of land and capital. It is true that what is paid for in each case is productive power but the crucial fact is that in the case of land, capital and organization, the owners and the productive powers of their respective factors are separable but the laborers and his labor are in position of the Siamese twins. There can be no absenteeism with labor. It makes little difference to the capitalist where his capital is used, whether in a sewer or in an office, but to the laborer it may be a matter of considerable concern. In effect, therefore, while rent is paid for the use of land and interest for the use of capital, wages are paid for the use of men.

Then again wages derive a peculiar importance from the natural law summed up in "the edict of Eden" that man shall live

by the sweat of his brow. For unless relieved by an inheritance, he depends for his livelihood on the returns he secures from his labor. He may, it is true, as a result of previous labor of his own and others, amass sufficient wealth to maintain him in idleness during the remainder of his life, but in the world as it is, the great majority of mankind are dependent on their wages for a living. This is accentuated by the fact that labor cannot like capital be stored, but is highly perishable.

The subject of wages, therefore, is an intensely personal one; in any theory of distribution it occupies a place of paramount importance. Labor is the primary source of all wealth and it is in the form of wages that two-thirds of those engaged in gainful occupations receive their share of the things that make life worth while. It is no exaggeration to say that of all matters under the sun there is no one that concerns us quite so closely from the office boy to the general manager, as the contents of our pay envelopes. But, before we see what determines the size of their contents, we should notice some practical facts about wages and their methods of payment that will give us a broader view of the wage question.

## METHODS OF WAGE PAYMENT—TIMEWORK

The two primary forms of wage payments are timework and piecework. The former is the older and up to quite recently was the commoner. In the days of craftmanship and in the early part of the factory system when labor was not highly specialized, and the close relation between employer and employee rendered supervision easy, the timework method of payment was satisfactory. And for many kinds of work it is still preferred. In the higher positions, in small plants, or where the work is of a varied character as farm laboring, salaries and day pay are not only preferable but often the only feasible method of remuneration. The chief advantage to the worker lies in its stability, for especially as the length of the time unit increases he is assured of a steadier income.

But with the change from small to large scale production, the time method of payment has shown its unfitness for many kinds of work, both from the viewpoint of the employer and the em-

ployed. When large numbers of men are engaged in one plant on the same kind of work, there is a tendency to a deadening uniformity—both of effort and of reward. It becomes as difficult for the superior workers to obtain recognition as for the employer to recognize superior ability. The pay comes to be based on the average worker and the output adjusted to average pay. This kills initiative; the superior worker slackens his pace to that of the less efficient; the productivity of labor is lessened; cost is high and wages low.

## PIECEWORK

To increase output and stimulate individual effort the piecework system came into prominent use. The employee is paid not by the hour, week or month, but so much per piece for work turned out. A high degree of specialization and a standardized product consisting of large numbers of similar units, made this plan feasible. The rate of pay is based on the old day time earnings. If an average worker turned out ten units of product a day and received $2.50, the rate would be set at 25 cents per piece. Should he produce only eight units, he receives only $2.00 for the day, but should he finish twelve, his daily earnings rise to $3.00. The employer is relieved of the necessity of driving, for this system stimulates all workers and, moreover, rewards them in relation to their varying abilities. By a system of inspection, the quality of the product may be assured though for particular work requiring a high degree of accuracy the piece rate plan may not be desirable. Not only does the faster worker receive higher earnings but the employer makes bigger profits; for the larger the number of pieces turned out, the smaller is the amount of overhead to be charged to each, and therefore, the lower the cost of each.

Notwithstanding the advantages of this plan, in practice it has failed through interference on the side of the employer and partly through opposition from the side of labor. One cause of its failure was due to the cutting of the rates by employers. This little historical comedy affords an interesting if not flattering glimpse into human nature. Now that it was to the employee's advantage to work, he did so with a vengeance, doub-

ling and trebling his output in many cases and likewise his pay. Though no doubt this increased output was abnormal in some cases, being due to over-stimulation or intense competition, in many cases it disclosed the wholesale prevalence of "soldiering." At any rate employers even though they gained by the increased output, could not bear to see their employees earning such unusually large sums and so cut the rates. The disgruntled employees forced to work harder and harder to earn a small increase in pay, became wary of increasing their output and naturally suspicious of piece-rate methods.

For other reasons piecework has been opposed by the workers either individually or by concerted action through their unions. It is a more precarious method of payment; while the worker may earn more he may through the inefficiency of his employer earn less. The responsibility of the employer to furnish the employee with steady work is somewhat lessened. It is claimed that it leads to intense competition among the workers, resulting in over-stimulation, injurious to health.

## THE NEW COMBINATIONS

With a view of combining the advantages of time and piecework and eliminating as far as possible their disadvantages, there have arisen a number of wage systems commonly called premium and bonus systems. These recognize the right of the employee to a minimum wage and have as their basis a straight hourly rate. A definite time allowance is set for each job, and an additional compensation is paid for work completed within, or in less time, than the standard. The first of these new systems to be introduced into the United States was the Halsey premium plan. A standard time is set for each job. Usually under this system the standard time is based on past records of performance. The workman is paid at his usual rate. But if he completes the job in less than the standard time he receives a proportion, usually one-half or one-third of the time he saves. Thus, if his hourly rate is 50 cents and the job is scheduled to take three hours, should he complete it in two, he receives $1.00 for the two hours plus twenty-five cents for half the hour saved, in which case he is paid at the rate of 62½ cents an hour. Should

the job take him more than three hours, he still receives the base rate of fifty cents. The workman is thus assured of a full day's pay but at the same time is encouraged by a reward to increase his output, while the employer though he may pay the employee a larger total wage, pays a lower rate per piece, so that high wages and low costs go together. The objection is sometimes made that under this plan the workman is paid at a lower rate for the extra work he performs; that part of the results of his increased exertion go into the employer's pocket. This is true but is partly offset by the fact that in many plants where this plan is in operation the flow of work is greatly facilitated by more efficient coöperation than usual on the part of the management.

The later systems, the most prominent of which are the Taylor differential piece rate plan, the Gantt task and bonus and the Emerson efficiency system, emphasize intimate coöperation between the management and the men; and are characterized by the scientific accuracy with which their standard tasks are determined. The idea of scientifically determining the standard time was originated by Frederick Winslow Taylor and forms part of the theory of scientific management presented by him before the Society of Mechanical Engineers in 1903. Taylor rightly avers that the failure of the piece-rate plan was due to "the ignorance of employers as to the proper time in which work of various kinds should be done." Under Taylor's system, the best method of performing the work and a fair time for its completion are found by accurate motion and time studies. The men are carefully selected with a view to their fitness, are trained and the performance of the work is facilitated in every possible way by the coöperation of the management. The criticism is often made that the standard times of the new systems are so arduous as to be injurious to the health of the worker. When this is the case it is to be deplored for it is against the best interests not only of the workman but of the employer. But Taylor himself was very emphatic on this point and the school of industrial engineers who have followed him are, generally speaking, conservative in the setting of the standard times. Taylor's own words on this question are worth quoting:

These tasks are carefully planned so that both good and careful work are called for in their performance, but it should be distinctly understood that in no case is a workman called upon to work at a pace which would be injurious to his health. The task is always so regulated that the man who is well suited to his job will thrive while working at this rate during a long term of years and grow happy and more prosperous instead of being overworked.

The most remarkable thing about the new wage systems is that they have succeeded in uniting, what before seemed to most employers and employees, to be most unnatural bed-fellows, namely, high wages and low costs. They have demonstrated Taylor's claim, "that it is possible to give the workman what he most wants—high wages—and the employer what he wants—a low labor cost—for his manufactures." Cheap labor is not always so cheap nor is the causal relation between high wages and high costs and prices as simple and inevitable, as is sometimes claimed.

## SOME CONSIDERATIONS AFFECTING WAGES

In any estimation of wages one point to bear in mind is the distinction between nominal and actual earnings. The old proverb that "things are not always what they seem" is true of wages as of other things. Big daily wages may not be so big if irregularity of employment is taken into account, as in the case of bricklaying and in some mining operations. A smaller daily rate with regularity of employment may in the long run mean larger total earnings. A high wage in a dangerous occupation or one pursued at high tension may on account of the shortened working life of the operative, mean lower total earnings. A lower piece or bonus rate in a concern that equips its employees with the most up-to-date machinery and backs them up with efficient coöperation may result in larger earnings than a higher rate in an inefficiently managed plant. The same principle applies to a sales force on a commission basis; it is not only the commission that affects total earnings but also the coöperation the salesman gets from the house.

Quite as important when estimating earnings at different periods or places is the distinction between *money wages* and

*real wages.* Not the number of dollars in the pay envelope but the quantity of goods those dollars will purchase constitutes real wages. Owing to the fact that changes in wages fail to keep pace with changes in the prices of commodities in general, at two different periods though money wages remain the same, real wages may radically differ. The idea of what constitutes a fair wage is fixed by the traditional money wage of an occupation and in periods of rising prices considerable injustice is apt to be done because of failure to take into account the shrinkage in real wages which occurs. Not only the interest of the employer but the evidence of the senses on both sides act as deterrents. The same amount of dollars is paid and received; and if perchance the number of dollars is increased, it seems to both like a real increase, whereas the addition may still leave the employee's real wages smaller than before. Some concerns during the war adopted the wage index method of payment, raising the money contents of the pay envelopes in accordance as a price index indicated rises in the general level of prices. How this will work now that prices are falling, remains to be seen. While such a plan would be difficult of general application and hardly necessary under ordinary conditions in an abnormal period such as we have just passed through, it has much to commend it. As stated in our discussion of the effects of price changes, real wages tend to vary inversely with changes in the general level of prices, decreasing in a period of rising and increasing during a period of falling prices. It should be noticed, however, that in periods of rising prices, employment is more constant, a fact which especially in the lower ranks of labor by increasing total earnings, somewhat mitigates the shrinkage of real wages. The reverse is true in periods of falling prices, when the dread spectre of unemployment stalks among the workers, reducing their total earnings and in many cases bringing no wages at all.

According to an investigation conducted by the United States Bureau of Labor Statistics, based on the retail prices of a set of commodities chosen to represent the expenditure of an average family, the cost of living in the United States has increased from 1913 to 1920, 16.5 per cent. Wholesale prices reached their high

water mark in May, 1920, when measured by the Bureau of Labor Statistics' weighted index they registered 272; in June, they dropped to 269, in July to 262 and in August to 250. The Bureau's weighted index number of the retail prices of twenty-two principal food articles with 1913 as the base year, reached its maximum in July, registering 219; in August it fell to 207; September 203; October 198. In the usual course of affairs wholesale prices move first, then retail prices; while the cost of living brings up the rear, held back somewhat by high rents.

Real wages are also affected by considerations outside the pay envelope. Unhealthy conditions in the plant and harsh managerial policies discount even big pay. On the other hand, pleasant working conditions, opportunity for advancement and education augment real wages. Local environment, social considerations, vacation periods, enjoyment of the work and a deep satisfaction in its results, all enter into the pay a man receives for his daily tasks.

## GENERAL STATEMENT OF THE PROBLEM

Under our present economic system the price of human services like the price of commodities is determined by the law of demand and supply. When labor is urgently desired and is plentiful, wages will be low. Such a statement of the cause of high or low wages is so general as to be of little practical value. In order to understand why wages in a given trade or profession are high or low, or to be able to estimate the trend of wages for a given line of work ten years hence, our knowledge must be more definite. We need to know not only the general cause but the underlying particular causes which together govern the action of the general law. What are the factors governing the supply? What determines the scarcity of labor and on the other hand, what factors govern the demand by affecting the desire for labor or its productivity?

One of the first things to bear in mind is that the wage of an individual or class of individuals, is the resultant of a number of distinct though interrelated causes. Sometimes one and sometimes another may be the more active or conspicuous, but the wage is influenced by the action of all. A theory is simply

an explanation of fact, and some theories have attempted to explain wages by attributing their determination to some one factor. The old subsistence theory of the Physiocrats which gave rise to the so-called "iron law of wages," looked at wages from the supply side and saw them determined by the subsistence of the laborer. The value of labor like that of commodities, they thought, was determined by cost of production. The productivity theory as it is often explained, errs by over-emphasizing the factors on the demand side. In order to obtain a well rounded, unbiased view we should first note the general truth that wages are the resultant of several separate though interacting factors. The next thing is to get a clear view of each of these, their mode of action and as far as possible their relation to each other. The value of labor, like all values, is influenced not only by material things capable of measurement but by mental forces hard to estimate. To analyze all of the factors immediate and remote which influence the wages of different kinds of labor would be a task indeed, but it is possible to single out the most important. A knowledge of these places a fairly practical answer in our hands to the question: How are wages determined? We shall first turn our attention to the factors influencing wages on the side of demand.

## WAGES AFFECTED BY DEMAND FOR LABOR'S PRODUCTS

The demand for labor is derived from that of the products produced by its aid. Any increase in the demand for the product of a particular industry will increase the demand for workers in that industry, and tend to raise wages. Any increase in the price of a joint product acts to raise the productivity of its factors of production. In the chapter on distribution, it will be recalled, the productivity of nitrogen was increased by the rise in the price of wheat. In a study of the figures published in the *Monthly Review* of the Bureau of Labor Statistics on wage movements during the war, the greatest advances are shown to have taken place in those industries for the products of which the war created a special demand, such as the iron and steel industry, coal and mining and shipbuilding. Between January, 1915, and December, 1917, in the iron and steel industry,

employment increased 82 per cent, payroll 235 per cent, and per capita earnings 84 per cent! In other industries such as printing and glass blowing, the products of which were not so urgently demanded, the increase in wages was not so extreme. From 1912 to 1917 the wages of compositors and linotype operators (newspapers) advanced 111 per cent, while those of open hearth workers rose 187 per cent. The fact that the value of labor depends on the demand side on the demand for its products is of fundamental importance and has many practical applications. In choosing a trade or profession a young man should consider not only the present demand for the services he contemplates fitting himself to perform, but what that demand will be ten or twenty years hence.

## THE INFLUENCE OF EFFICIENCY ON WAGES

Efficiency is one of the primary causes of productivity and hence exerts considerable influence on wages. In looking at the nation as a whole, the more robust in health is its working population, the more alert intellectually, the more highly educated and trained, the more energetic in spirit, the higher will be the level of prosperity enjoyed by all classes including labor. And this not only because of the relation between the productivity of labor and wages; but also by virtue of the fact that a vigorous and enlightened working force is better fitted not merely to produce wealth but to command a fair share of it after it is produced.

The educational policies of the big corporations, the work of Taylor and the modern school of industrial engineers, bear undeniable testimony to the fact that it pays to educate; while the new wage systems have demonstrated the connection between individual efficiency and wages. We are just at present interested in the relation between efficiency and wages on the demand side. In any line of business good workers are preferred to poor ones, clever ones to clumsy, well trained to untrained, experienced to inexperienced, willing to unwilling. The more proficient a man is at his trade or profession, the more he will be in demand. A first-class salesman, not necessarily a brilliant man, but a steady producer, is in greater demand than a second

rater. If paid on a commission basis, the relation between his productivity and earnings will be self-evident. But if paid a straight salary his pay will still be based on sales. About six years ago a superintendent of the Carnegie Steel Company resigned to take a position as general manager of a big steel plant in Pennsylvania at a salary of $50,000 a year. In the first three months by one invention he reduced the costs of every ton of steel produced by fifty cents and as their annual output ran over a hundred thousand tons, he more than earned his salary by this one improvement. Big concerns are able to pay large salaries to men gifted with executive ability and constructive ideas because of the productivity of their services.

There is a disposition on the part of some to attribute the good fortune of others to luck or pull. There is no doubt but that these two take a hand in the game of life. But to those who are dissatisfied with their earnings it might be good advice to look to their personal efficiency; for often as Shakespeare puts it:

"The fault, dear Brutus, is not in our stars,
But in ourselves, that we are underlings."

## EFFECT ON WAGES OF EFFICIENCY OF OTHER PRODUCTIVE FACTORS

The productivity of the worker is influenced not only by his own efficiency but also by that of the other factors coöperating with him in the productive process.

The addition to the total product that is attributed to any one of a group of productive factors and is said to determine the productivity of that one, in the sense that it is the amount that depends on its presence or absence, is, it will be recalled, not produced by that factor alone but is the joint product of all and is, therefore, influenced by the efficiency of all the contributing factors. The general result is that whenever several factors are engaged in the making of a common product an increase in the efficiency of any one increases the productivity of each of its fellows. The productivity of labor is enhanced by improved machinery or superior organization.

N. I. Stone, who was connected with the United States Tariff Board, states that in the Board's investigation in the wool in-

dustry they found that almost invariably the mills paying higher rates of wages per hour produced goods at lower costs than their competitors paying lower wages. This, the Board found, was due partly to the more efficient management of the higher wage mills but more generally to the better machinery used in the higher wage and low cost mills. In the carding department of seventeen worsted mills, the mill paying its machine operatives thirteen and eight-tenths cents per hour had a machine cost of four cents per one hundred pounds, while the plant paying 11.86 cents per hour had a cost of twenty-five cents per one hundred pounds. This was due largely to the fact that the lower cost high wage mill had machinery enabling every operator to turn out more than 326 pounds per hour, while the high cost low wage mill was turning out less than forty-eight pounds per hour. An investigation some years ago into shops operating under the Taylor System of scientific management, revealed the fact that where the system was in successful operation costs had been reduced and wages increased from 30 to 100 per cent.

## EFFECT OF IMPROVED MACHINERY AND ORGANIZATION ON DEMAND FOR LABOR

The factors of production not only coöperate in the productive process but they compete for employment. Business men are ever seeking the most efficient combination and in so doing are always ready to substitute for any one factor another which may do more work for the same cost or the same work for less cost. If the job can be done cheaper by machinery, then machinery takes the place of labor. While machinery can never displace labor in general, it may diminish or destroy entirely the demand for a particular kind of labor, just as the old wood cut engravers were thrown out of work by the invention of the half tone process, glass blowers by glass blowing machines. From this fact arises the ancient antipathy of organized and unorganized labor to labor-saving machinery. One can scarcely blame workmen for opposing a device which if it does not actually take the bread out of their mouths at least scrapes all the butter off. To tell them that it is for the ultimate benefit of labor in general is poor consolation. Whether it be salesmen

discharged because of a centralization of sales through a combination of hitherto competing concerns, or mechanics thrown out of employment by inventions, the immediate effect is distressing and those who bear it are martyrs to progress. It is unfair that a few should bear the brunt of a process which enriches society as a whole. In some cases by arrangements between the unions and the bosses as when the linotype machines were introduced in the printing trade and the molding machines in the stove industry, provision is made for the men to work the new machines. It was always Taylor's policy in installing his system of scientific management in a plant, not to discharge employees who might be displaced by the changes made, but to find them positions elsewhere wherever possible; that is also the policy today of the leading industrial engineers and of many big concerns. Such a practice is not only eminently fair but expedient in that it tends to lessen the animosity of manual workers to improved machinery and inventions.

On the other hand though invention whether along the line of improved machinery or methods of organization does often diminish and even annihilate the demand for a particular kind of labor, its general effect on labor in the long run is to increase demand. Machinery practically destroyed the old time shoemaker's occupation and inventions like the McKay sewing machine threw out of work numbers of specialized workers. But as a result of the introduction of machinery into the shoe industry, costs and prices have been so lowered that whereas one hundred years ago only the wealthy few could afford to own a pair of shoes, today they are within reach of all. And with the increased demand for shoes the demand for makers of shoes has so grown that there are more people relative to the population engaged in the shoe industry today than when shoes were made laboriously by hand. Moreover, another army of auxiliary workers finds employment in the manufacture of shoe machinery and accessories and the raw materials required for these. It is evident then that if machinery throws some out of work it finds new work for others, and wherever the demand for the product is elastic the increase of that demand through the lowering of price acts likewise to increase the demand for labor.

This is the lesson history teaches. If Stevenson's locomotive threw a few teamsters and canal men out of work, it has redeemed itself since by finding employment for thousands of railroad engineers, conductors, firemen, locomotive builders, and so on ad infinitum. In the long run, machinery is a staunch ally of labor and tends to raise real wages not only by reducing the cost of commodities but by increasing the productivity of labor and thus its price, and by increasing the demand for the products of labor and thus that for labor itself.

## SUMMARY

Wages are influenced on the side of demand by—

1. The demand for labors' products
2. The efficiency of the worker
3. The efficiency of the other factors of production
4. The supply of and the demand for the other factors that compete with it for employment.

## TEST QUESTIONS

1. Why is the share of a nation's income paid as wages of especial importance?
2. What are the two fundamental forms of wage payment?
3. What have the new wage systems demonstrated?
4. Why is it well to distinguish between *real* wages and *money* wages?
5. What are the chief factors influencing wages on the demand side?
6. Explain the effect of improved machinery and organization on wages.

## CHAPTER XXVII

## WAGES—FACTORS ON THE SUPPLY SIDE

### GROWTH OF POPULATION—INTERNAL

Turning our attention to those factors influencing wages on the supply side, we come first to the general effect on the labor supply of an increase in population. While it is obvious that the total population and the labor force of a country are not one and the same thing, owing to the fact that the population includes many women and children, aged people and others, unwilling or unable to work who are not engaged in gainful occupations, it is nevertheless true that an increase in the population means an increase in the labor supply or to be exact on the supplies of different kinds of labor. In any given country the growth of population depends, first on internal growth, that is, the excess of births over deaths; second on immigration and emigration.

All discussions of population have been profoundly influenced by Malthus, who in his essay, on "The Principle of Population as it affects the Future Improvement of Society" first published in 1798, propounded a theory that set the world agog. According to Malthus, the one great cause impeding the progress of mankind toward happiness is the "constant tendency in all animated life to increase beyond the nourishment prepared for it." This arises from the fact that all animated beings are impelled by a powerful instinct to reproduce. In irrational animals and plants, this instinct is not checked by doubts as to the future provision of the offspring so that whenever there is liberty the power of increase is exerted and the superabundant effects are suppressed by want of nourishment. In man it is checked by reason in the shape of considerations regarding the difficulty of providing for the offspring, the sacrifices that must be made

and so on. This "moral restraint" often leads to vice but "if restraint is not exercised the human race will be constantly endeavoring to increase beyond the means of subsistence because of the fact that naturally population would tend to increase by doubling itself every 25 years or in geometrical ratio as 1, 2, 4, 8, 16, 32, while the food supply would only increase in arithmetical ratio as 1, 2, 3, 4, 5, 6. In a nutshell the Malthusian principle of population asserts that population ever tends to press on the means of subsistence. In so doing, it is restrained by two classes of checks, the preventive, termed by Malthus moral restraint, which restricts the birth rate and the positive checks,—misery and vice—which include all those causes which tend to shorten human life.

Malthus proved his theory by an exhaustive historical examination of the action of the checks in a large number of races from the time of the ancient Greeks and Romans to Great Britain in his own day. In principle undoubtedly Malthus was right, and as far as the past went he probably painted his picture of the operation of the checks none too blackly, nor indeed did he exaggerate their effects on the lower classes in the England of his time. But his picture of the future was somewhat darker than time has proved to be the case. The hand of progress in civilized countries has since somewhat accelerated the action of the preventive and lightened the operation of the positive checks.

## POSITIVE CHECKS

The three principal checks to population acting on the death rate are famine, war and disease,—mankind's ancient enemies. During the nineteenth century industrial progress in the principal civilized countries has placed their population in normal times beyond the reach of famine. Yet it ever hovers on the outskirts and in times of depression or sickness is a very real menace to the poorer classes; while in the hygienically more backward countries it still descends at awful intervals, as at Shantung, China, and carries off its victims by the thousands. War, too, in spite of hopes and claims to the contrary continues to make its periodical onslaughts and its bloody jaws are scarcely dry from its latest killing. In the case of disease, medical and san-

itary science and hygienic education have done much to lessen its ravages, and account for the lowering of the death rate in the principal civilized nations during the last seventy years.

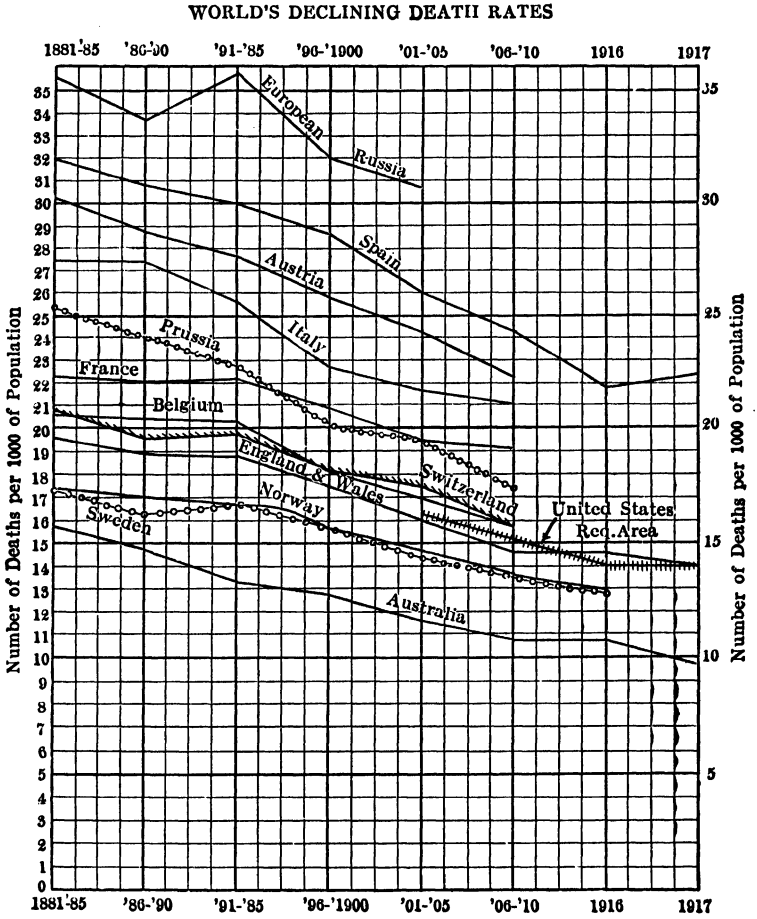



FIG. 20

One of the most gratifying features in this direction has been the marked decrease in the rate of infant mortality that has taken place in most civilized countries. In the United States, the death rate for men and women between forty and sixty years of age is higher than in most European countries chiefly on ac-

count of the high death rate from organic diseases of the heart, nephritis and Bright's disease, which is attributed by some to the high nervous tension of business life in this country. A large number of deaths are due to preventable causes. The advance of medical science, better living conditions, more attention to personal hygiene, especially in the case of city dwellers who are handicapped in obtaining the fresh air, exercise and sunlight essential to the best of health, will tend still further to lower the death rate and prolong human life.

### VOLUNTARY CONTROL—THE STANDARD OF LIVING

Nature's crude method is to encourage the reproduction of the species by powerful instinct and cut down the surplus with her three death sickles, famine, war and disease. Man as a rational being seeks to prevent overcrowding and its disastrous consequences by bringing fewer into the world. He is influenced by considerations regarding the difficulty and expense of the future provision of his offspring. This set of considerations called by Malthus "moral restraint" is usually discussed in modern economic treatises under the head of the standard of living or the standard of life. In its strictest sense the standard of living consists of those desires, the satisfaction of which an individual or class of individuals considers as essential to happiness and to gain which they will make any reasonable sacrifice, such as the postponement of marriage. It is in essence a psychological thing, a concept more or less definite, represented in material life by those necessaries and comforts which a man has become accustomed to regard as his right and without which he would not consider life worth while.

These considerations may lead him to remain single or postpone marriage till late in life or to limit deliberately the size of his family. A moderate salary will enable a single man to enjoy life on a comparatively comfortable scale, while marriage means a division of his income by two and a renunciation of some of the luxuries of bachelorhood. He is reluctant to put his neck into the marriage yoke and shoulder its difficulties and responsibilities. Moreover, owing to the increasing length of the required period of preparatory training for business and the pro-

fessions, many young men when they want and ought to marry cannot afford to, and are forced perchance to see the girl of their choice carried off by some old but wealthy rival. Nor is this matter by any means only a man's question. Many girls today

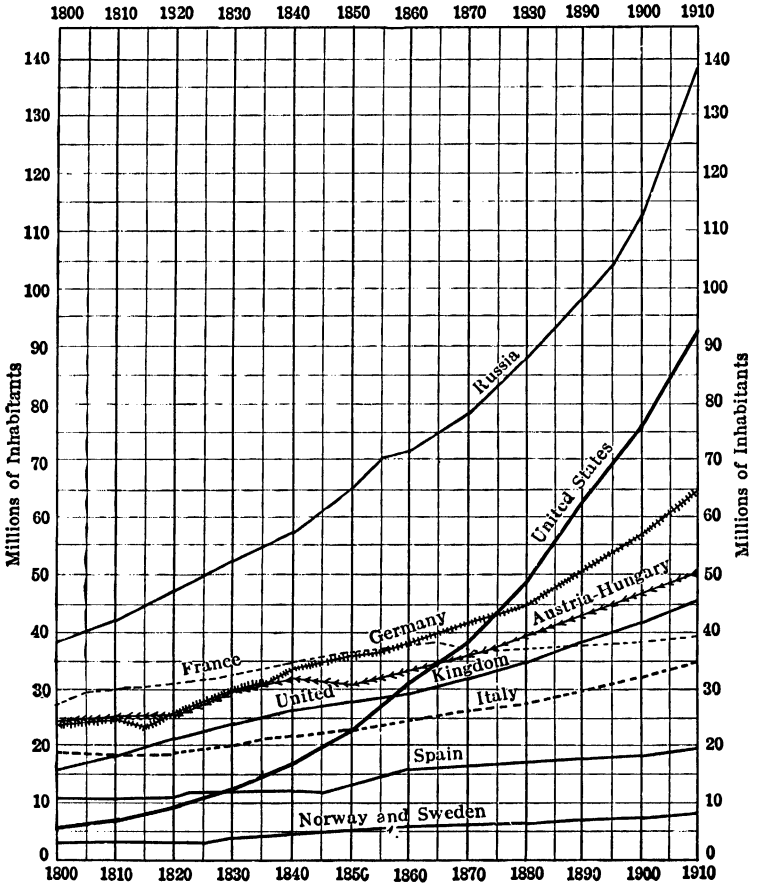



FIG. 21

earn as much if not more than the men with whom they associate. Such a one with a salary enabling her to live comfortably and dress stylishly, must be genuinely in love to throw up her independence and marry a man with a salary no larger perhaps than her own, knowing full well it means going without

many things so dear to the feminine heart. The "chum marriage" of our big cities may offer a loophole. Both husband and wife may work, living comfortably, even luxuriously, on the double income in a small flat. Here we come to the third and perhaps the most drastic aspect of this question.

It is not only by preventing unions or deferring the marriage age but by limiting the number of the family after marriage that the standard of living gets in its work on the birth rate. A glance at the vital statistics of the principal civilized nations for the last century leaves little doubt but that the decrease in the birth rates which began in the latter half of the nineteenth century and is still continuing, has been brought about not by a decrease in the number of marriages but by a deliberate restriction of the family.

In France where the birth rate fell from 3.16 per cent per 100 for the period 1806-1816 to 2.05 for 1901-1911, the marriage rate only dropped 1.63 to 1.52 per 100. Figures for England and Wales show a similar relationship; during the period 1876-85 the birth rate per 100 of population was 34.2; it dropped to 28.6 for the period 1896-1905. The marriage rates for about the same periods changed only from 16.6 per 100 during 1861-70 to 15.6 for 1891-1900. The birth rate for France had further declined in 1913 to 1.88 per 100 while in the United Kingdom it had sunk to 15.0 per 1000. The vital statistics of the United States have been and still are shamefully inadequate. With the exception of one or two States in the East, Massachusetts for example, there has been an utter dearth of reliable statistics. The present birth registration area of the United States covers only 53 per cent of the total population. The death registration area covers but 81.1 per cent. Estimates based on what figures have been available indicate that the United States is following the European fashion. Indeed, statistics are hardly necessary; the large families of colonial times are becoming as rare as the large flocks of wild pigeons that once roamed the continent. The birth rate for the United States registration area in 1915 was 24.3.

A characteristic of the preventive check often remarked is the uneven manner of its action. Some concern has been expressed because of the fact that in most countries statistics show that the

higher classes, so called, are only just holding their own, if not actually failing to maintain their numbers, while the laboring classes by virtue of their larger families tend to increase in spite of their higher death rate. Population is thus said to be growing at the bottom rather than at the top. It is a question, however, as to what part of the superiority of the higher classes is due to heredity and what to education and environment. If they constitute a superior strain of the human species it would be a pity to let them die off. If, however, the stock of the common garden variety of mankind is capable of refinement and polish by education and environment, it might be as well to keep the walls of class division low enough to permit the free entrance of the more vigorous stock of the lower classes to replenish the withering of the upper. It is a rather peculiar biological paradox that the qualities that fit some for success in the immediate struggle for existence unfit them for perpetuating their kind. Probably this is exaggerating the actual facts; but there is no room for doubt that the preventive check is more active in the cases of the middle and upper classes than in the laboring classes which are not fired with the same intensity of ambition or gifted with the same degree of foresight or prudence in this particular.

## INCREASE OF POPULATIONS OF CHIEF COUNTRIES

Notwithstanding the decrease in the birth rates, the populations of the principal countries with the classic exception of France, continue to increase, as the accompanying chart shows.

Statistics prove that high birth rates and high death rates usually go together owing to the more acute struggle for existence, as is illustrated by the history of China and India. On the other hand, if the birth rate is so low as to approach the death rate, as in the case of France, the population will tend to be stationary and may even be threatened by race suicide. A gradual growth through a medium birth rate accompanied by a low death rate is the sanest, economic course for the older nations.

## THE MODERN TENDENCY

The continuous decline in the birth rates of the leading countries of the world which set in during the latter half of the nine-

teenth century and which is still in operation, seems to augur a new principle of population for twentieth century civilization, a principle born of the changed economic and social conditions of

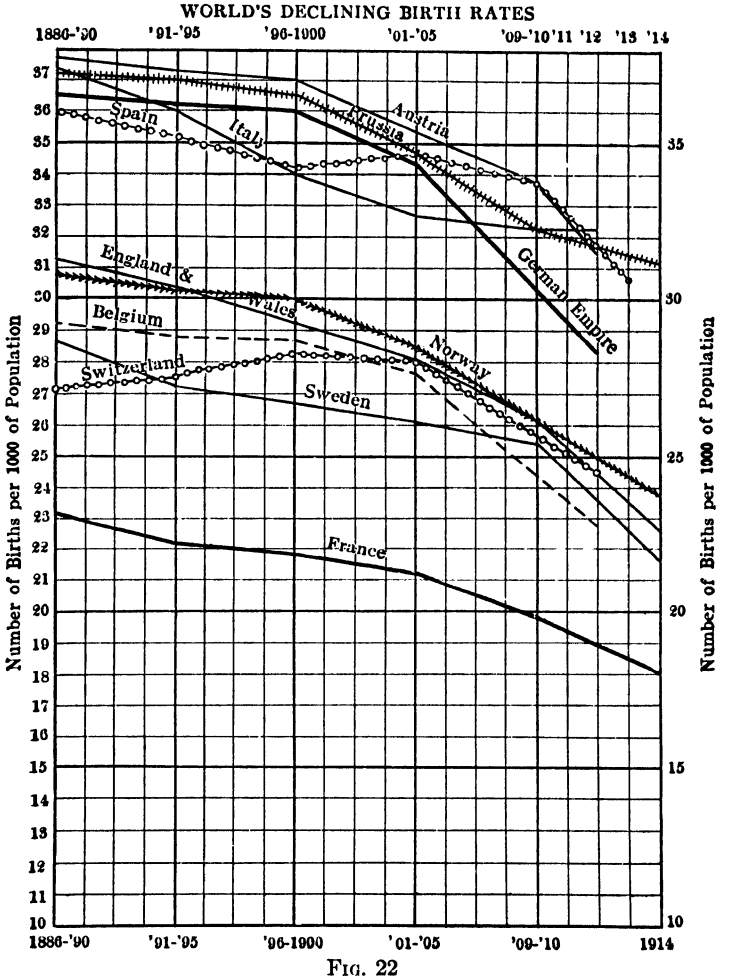



FIG. 22

modern nations. Before and during the time of Malthus, no doubt subsistence acted as a spring pressing down on population. On its release population increased; when it pressed down population decreased. But the experience of the chief nations of the world during the last sixty or seventy years points to an opposite

tendency. As a result of the industrial revolution that ushered out the eighteenth century the wealth of the great nations has been enormously augmented, all classes have been enriched, real wages of labor are higher than ever before. The spring has been released yet the birth rate has failed to respond; in fact, it has decreased as wealth has increased.

The turn in the tide did not take place for the majority till the latter half of the century. France it was that led the way to the very beginning of the century. During the last fifty years France has several times found it necessary to stimulate the growth of her population and is today offering bounties to women bearing two children or more, legitimate or illegitimate. In 1911 the deaths exceeded the births and under the strain of war the reproductive powers of the nation again failed to keep pace with death. France may be in no danger of race suicide but assuredly there are no signs of a tendency for population to advance so rapidly as to encroach upon the means of subsistence. Vital statistics indicate that the chief civilized nations of the world are following hard on the heels of France.

The changed economic and social conditions of modern civilized life, the rise in the standard of living, the goading of ambition, increased knowledge, the drift toward the cities, all tend to strengthen the action of the preventive check. If it be true that it is the tendency for man in his natural or crude state to increase his numbers until checked by famine, war and disease, it would seem to be the philosophy of civilization that prevention is better than cure. Rather a smaller number and that number better fed, clothed, educated and provided with a larger proportion of the things that make life worth while, than a horde of underfed, ill clothed, ignorant creatures destined to a pitiless struggle for a bare existence. Instead of blindly increasing and allowing nature to check his numbers in her own crude and cruel way, man is controlling his own increase. The population in civilized countries today no longer presses on subsistence, but instead the standard of living presses on the population. Nature no longer checks man; man checks nature.

The standard of living exerts a dual influence on wages; first by restraining the growth of population as a whole or in the case

of a particular class by tending to limit the supply of labor. Second, as has often been pointed out, it influences the bargaining power of the workers by stiffening their backs against a reduction in wages below that which they consider essential to maintain them in their accustomed mode of living. But the standard of living is not a fixed thing; it is based on desire the nature of which is to grow and through ambition it may exert a positive influence on wages by stimulating the worker to secure an advance.

## GROWTH OF POPULATION—EXTERNAL

The spectacular growth of the United States of America was one of the wonders of the nineteenth century. It is scarcely conceivable today that this great country with its hundred and five million inhabitants, numbered a little over a century ago less than four million souls.

TABLE X.—GROWTH OF POPULATION OF THE UNITED STATES

| Census Year | Population of U. S. Exclusive of outlying possessions | Percentage of Increase | Census Year | Population of U. S. Exclusive of outlying possessions | Percentage of Increase |
|---|---|---|---|---|---|
| 1790 | 3,929,214 | | 1860 | 31,443,321 | 35.6 |
| 1800 | 5,308,483 | 35.1 | 1870 | 38,558,371 | 26.6 |
| 1810 | 7,239,881 | 36.4 | 1880 | 50,155,783 | 26.0 |
| 1820 | 9,638,453 | 33.1 | 1890 | 62,947,714 | 25.5 |
| 1830 | 12,866,020 | 33.5 | 1900 | 75,994,575 | 20.7 |
| 1840 | 17,069,453 | 32.7 | 1910 | 91,972,266 | 21.0 |
| 1850 | 23,191,876 | 35.9 | 1920 | 105,683,108 | 14.9 |

Needless to say this rapid growth was not wholly due to the natural increase of births over deaths but largely to immigration. During the last hundred years over twenty-nine million inhabitants of the old world sailed the seas to try their fortunes in this new Eldorado of the West. From 8,385, in 1820 their numbers increased to 1,026,499 in 1905 and before the war cut their coming, they were streaming in at the rate of over a million a year. In the past this country has had ample land to accommodate this vast perennial influx but it is evident that if the same rate of coming were to be maintained during the twentieth century overcrowding must eventually result. The density of population of the United States increased from 4.5 to the square

mile in 1790 to 30.9 in 1910. We are still fortunately situated in comparison with the older nations of Europe. France has a population of 191 to the square mile; the United Kingdom 379; the German Empire 324; Italy 331, while crowded little Belgium has 673 to every square mile. But while there is still plenty of elbow room in this great country, the days of abundant free land are gone; and we talk today of the necessity of conserving our once apparently illimitable natural resources. Indeed, it is even whispered that the cost of our food is already being raised by the action of that arch enemy of growing populations, the law of diminishing returns. In recent years the number of immigrants arriving in this country has been strictly limited by law. During the fiscal year ending June, 1920, 430,000 passed through our gates at Ellis Island. An unusually large exodus of emigrants took place, however, 288,315 leaving an excess of immigrants of 193,514.

Immigration like the standard of living does not affect all classes of the population equally. During the earlier part of the nineteenth century the majority of our immigrants came from the United Kingdom, Germany and Northwestern Europe, latterly Southern Europe has been furnishing us with the great part. The large majority of these are of the lower classes; in 1913, 269,000 were illiterate. Of the 376,776 Italians who immigrated to the United States in 1914, over 28 per cent were agricultural and 29.4 were day laborers. While immigration adds to the number of professional and skilled workers, it increases most of all the supply of unskilled labor.

The immigration question is plainly not one merely of numbers but of kind. The wisdom of admitting into the population a large element whose standard of living is below that of the native born has been doubted. So far the country's capacity for assimilation does not seem to have been seriously strained. A more real though more subtle danger from a continuous influx of immigrants is the maintenance of a stratum of population to perform the rough labor of the nation, which though its numbers would be changing, would itself be permanent and possessed of a standard of living below that of the native American laborer. Such a condition must inevitably result in lowering the dignity of

labor in the eyes of the native American in much the same manner as it was lowered by slavery in the eyes of the Southerner. A wise immigration policy will seek not only to regulate the number but the character of the immigrants admitted, discriminating between not only the fit and the unfit morally but the fit and the unfit industrially, encouraging those classes for whose labor there is a demand, and discouraging those of a kind of which there may be already an oversupply.

## SUPPLIES OF DIFFERENT KINDS OF LABOR

We have used the term "labor supply" in a loose and general sense. For there are as many different kinds of labor as there are different sorts of land, and the quantity of each kind that is forthcoming at given prices constitutes its supply. The labor supply of a country consists not of one homogeneous supply but of a number of separate supplies of different kinds of workers.

For the sake of convenience these are often divided into groups or classes. The various kinds of common labor may be included under unskilled labor. Next in order comes the great army of semi-skilled workers. Skilled mechanics of all kinds form a class by themselves. Leaving the factory, we might class together the rank and file of office workers including salesmen and others who work out of offices. The general run of professional men, doctors, lawyers, artists, engineers, etc., constitute a distinct class. About on a par with these are the smaller executives; the heads of departments in the big corporations and the officials or owners of smaller concerns. Last but not least, we come to the real aristocrats of labor, the big business executives, the Garys and the Morgans with whom we might include the Charlie Chaplins and the Carusos and other eminently successful and productive members of the professional classes. Each of these classes contains a number of distinct occupations and the question is what are the chief factors limiting the numbers of workers entering these.

## NATURAL ABILITY

In the unskilled and semi-skilled groups, the numbers are more directly dependent on the growth of population, and in the

United States are especially influenced by immigration. But in the skilled and professional classes, the supply of workers available in any occupation, is limited by other factors, among the most important of which are native ability, education, and social environment. The importance which scientific management has attached to the selection of men for even the most menial tasks, such as handling pig iron and shovelling, shows that some natural aptitude is requisite for the proper performance of any kind of labor. But in general, of course, it is true that whereas there are many fitted for those humbler tasks, there are comparatively few gifted with the high degree of intellect and personal ability which are demanded for handling big business or for exceptional success in the professions. For one Goethals able to engineer a project of the proportions of the Panama Canal, there are a thousand who could only handle a shovel. Certain kinds of work, such as illustrating for advertising, require special types of ability possessed by comparatively few. Natural aptitude and hereditary ability place a limit on the supplies of those eligible to fill positions of this sort.

## EDUCATION AND TRAINING

But it is the difficulty and expense of securing the necessary education and training which acts as the great check on the numbers entering the trades and professions. To apprentice a boy to a trade requires a financial sacrifice on the part of the parents as well as patience and pains on the part of the apprentice, while preparation for a professional career is today a long, drawn out and expensive matter. It is not only the expense involved but the time and effort. Were all kinds of higher education made free as far as tuition goes, the lure and necessities of the present, and the continuous effort over a number of years, that must be put forth to complete a full medical, engineering or other professional course, would still serve to limit the number availing themselves of it.

The tendency all along the line is for the professional schools to raise their entrance requirements and extend the length of their courses. Many medical schools which a few years ago admitted students straight from high school now require two years

college or even a full A.B.; law and dental schools are following suit. Business itself is rapidly becoming a profession in that those who aim to fill all but the most lowly positions must obtain some perliminary training, while the younger generation entering the business arena is being equipped with almost as thorough a training in the new schools of commerce of our universities, as their brothers entering the older professions. The trend in our new schools of business administration is toward extension of the course from two years to four. In the realm of accounting most states require those eligible for the C. P. A. examinations to have had a high school course in addition to the grammar school grades previously sufficient. This raising of the educational fences around professional occupations tends to restrict the number of entrants, and raise the rates of remuneration. The cost of preparing for a trade or profession acts in a somewhat similar manner on the price of labor as the cost of production on the price of commodities. The professional remuneration must be sufficient to offset the cost of preparation or the supply of those entering will decline. In those occupations demanding a lengthy and expensive training, earnings will tend to be higher because of the fact that the number fitted to enter them is limited to the few who have had the necessary general and special education.

How, then, account for the fact that many who possess a fine education earn but a pittance whereas others who have never seen the inside of a college make fortunes? There may be many and diverse reasons; financial success is the resultant of a number of forces, any one or more of which may be the determining causes. In the first place the difference may be due to natural ability or the lack of it. The educated ass is after all but an ass and no waving of the educational wand will transform him into a lion. Then, too, some who go through college acquire but a diploma and a coat of social polish whereas others who have never seen a college campus by intense intellectual effort applied to their work and by extensive reading and varied experience acquire a genuine and practical education. The education of some college men comes to a full stop with their graduation exercises. There are those who believe that an

academic education though it may make a better man does not make a better business man, in that it gives him interests intellectual and otherwise which are detrimental to the intense and narrowly concentrated habits demanded for the accumulation of money. This, of course, cannot be said of a technical education, or of a college course supplemented by a specialized business training. Also the demand in many skilled occupations is small and inelastic and oversupply may ensue as a result of undue popularity as in the case of trained chemists in Germany. The combined efforts of the German government, the universities and industry to develop the dye industry and chemical research in the years preceding the war, resulted in attracting an extraordinary number of able men into chemistry. Their numbers were so great that the inevitable competition between them for positions made the salaries exceedingly small in comparison with those received by men of equal ability and training in other fields.

## SOCIAL ENVIRONMENT

Entrance into certain occupations is further influenced by social considerations. Class distinctions are less marked in the United States than in the older nations yet here as everywhere they exist. The majority remain in the class into which they are born. The extraordinary man in whatever class will force his way to the top but after all, these are the exceptions even in the United States. Only the unusually clever or the unusually dull will rise or drop out of their respective strata. Born in a favored class, surrounded with every care and attention from babyhood up, better nurtured, played upon by the subtle influences of a cultured home environment through imitation and suggestion, well educated and then launched out on his career after graduation with the aid of family or social connections; compared with the son of a day laborer such a one has a flying start in life and must be more than usually stupid to fall to the rear in the race. The presumption is that he, like the laborer, will stay among his own people. In the course of generations families rise and wane like kingdoms but the process is a slow one. Social environment means opportunity and opportunity plays

a great part in business and professional life. While it is true that the higher positions in political, professional and business life are possibilities to all classes, they are not probabilities. But in the world as it is the majority in the lower classes are debarred from ever reaching them. Social environment means preferment for some and expulsion for others; it tends to limit the number available for many positions.

## INTER-ACTION

There is considerable difference of opinion as to the relative importance of native ability, education and environment. Adam Smith expressed the opinion of his time when he said that the difference between the philosopher and the porter was chiefly due to education, custom and habit. The discoveries of Mendel and Darwin have tended to emphasize the importance of heredity. Clay, the English economist, maintains that "incomes derived from work vary far more than do native ability and capacity." "All operations needed to supply all the ordinary needs of life have been studied and simplified until any person of ordinary intelligence *provided he has the necessary training* can do most of them. The opportunity of training and entry into trades is then the most important influence and the fundamental reason for the difference in the wages of different occupations. Low paid occupations are low because they are overcrowded, while a high remuneration is secured for an occupation by restricting entrance to it."

Native ability is perhaps the limiting factor for the highest positions. As Taussig aptly puts it, "Generals probably are born not made. But Colonels and Captains can be trained." The supply of generals in the industrial army is limited by the rarity of genius, but the limiting factors for captains and colonels are more usually education and environment. The abstract question as to which is the most important is best left to the tender mercies of debating societies. The vital thing to notice is that all three play a weighty part in the determination of wages. No hard and fast rules can be laid down that will apply to all cases or conditions. All three are omnipresent; they act and react on each other and sometimes one and sometimes an-

other is the determining factor. To the individual in his little day education and environment in that they are more or less under his control are worthy of more practical consideration. As someone has said, we cannot choose our parents but we can pick our environment. The easier this is made in any nation, the freer is education to all, the lower the walls of class distinction, the more nearly will differences in wages tend to correspond to differences in natural ability. And if it be true, as it probably is, that the ability required for the performance of the great majority of tasks is possessed by the great majority of folks then there will be a tendency toward a greater equality of earnings at a higher general level.

## ORGANIZED CONTROL OF THE DEMAND AND SUPPLY OF LABOR

Under conditions of perfectly free competition on both sides, the price of a commodity or service is said to be determined by the natural action of the law of demand and supply. Rarely today is anything bought and sold under such conditions. Usually there is some agreement or combination on the part of either buyers or sellers or of both. Any such control over the demand or the supply constitutes interference with the natural action of the law. And if the control is sufficient to influence value, the price can no longer be said to be determined by the natural action of demand and supply but is regulated by monopolistic control on the part of either the buyers or the sellers. If both the supply and the demand are under absolute monopolistic control, then the price will be set by bargaining. Where competition is perfectly free, the natural interaction of the forces of demand and supply tend to establish an equal price, a fair price in that it satisfies both sides. But in the world as it is today free competition seldom exists and organized control of the forces on one side or the other places the fixing of the price more or less in the hands of one side which thus has a strong temptation to disregard the interests of the other side and set the price high or low according as that side is seller or buyer. And the rather humorous thing is that if any objection is raised and governmental interference is proposed the manipulators loudly assert

the divine rights of the law of demand and supply, and bitterly assail any interference with its "natural" action. Where, however, the forces on both sides are organized, both meet on an equality; and an amicable and fair price is again the natural result.

The demand for labor today in many occupations is largely an organized demand. The employer may be an individual but in these times of large scale organization he is apt to be a big corporation, employing thousands of men, perhaps, as in the case of the United States Steel Corporation, controlling a large proportion of the workers employed in one industry. But even if there are only a few big employers of labor in one trade and there is perfectly free competition between these for men, monopoly cannot be said to exist. Just as soon, however, as these big concerns combine for the purpose of hiring men, and act together making agreements as to what they will or will not pay, free competition between them disappears and in its place comes an organized demand for labor. This is made possible in industries today by the existence of the numerous kinds of employers' associations. The various forms of monopolistic agencies previously described place in the hands of employers a control over the demand for labor similar to that which they exercise over commodities. Not only are the employers in one branch of industry organized but by means of their general associations such as the National Manufacturers' Association, they are capable of concerted action as a whole.

It follows that if labor remains unorganized under such conditions, it must ever be at the mercy of capital. It is, of course, not necessarily a case of warfare; neither the organizations of capital nor of labor are designed primarily for fighting but for legitimate and useful purposes. Organization nevertheless places a dangerous power in the hands of one over the other when that other is unorganized. In the first place even when it is a case of man to man, the worker is at a disadvantage. His labor is perishable and cannot be stored like commodities. It may be withheld, but as in the great majority of cases the laborer depends on his labor for a livelihood; loafing means starvation for himself and family. What is a great loss to

him may to his employer mean merely the loss of one man among many. As a bargainer he is, as a rule, no match for his employer in respect to position, education or knowledge of conditions; he is the under dog.

Labor's sole hope lies in organization. Only when the workers are organized will they be enabled to meet their organized employers on an equal footing in the bargaining process. Through their organization they can maintain a reserve fund to permit their exercising their inalienable right of withholding their product when not offered what they consider a fair price. They may also follow their employers' example and maintain paid representatives at the state and national legislatures to protect and advance their interests in respect to legislation. They are enabled to sell their labor through skilled representatives even as the corporations buy it by specialists trained for that purpose. Through their trade union secretary or other representative they appear before their employers not as lone individuals but as an organized group. The employer risks the loss not merely of one man but of many. By means of apprenticeship rules and sometimes other perhaps more questionable methods, they are enabled to regulate the supply of their product to the demand. In all this labor is simply falling in line with the inevitable trend of the times by substituting collective action for individual. Like the entrepreneur, the worker is selling his product through an organization. For this purpose as well as for fraternal reasons outside of our present discussion, the trade union has come into being.

That labor has a right to organize under our present system, there can be no question. If the workers sell their labor in competition with each other to an organized body of buyers, they like the farmers of old must ever be the dupes of the law of demand and supply. It is a clear case of a buyer's monopoly. A fair wage is imperilled when the employers who represent the demand for a particular kind of labor are organized and the workers who constitute the supply are unorganized. Both sides being organized, they meet on an equality, the only just basis for a bargain. It is labor's human right to organize; and not only its right but its necessity. The workers do so not to gain a

profit but to make a livelihood. Neither does it betoken a very broad-minded attitude on the part of some who have taken a conspicuous part in recent business combinations and declaimed loudly against destructive competition in the selling of steel and other things, that they should remain blind to labor's danger from "destructive competition" and refuse to recognize labor's right to organize. Nor is it a valid argument against labor organization, that trade unions or their officials have sometimes done some things which they ought not to have done. Restriction of output or violence are to be deplored for the worker's sake as well as for others and should be punished. But big business is by no means a saint and on both sides the wrong sometimes done is beside the point. Both capital and labor are benefitted by organization which when applied to both means a more harmonious adjustment between demand and supply, and the only true basis for a fair wage under our present large scale system of production.

## TEST QUESTIONS

1. Give a brief account of the Malthusian theory of population.
2. Explain the action of the three positive checks on population.
3. Explain the action of the preventive check on population.
4. What is meant by saying that the population of a country is growing at the bottom instead of at the top?
5. What is the "modern tendency" in reference to the populations of the chief civilized nations?
6. Mention some of the considerations entering into a wise immigration policy for the United States.
7. How do natural ability and education affect the supply of labor in a given trade or profession?
8. What effect do trade unions have on wages?

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# CHAPTER XXVIII

## INTEREST

From the point of view of distribution interest is the share of the joint product of industry paid for the use of capital. Just as rent is paid for the use of land, interest is paid for capital. Because of the service capital performs in our industrial system, those who borrow it are able and willing not only to return it intact at the close of the period of the loan but to add something extra out of the profit they have derived from its use. Not only is the payment of interest justified by the service the borrowed capital renders but it is necessary to induce the supply of surplus wealth demanded by our economic system for the purpose of production. Capital is not furnished freely by nature in unlimited quantities like air, but is brought into existence at an expenditure of labor and saving; therefore, some stimulus is necessary to insure an adequate supply and to induce those who possess it to abstain from its use and loan it to others. In other words capital has value for the same reason that other things have, for its scarcity on the one side and its utility on the other. Its price or the rate of interest is determined by the supply of capital in relation to the demand for it.

### THE RELATION BETWEEN THE LOANABLE CAPITAL FUND AND CONCRETE CAPITAL GOODS

We have already shown how capital comes into existence by labor and saving. Capital consists of the products of past industry saved and used for the purpose of further production. The fact that this saving is represented today by money makes it necessary to point out more clearly the connection between the money savings and the actual capital wealth saved. All money savings come from the money incomes of the people, from rents received by owners of land, from the wages of workers, in-

terest of owners of capital, from the profits of entrepreneurs. These instead of receiving their shares of the commodities they have assisted in making, in kind, are paid with money. Part of this money they spend for commodities and services to satisfy present wants. To society the amount thus spent on consumption goods measures the value of actual wealth consumed. But the amount they refrain from spending measures the value of actual wealth saved. This money and currency saved constitutes the capital fund of the nation. Part of it is reinvested by those who have saved it in their enterprises. Part of it is deposited in commercial or savings banks, paid as premiums to insurance companies, to building and loan associations or for the bonds of municipalities, railroads or industrial corporations, is loaned through these agencies of investment to business men who ultimately exchange it for concrete capital goods. It is thus evident that the origin of the money and credit which constitutes the loanable funds of the nation is the supply of actual wealth produced by the community and saved. The loanable capital fund simply represents and measures the value of concrete capital goods.

## THE SUPPLY OF MONEY AND THE RATE OF INTEREST

The supply of loanable capital funds depends on the quantity of actual wealth saved. This needs to be emphasized because of the erroneous though very plausible belief that the supply of money and credit *is* the supply of capital and its extent determines the interest rate. But the total supply of money and credit is by no means identical with the supply of loanable capital funds. A large part of the former is required for consumption purposes and only that part is available for loaning which is not required for present spending. An increase in the quantity of money and credit means higher prices; a decrease results in lower prices, and it is chiefly by reason of the effects of rising and falling prices on the supply and demand for capital that the interest rate is influenced by money and credit. The temporary effect of an increase in the monetary supply would indeed be a lowering of the rate of interest but a continued increase results in raising it. As we saw when studying prices a period of rising

prices stimulates business enterprise. This increases the demand for capital and tends to raise the rate of interest. The opposite is true as a result of a continued decrease in the supply of money and credit. Falling prices discourage enterprise and decrease the demand for capital. As stated by that eminent authority on money Joseph French Johnson[1]: "If the adjustment of prices is perfect, the supply of money not being increased except to meet an increasing demand, the rate of interest will be entirely independent of the amount of money in existence. The saving and productive capacity of a people upon which the rate of interest depends, is not a product of the money supply, but of their thrift and energy and of the country's natural resources."

## SAVING AND THE SUPPLY OF CAPITAL

The supply of loanable capital depends on saving. What, then, are the influences governing the savings of a nation? The new capital of a nation is drawn from two main sources. A large part, much larger than is usually supposed, is derived from the reinvested surpluses of business concerns. According to the estimate of David Friday[2] based on an analysis of the net incomes of all corporations in the United States, the total capital from this source in 1919 was placed at $2,800,000,000. The balance of the nation's new capital depends on the savings of individuals. The total savings for 1919 from all sources from all business concerns including the reinvested savings of farmers and from individuals were estimated by Friday at $15,000,000,000. The ability and willingness of people to save depends on the amount of their incomes and their thriftiness. A minimum income sufficient at least to satisfy the vital necessities of the present is a prerequisite to any saving at all. Savings come out of surplus and it is obvious that a bare subsistence leaves nothing to save from. Present needs have a preferred claim on income, the future can lay claim only to the excess above the minimum requirements of the present. The very poor are by stern necessity compelled to live from hand to mouth; safety deposit boxes and

[1] For a detailed explanation of the relation between money and the rate of interest see Joseph French Johnson's "Money and Currency," which is the most able and brilliant work written on that subject by an American.

[2] "Profits, Wages and Prices".

bonds exist not for them. In every country there is a substratum of the population living in this condition. These, it is evident by virtue of their poverty, are ruled out from contributing to the capital funds of the nation. Not much better off in regard to the mere ability to save even in this the most favored land of the worker is the rank and file of the laboring and lower paid portion of the clerical classes who though their incomes are without doubt above a bare subsistence, yet admit of scant opportunity to save except to the most thrifty. They do indeed save temporarily, but their two dread enemies, sickness and unemployment, wipe out their little stores as fast as they gather them together. Like "Alice in Wonderland," with all their running they get nowhere. On the other hand the very rich with incomes far in excess not merely of their needs but of even their lavish wants, save large sums with ease. The accumulations of this class probably furnish the major part of the capital funds of the nation. Between these extremes whose savings or lack of savings are conditioned chiefly by the size of their incomes lies the great mass of the middle classes, the extent of whose accumulations depends more on their willingness to save than their mere ability, on their thriftiness rather than the size of their income.

In turning from the material to the psychological side of saving we find its essence to be a conflict between present and future wants. To the great majority saving involves sacrifice, the abstaining from the satisfaction of present wants in order to provide the means for supplying a future satisfaction. This is the essence of thrift. In order to save up for a home or for old age the thrifty deny themselves daily. Psychologically it resolves itself into the balancing of a want for a present good, intensified perhaps by a strong appeal to the senses, against the colder, intellectual desire for something in the future.

One of the first secrets of thrift, then, is the ability to control present wants. This some people never learn to do. Needs have their limit but wants are of infinite elasticity. No matter how large the incomes of some they never have more than enough to live on. The wants of the majority increase as fast if not faster than their earnings. Thousands have found it more difficult to save on an income of $5000 than when they were earning

less than half that sum. An excellent plan, but one seldom adhered to by those starting out on their careers, is that of banking one-half of all increases in earnings. This fifty-fifty plan of division between present and future if generally practiced would bring modest fortunes to thousands who are now drifting toward a penniless and dependent old age. That large, happy-go-lucky class whose hearts all beat to the fond belief that they "have nothing to save" include the man with $18,000 as well as his poorer brother with $1800. And though each honestly feels that if he were only receiving a couple of thousand a year more he would surely have a safe deposit box bulging with bonds the human likelihood is that his wants would bulge faster than his income. The rare art of saving as the sage would put it depends not only on the greatness of one's wealth but on the fewness of one's wants.

But if the control of present wants constitutes the negative side of saving, the positive side consists in the cultivation of wants for the future. These furnish the motive power for saving and are the products of the imagination. Foresight is the mainspring of thrift. In no other power do men vary more than in their ability to visualize the future. The degree in which this important faculty is possessed is to a large extent the measure of the modern man. Many there are who fail to show even a trace of the instinct that teaches the dog to bury his bone and the squirrel to secrete his winter store of nuts. The southern darky is perfectly happy as long as his body is warm and his stomach filled; others look but a few days ahead. Still others, founders of families, builders of big industries, statesmen, plan for generations unborn. Such men as the Astors, the Hills and Harrimans, the Vails and the Roosevelts, gifted with vision into the distant future, tower above the shoulders of the multitude.

Foresight marks both the development of races and individuals. Young races as well as young people live mainly in the present. The logical time to save is in youth or middle age when energy is at its zenith, but the natural time seems to be toward the tail end of life when oncoming old age begins to herald its approach by decreased vigor or twinges of rheumatism. Not

till most men get well into their forties do they realize the necessity of some provision for old age. They are then in such a hurry that instead of investing they take to speculation and end up by losing all they ever had.

With the average man and in particular the average young man present wants are dominant not merely because they largely spring from the bodily appetite but because they are reinforced by the seductive appeals of the senses. What the eye sees the mind is apt to want. This natural fact makes saving in the city harder than in the country. The city dweller undergoes a continual bombardment through the senses from the attractive wares displayed in store windows and in use by passers-by. He and in particular his wife live in a most tantalizing atmosphere of temptation. They are forever seeing something they want which in all likelihood they would not have wanted had not their desires been deliberately stimulated. It is different with future things, such as next year's vacation, a home of one's own or provision for old age; these are not as a rule visible to the physical eye but to the eye of the mind which alone has the power of peering into the future. More than on any other one thing thrift depends on imagination, the faculty by means of which all ideas are created including those which embody wants for the future.

A third requisite to thrift is will-power. Saving is a Marathon race in which many start but few finish and the reason is the same in both cases, namely, lack of staying power. Will-power, according to modern psychology, is the ability to keep an idea permanently in mind. Most people start out to save for something or other at one time or another but the failure of their savings actually to materialize is commonly due to the lack of permanence of their wants for future things which are ousted from their minds by the flow of new wants borne of the ever recurring present. The present is always with us, the future ever beyond. Saving necessititates the keeping of an idea permanently in the mind. It involves continuous concentration upon a single idea. Now a purpose of any kind to be retained in the mind in a dynamic state, requires to be fed just as a fire under a boiler must be fed or it ceases to generate sufficient power to produce action and finally dies out. The most com-

mon reason why men fail to achieve in saving and in the larger field of life itself is because they fail to maintain the desires on which all achievements depend for their motive power.

Finally, a definite plan of saving is a great aid. Here a number of institutions, savings banks, insurance companies, building and loan associations, fraternal organizations and clubs of various kinds perform a useful function in aiding would-be savers to save regularly according to some prearranged plan. The arrival of the baby bond and the installment plan of purchasing securities makes it possible for almost anyone who wills to save easily and systematically.

Of course, saving like every other virtue is capable of being carried to excess, but with human nature as it is, and in the face of statistics which indicate that 93 per cent of those reaching the age of seventy-five are dependent on work or charity for their support and 90 per cent of the population die intestate, there is little danger of erring on the side of thrift. He who saves not only confers a benefit on himself but on the nation which he assists by supplying it with capital for productive purposes. This lesson requires to be driven home for the sake of society at large and of the individual, whose interests in this case are parallel. It is no credit to the United States that it ranks as low as fifteenth among the nations in the percentage of savings accounts to population. The necessity and advantages of thrift should be taught in the schools but in the absence of this every man who is interested in getting along in the world should see to it himself that he is fully alive to the value of saving. The words of James J. Hill along this line are well worth quoting: "If you want to know whether you are destined to a success or not you can easily find out. The test is simple and infallible. Are you able to save money? If not drop out. You will lose. You may think not but you will lose as sure as fate for the seed of success is not in you."

## SOURCE OF THE DEMAND FOR LOANABLE CAPITAL FUNDS

In turning from the side of supply to that of demand in order to see the real forces that determine the interest rate it is also

well to emphasize the fact that the source of the demand for capital funds is the productivity of concrete capital goods. It is often said that "money breeds interest." This, of course, is true in a superficial sense, but as an explanation of the payment of interest it stops short of the main facts. The real reason that money is able to breed interest is because business men by means of it can secure buildings, machinery, materials, land and labor which under their management produce a greater amount of wealth than they originally cost. Out of this extra wealth interest is paid for the use of the money with which these productive capital goods were obtained. It is obvious that gold or dollar bills cannot grow corn or make shoes. But they do enable the farmer to procure the seed and the shoemaker the machinery by means of which they are able to produce corn and shoes. It is purchasing power which is borrowed and purchasing power that is returned, but it is out of the productivity of what is purchased that interest is paid. The true source of interest is thus the productivity of capital goods. The manner in which these aid production has already been explained.

In its broadest sense interest is the payment made for a loan of wealth. We have only spoken of wealth loaned for productive purposes. Money is often borrowed for public or private consumption. Governments, municipalities and private individuals borrow for the purpose of spending to satisfy present wants and are willing to pay back more than they borrowed. In olden times when most borrowing was for immediate use, arising out of the necessities or misfortunes of the borrowers whose urgency was often taken advantage of by unscrupulous money lenders as it still is today, the payment of interest was looked at askance and condemned by religion, law and public opinion. While the exaction of an exorbitant rate of interest is, of course, to be deplored, there is no just reason why a person who borrows the wealth of another and uses it for his own ends should not pay for that use. The reason of the prejudice against usury, as it was termed, apart from the aversion to the practice of extortion, was the failure to see the real source of the payment. It was money that was borrowed and money which was paid back; and as Aristotle long ago pointed out money cannot itself make

more money, hence there could be no legitimate reason why the lender should demand back more money than he loaned. The source of the service performed by the money borrowed is derived from that which is purchased with the money or to be strictly accurate the want it serves to satisfy. And the reason the borrower is anxious to borrow and willing to pay interest springs from the fact that his present needs are of a greater degree of intensity than those of the future. On account of this psychological fact, a stipulated sum of money in the present possesses greater utility than the same sum a year hence. $100 for present use is worth $105 a year hence. The $5 interest represents the difference between the utility of present use of the money and the estimate of its future utility. The loaning of money is a productive act in that it transfers wealth from the possession of one person to another to whom it has greater utility. This is especially true in the case of sickness or temporary misfortune where the need for present wealth is urgent and more enterprises of the sort recently established in New York on the Morris plan whereby needy people are able to borrow on their personal credit at a reasonable rate are to be desired. Part of commercial rent as already explained is in reality interest, being a return for the capital invested in the land in the form of houses or other improvements. In all cases whether the wealth loaned is applied to the production of future commodities or to satisfy the more pressing needs of the present, interest springs from the service the use of the loan confers on the borrower.

## THE RATE OF INTEREST

The rate of interest will be determined by the marginal cost of saving on the supply side and on the demand side by the marginal productivity of capital goods. A large amount of saving would take place without any payment of interest and it is perfectly conceivable that the surplus wealth of a nation might exceed that required. The interest rate in Great Britain toward the latter part of nineteenth century dropped for a time below 1 per cent. But as things are, some payment is necessary to induce a supply sufficient to satisfy the demand. The march of progress, invention and the extension of business enterprise,

not to speak of wars, which are agencies of destruction, all tend to increase the demand for capital. It is the marginal part of the supply that would be lacking if no payment were offered. A rate of interest just sufficient to induce this portion of the supply must be paid. With no inducement at all a large accumulation of wealth would take place. A rate of 2 per cent would increase the amount but not sufficient to supply existing need. To insure the quantity required a higher rate, say 4 per cent, must be paid. This payment is just sufficient to make it worth while for the marginal savers to save the extra quantity required. This rate constitutes the supply price of loanable capital.

The demand price will be determined by the least profitable use to which the supply can be put. Some business men will be willing to pay a high rate of interest on account of the productivity of their enterprises. Were the rate say 10 per cent, rather than go without they would willingly pay it. But the amount of capital demanded at this high rate would only find employment for a small portion of the existing supply. A rate of 6 per cent would increase the amount demanded by making it worth while for more concerns to borrow and others to borrow more. While a rate of 4 per cent would make the demand about equal to the supply. This rate on the demand side would be equivalent to the least profitable use made of the borrowed capital and represents the productivity of capital at the margin On the supply side it is equivalent to the marginal cost of saving Should the rate of interest go any higher, the supply of loanable capital will increase because of the extra inducement to save and at the same time the demand would fall off with the result that the rate will tend to fall. Should it fall below this equilibrium rate saving will be discouraged, enterprise stimulated and the rate would tend upward. Interest is the price paid for a loan of wealth and like any other price except that of land, it is based on marginal cost on the one hand and marginal utility on the other.

We have spoken of *the* rate of interest because there is a tendency toward a general rate. Capital differs from land or labor in its degree of mobility. The loanable capital of a nation and of the world for that matter exists as a fund of money and

credit which flows readily from one occupation or place to another. Competition on the one hand by business men in different industries and places for its use, and on the other hand by those who own or control it to obtain the highest rates for it tend to equalize interest rates of loans within a nation and even between different countries. This does not mean that all forms of loans bring exactly the same rate but there is a tendency for the same kind of loans in any one country and for some kinds in all countries to be nearly equal. Capital in the form of money flows toward the most profitable market. If the rate is higher in New York than in London loanable funds flow to New York and the increased supply there tends to lower the rate. The same is true of individual industries. If the earnings in one industry are greater than another, capital will be attracted to it. After a time the increased supply will lower the earnings and the rate of interest will fall toward the general lead.

Differences in the rate of interest are often due to other elements outside of pure interest which, strictly speaking, is the payment for the use of capital only. "Gross interest" may contain payments for management or storage as in the cost of pawnbrokers' loans, or for repairs and replacement as in the case of that part of commercial rent paid for improvements which as before stated is strictly interest. Risk exerts a great influence on interest. The greater the risk as a general rule the higher the rate of interest. This is a truth that investors, especially amateur investors, would do well to paste in their hats. Safety of the principal is the first consideration in investing; as high a rate of interest as possible the second. The reversal of this order often leads to the loss of both principal and interest. This, of course, is not always the case but often enough for the rule to stand. On account of safety the governments of the great nations, well known municipalities and railroads are able to borrow at a lower rate than industrial concerns. British "consuls" and United States bonds are as safe as is humanly possible. Municipalities seldom fail to meet their obligations. Railroads must run. This element of payment for risk is in effect compensation demanded by the lender on account of danger of loss to his principal. Distance also affects interest

rates. Those localities or small countries far from the capital centres must usually pay a higher rate of interest. Their enterprises may be just as safe in reality as those nearer home but they are not as well known and hence as a rule they must pay a higher rate to induce distant owners of capital to loan them their wealth. The same truth applies to small unknown enterprises which must often pay a higher rate to secure their funds than larger and better known concerns whose securities are listed on the big exchanges.

## TEST QUESTIONS

1. Distinguish between the supply of money and the supply of capital.
2. Name the different sources of new capital.
3. What are the factors on which saving depends?
4. What is the source of interest?
5. Why was interest condemned in ancient times?
6. Why is it justified today?
7. What determines the rate of interest?
8. Why is there a tendency toward a general rate of interest and not toward a general rate of wages?

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# CHAPTER XXIX

## PROFIT

### WHAT IS PROFIT?

We now come to the last and most elusive of the shares in distribution concerning which there is some difference of opinion. In its broadest sense profit is a complex form of income containing elements of any or all of the other forms, rent, wages and interest. It is the difference between the total expenses of an enterpriser or enterprise and receipts. The expenses of a business concern are the sums it pays for the other factors, land, labor, and capital; these sums constitute the incomes of these factors. When the concern hires or borrows the other factors the sums paid for their use stand out clearly as rent, interest and wages. But when the concern issuing its own land, labor or capital the returns to these factors become merged in its profits. The question is, are we to consider all of the balance of the joint product of industry retained by the owners of the enterprise as profit or shall we analyze it into its constituent parts and count as profit only that share not imputable to the other factors whether owned by the enterprise or not. And if we are able to distinguish a fourth share of income entirely separate from that of land, labor and capital, to what other factor is it to be attributed? Why should profit be paid? Has it any economic justification or is it merely an excrescence, a sort of overflow from the earnings of the other factors, illicitly retained by those who employ and thus exploit them?

In business practice that which is considered as profit varies. In the case of a tenant farmer, rent is an expense and will not be included in his profit, but he may fail to distinguish from the

balance of his receipts over expenses, separate payments of wages and interest for his own labor and capital. His profit will not include rent but might be held to comprise elements of wages and interest. If he owns his own land rent will also be included in his profits. Should he hire laborers, the wages of these will be part of his expenses but he will be likely to lump his own wages of management in with his profit. In the same manner a small storekeeper owning his property and using his own capital might count his total sales after deducting expenses, his profit. This is sometimes termed gross profit. Such a course is often grossly misleading, for his real profit is likely to be the Dutchman's 1 per cent or less; the tendency is to carry the analysis further and at any rate to distinguish rent and wages from profits and such a course seems not only good practice but sound theory. In partnerships, as Taussig instances, a distinction is sometimes made between interest and profit. From the net earnings there is first deducted an allowance for interest at the current rate for the capital used. Salaries for the active partner or partners are then paid out of the balance and the remainder is divided among the partners as profit. In the corporation form of organization the analysis of the different shares is fairly complete. A distinction is made between borrowed capital and that owned by the corporation. Interest on borrowed capital, as on bonds or notes, is an expense. The return on capital invested in the concern the actual value of which is hard to ascertain is included in profits, which are paid in the form of dividends. Labor, including the labor of management from foremen's wages to directors' fees are all regarded as expenses. Rent for hired land is of course an expense, but the practice of listing as an expense the rental value of land owned and used by the corporation varies, usually the profits of corporations contain traces of economic rent.

Whatever profit is or is not, one thing is clear; it is always the share paid to the enterpriser or owner of the enterprise. If we carry the analysis to the last ditch, after deducting from gross profit or net earnings the amounts imputable to land, labor and capital owned and used by the enterprise, we still have a residue which we may term pure profit. In practice, however, profit has

no such narrow meaning nor is there any reason in theory for so limiting it. If the business enterprise owns its own land or capital the returns imputable to these factors belong to it. A business organization is comprised of land, labor and capital; these factors become merged in it in a new entity and the returns likewise become merged into profit.

Just as economic rent is the share of the joint product paid to the owners of land, wages that paid to the laborer and interest that paid to the owner of capital, profit is the share paid to the owners of the business unit or organization for the part it plays in the production of the joint product. It is based on the productivity of organization as a separate factor in production, just as rent rests on the productivity of land, wages on that of labor and interest on the productivity of capital. The nature of organization and the function performed by it we have already explained. It is the structural unit, uniting the other factors into a producing concern. From the viewpoint of distribution profit is the share of the joint product assigned to it for the service it renders.

On the side of supply profit is the supply price of organization as interest is the supply price of capital. Capital comes into existence as a result of labor and saving, organization as a result of labor saving and enterprise. Just as the supply of capital depends directly on saving, that of organization depends on enterprise. Business enterprise involves responsibility and risk. This responsibility and risk will not be undertaken for nothing. Profit is its reward and furnishes the incentive necessary to enterprise. Men will not undertake the organization of business enterprises merely for wages and interest. The primary motive for business activity is profit. It is the great regulator of industry. If profits are high in any particular branch of business or at any period, enterprise is stimulated; if low it is discouraged. And under our present system of private enterprise with its attendant risks and responsibilities profit is as necessary as wages. Under a régime of Socialism with the state shouldering the full responsibility of enterprise, or if the millenium were to arrive, profit might be dispensed with, but in the world as it is profit is not only a justifiable but a necessary payment.

### THE UNCERTAINTY OF BUSINESS ENTERPRISE

The justification and necessity of profit lie largely in the risk and responsibility of business enterprise. Production takes place in anticipation of demand. The enterpriser or enterprise estimates the wants of the community and the prices it will be willing to pay. He then undertakes to satisfy those wants by uniting the other factors in such a manner as to produce the commodity or service at the estimated price. In so doing he employs the other factors, paying for them or contracting to pay them at stipulated rates usually in advance of the receipt of the price and often before he has knowledge of what that price will be. These contracted expenses he must pay. What is left over constitutes his profit. This may be large or small or even nil, according as his judgment has been correct or conditions over which he has no control may change. If he is able to sell at a higher price than he anticipated, his profits are large; but, on the other hand, should the demand be less than he anticipated, or fall off in the interim, he must be content with a small profit or even suffer a loss. When prices rise he is the first to feel the benefit; when they fall, the first to feel the shock. Indeed, if profit is the most alluring of the shares of distribution, it is surely the most volatile. Rent, wages and interest are more stable forms of income. The owners of the other factors know in advance what their shares will be. They have contractual claims on the joint product. The entrepreneur has none. On the contrary, should the price of the joint product fall below the claims of the others he must make these good out of his own pocket. The owners of the other factors prefer a certainty to an uncertainty, a smaller, perhaps, but a surer source of income. Rather than undertake the responsibility and risk of going into business for themselves they prefer to hire or loan their labor or capital to others for a fixed return. The entrepreneur shoulders the responsibility of the enterprise and assumes the burden of the risk. His share lies on the lap of the gods and, though it be the lion's share, like the lion he must take the chances of the chase.

Business risk of course varies. It is greater at some periods than others and in some businesses. At times of sudden change

as at the outbreak or close of a war or the approach of panic it is increased. Sudden changes bring in their train big profit and

Number of Business Failures in United States & Canada
from 1900-1919
United States Charted by Thousands. Canada by Hundreds.

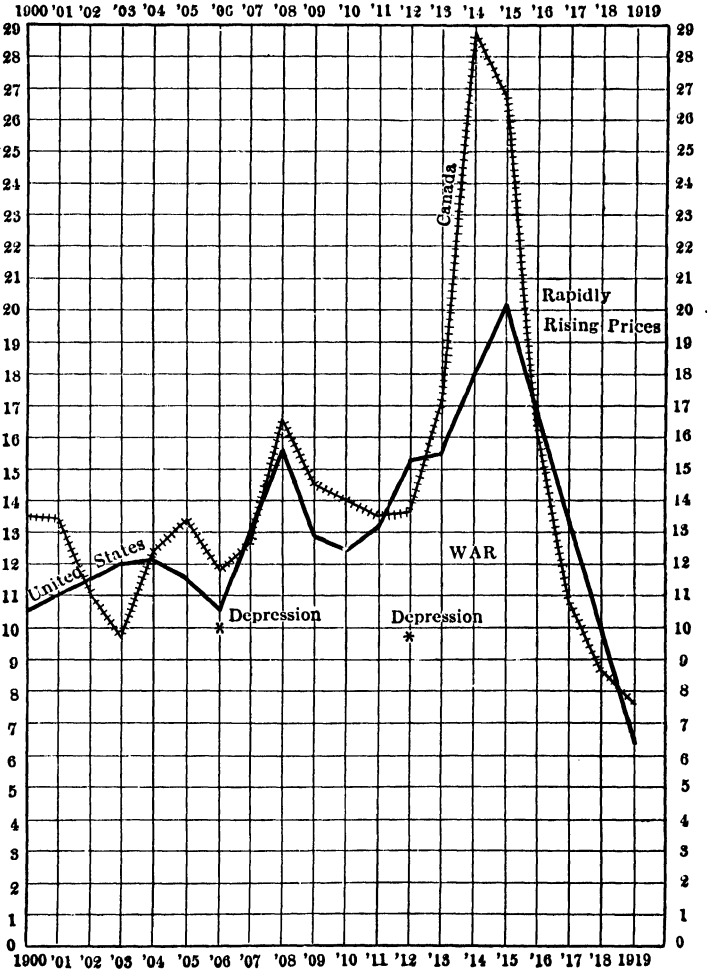



FIG. 23.

big losses. Fortunes are made and lost almost overnight. The accompanying chart which graphs the annual crop of business failures in the United States and Canada from 1900 on shows

at a glance the effect of change on the hazards of enterprise. Note the rise following a panic and how the line is tossed high in the air at the shock of war and how fast it recedes in the aftermath of rising prices. In periods of rapidly rising prices the risk is lessened by the raising of the margin between price and cost. In the recent war and post war period the margin was elevated to such an extent that the veriest tyro in business, however inefficient, made money, while the profits of many reached princely proportions. With the turn in the tide in 1920 this jovial state of affairs suddenly ceased. The tables were turned and it became as easy to lose as before to gain. As the level of prices fell it sank below the swollen costs of the previous period and in many places goods must be sold at a loss. As the margin narrows, costs must be reduced, a premium is again placed on efficiency. The salesman no longer loafs around the office hearing the prayers of importunate buyers but is hustled off on the road to sell and is soundly berated because he has grown "soft." The "easy money" disappears, the crop of failures increase, business again becomes business.

For new businesses or in new industries the risk is greater. A large percentage of new businesses fail. Accurate statistics are not available. It has been estimated that "nine of every ten corporations within ten years from the date of their formation have either dissolved, failed, reorganized or been swallowed up by other companies." Though it should be noted that the last two happenings by no means always denote loss. If we had mortality tables for business organizations without doubt they would favor those of human beings in showing a high death rate during the period of infancy. And there are good reasons why; a new enterprise faces many perils both from within and without,—fraudulent promotion, incompetency or inexperience, insufficient capital, unforeseen competition or inventions which may supersede its product. A new venture is always an uncertainty except in the ardent opinions of its organizers and promoters. In a new industry during the pioneer stage the hazard is usually high and failures and losses frequent. When the preliminary experimental stage is passed, when the ground has been cleared and the main thoroughfares marked out and the industry gets

its stride in the heyday of its youth, opportunities for making money are at their zenith. Such was the steel industry in the nineties, the rubber industry shortly after, and such is the moving picture industry today. Later on when it settles down into staid middle age, its possibilities realized, its methods standardized, the risks decrease and likewise the profits. In such an industry after competition has burnt itself out and the control falls into the hands of one large concern or a few who act together keeping up merely a show of competition, the risk is reduced to a minimum. Monopoly reduces the risk by virtue of its control over the conditions of supply or demand and the price and thus tends to entrench and often increase profit. Advertising, also, by reason of its control of demand lessens the risk. So, too, does the development of the science of organization and management which points out the causes of failure and makes known the principles governing the successful conduct of enterprises. But all this notwithstanding, as long as industry is left to private enterprise and as long as change continues in the world, and change is but the working out of progress, the conduct of business enterprise will involve risk and responsibility and unless human nature itself changes this risk will not be assumed for nothing.

In the light of this fact profit performs a most essential and useful function in industry. It is at one and the same time the alpha and omega of business activity; desire for it is the force that fires the spirit of enterprise; realization of it supplies the reward. It is the invisible current that motivates the whole machinery of our economic system. It is the instigator of new enterprises and the extender of old. No risks are too great for it, no obstacle too big, no sacrifice too much. Curtail it and enterprise is curtailed; increase it and business activity is stimulated; destroy it and the very force on which progress depends is destroyed.

## ENTERPRISE IN THE UNITED STATES

The growth and prosperity of the business organization of any nation depend on the enterprise of its people. On what then does

enterprise depend? The essence of enterprise is leadership. Those who undertake the risk and responsibility of launching and running a business require in a marked degree the qualities of leadership. There are of course many qualities that go to make up a leader, chief among which are energy, initiative, knowledge, including a knowledge of human nature, constructive imagination, confidence and courage, plus the practical faculty of getting things done. Any nation breeding men with these sterling qualities will never want for leaders in business or any other sphere of activity. The conditions of life in the United States especially in the early period of its history have been such as to foster these characteristics in a marked degree. The typical American may be eclipsed in the more cautious quality of saving by those of the older races but in enterprise he is second to none. No doubt the foundation for this faculty was laid in the pioneer days of colonial times and the first display of it was the desire to launch out as a separate nation, an undertaking that has been eminently successful. National character just as that of the individual is mightily influenced by early environment. And the cradling of this great nation took place amid surroundings that could hardly do aught else but foster the qualities of leadership and independence. The pioneer life of the early settlers with its unsettled conditions, its closeness to nature, its dangers, its freedom, lack of restraint, of conventions and standards, its riches of undeveloped resources waiting for the inventive genius of man; all invited enterprise. And the men who settled it responded to the call. Little wonder at this, for it was the pick of the old world, the adventurer, the liberty lover, the possessor of initiative and vision that sailed to its shores. Such a union of environment and human nature was bound to breed a race possessed of more than common enterprise. And the subsequent development of the country, its unparallelled rise in the space of a century to the richest among the nations of the earth, with an estimated wealth of $350,000,000,000 is its ample evidence.

There is no nation today where the spirit of enterprise burns more ardently than in the United States. In no other country is it so easily possible for any man to launch out for himself.

No other country has produced greater entrepreneurs, men with a higher genius for the organization of land, labor and capital into productive enterprises. Such men as Rockefeller in the oil industry, Hill and Harriman in transportation, Carnegie and Gary in the iron and steel industry, Bell and Vail in communication, Westinghouse and Steinmetz in the electrical field, Stone and Webster in water power development, Morgan in the realm of finance, these and scores of others less well known, are typical of the men this country has raised up from the ranks to take the lead in the organization of its industrial and commercial resources and of whom it may rightly be proud. It is true that these have not all been angels; their methods at times have been harsh, their personal gains by no means small. But business is not exactly a pink tea; at bottom it smacks more of the nature of a battle, as the inside history of almost any branch of industrial enterprise will reveal. These men are the conquerors, real heroes in their respective fields, leaders where leaders have been needed and if they have enriched themselves they have more enriched their country. Men of their caliber, men gifted with vision; men with the courage of their convictions, ready to shoulder the risk and responsibility of affairs, men endowed with genius for organization, able to mould the forces of industry into productive shape on the scale called for by modern methods of large scale production, and successfully direct the course of their giant concerns through the storms of competition and changing conditions which sweep every industry during its upbuilding, leaders of this type every new country needs and such men are not to be picked up on every street corner. Under the guidance of men of this type the American corporation as a master-form of enterprise has been developed to a high pitch of efficiency, the productivity of the country's land, labor, and capital has been increased, and its wealth enhanced. The famous ingenuity of the Yankee has nowhere been so signally displayed as in the field of business organization.

It may seem to some that freedom of enterprise in the States is unduly subject to governmental interference. This country has been unfavorably compared with Germany for instance, whose government, it is said, encourages and coöperates with business

while that of the States not only fails to give it the support it needs but seems bent on hampering it with unnecessary legal restrictions. This has appeared so at times, yet some restriction is needed in this country because of the intensely individualistic nature of its enterprise, because of its exceptional freedom, lest that freedom should develop into license, while on the contrary in Germany with its pre-war autocratic form of government there was little danger from this source, for the individual was entirely subservient to the government which dominated business in common with all other activities and the coöperation given as in the dye industry was usually to encourage the ulterior policies of the government. Such is the power of private enterprise in this country today that some control is needed. The corporate form of organization with its centralization of control facilitates the concentration of power into the hands of one or a few individuals. One, or several acting together on the executive committee of a big holding company might with ease control a whole industry, or a few men controlling big corporate interests by collusion might dominate several industries. There are men in the United States today who hold in the hollow of their hands more power over their fellows than ever did the feudal barons of old. The actual control over affairs exercised by some of these modern barons of business and the possibilities of power through modern forms of business organization are far from being realized by the general public. Though business and big business in particular is apt to chafe at any measure of regulation, it is conservatively evident considering the monopolistic nature of the powers exercised, that some regulation is for the general good. But whatever governmental control over private enterprise is exerted its purpose should be to regulate and not to restrict. Considering the important part played by enterprise in developing the resources of the nation and directing its business activities, to cripple it or even to hobble it with unnecessary legal restrictions would be detrimental to the welfare of the country. Any such control that results in preventing the organization or extension of business enterprises depresses business and not only lessens profits but reduces the other shares in the bargain.

In the field of business the call for leaders is as urgent today as ever and the opportunities are as great. In comparison with the old world this country is still undeveloped. In no other nation has it been so easily possible for any man to launch out for himself. In the race of the nations the United States has a flying start, with a national wealth estimated at $350,000,000,000, over $230,000,000,000 more than that of the United Kingdom. It has the raw materials; it is no longer handicapped for capital; it has the skilled and unskilled labor and as finely organized a body of going concerns as any nation in existence. With the advance of progress there are always new fields of enterprise opening up. The bulk of the large industries of the past have been tied down to the earth in the development of its denser materials; science and invention are opening up the realm of the air. Synthetic chemistry introduces still another field pregnant with profitable opportunities for private enterprise. Science and invention are the pioneers, the discoverers; enterprise follows hard at their heels, to make the possibilities they reveal realities for the use of all. Today science seems to be leading us across the threshold of a new era of industrial development,—an era that promises to be packed with opportunities for those who would steer the bolder course, who are willing and able to undertake the risk and responsibility of leadership, who have the vision to see, the brains to plan, and the ability to forge the factors of industry into productive shape.

## THE DIFFICULTY OF GAUGING PROFIT

Of all the shares of distribution profit is the most private. In the case of a competitive enterprise it is perfectly natural for the concern to wish to keep its profits to itself, and there are good reasons from a business standpoint why it should. In the case of a public utility company or a monopoly the wish to keep the extent of their profit strictly private is also natural; but there are excellent reasons why the profits of these concerns should be accurately gauged and available to the inspection of Federal or state commissions or other properly appointed persons. The desire for privacy in regard to profit by no means always springs from dishonest motives nor are expedients used to conceal profits

necessarily bad. But they make it extremely difficult to ascertain with any accuracy the extent of profits and often make it extremely easy to conceal profits for fraudulent purposes. Nominal profits are far from being real profits.

Overvaluation of purchases, undervaluation of inventories, excessive depreciation rates, charging capital goods to expense, watering of stock, are perhaps the most common devices used to conceal profit. Some of these, as inflated purchase prices of supplies, are plainly criminal, others such as the diversion of what otherwise would be profits into apparently excessive salaries or stock-watering, may or may not be justifiable expedients. In the case of a partnership it might be a matter of indifference whether the earnings were distributed in the form of profits or paid as salaries. In a close corporation it might make little difference except as a ruse to dodge the income tax. If, however, a clique gains control of a large corporation and uses the opportunity to pay themselves and their friends excessive salaries, it would be a filching of funds properly belonging to the other stockholders.

## STOCK-WATERING AND OVERCAPITALIZATION

Perhaps the most popular, at any rate the most widely known and condemned device for concealing corporation profits is stock-watering. The term is said to have originated from the practice of the old cattle men who in driving their herds to New York over the Jersey swamps fed them with salt; the thirsty kine then imbibed so much water on their way to market that their weight was materially increased. In reference to corporations, stock-watering consists in increasing capitalization by overvaluing present assets and issuing new securities based on this overvaluation; this lowers the dividend rate by spreading earnings of actual assets over a larger amount of outstanding stock. The ease with which excessive profits are concealed by this process is obvious. The same net earnings distributed over a larger capitalization mean a lower dividend rate. Suppose that after paying the usual 7 per cent on preferred, the balance of net earnings to be distributed among the holders of $1,000,000 common stock was $200,000, which represents a dividend rate of 20

per cent. The same net earnings distributed over $2,000,000 common stock would mean but a 10 per cent dividend. A going concern wishing to conceal unusually large earnings, may by a revaluation of its capital assets satisfy the proper authorities of its right to increase its capitalization, issue new securities, sell or distribute them among its stockholders in the form of a stock dividend. Its dividend rate thereafter on the increased capitalization will be but normal. In the case of a new corporation or a reorganization with large anticipated earnings the capitalization will be so adjusted as to permit the payment of dividends at the current rate. To go into details here would bring us into the realm of corporation finance, a most fascinating subject, for light on which the reader is referred to W. H. Walker's excellent and practical treatise.

Stock-watering is one method of overcapitalization. It is deliberate overcapitalization, and as such it is an evil practice. But it is doubtful whether all that is called stock-watering is in reality watering. In many cases the capitalization is but brought up to its proper figure. Take the classic example of the United States Steel Corporation, which is said to have been "watered" to the tune of $550,000,000. In this transaction $550,000,000 preferred and $550,000,000 common stock of the steel corporation plus $304,000,000 of its bonds were delivered to the promoting syndicate in exchange for the capital stock of the ten constituent steel companies, plus $25,000,000 in cash. The assumption is that the securities of the old companies represented the value of their capital assets and that the new corporation issued capital stock $550,000,000 in excess of the valuation of the properties of the old companies. The steel corporation claimed that the $550,000,000 represented the capitalized value of the economies made possible by the new corporation. The earnings of the corporation since have justified this claim. The new corporation was a more productive organization than were previously the ten old companies. The extra capital stock issued did not overvalue the productive power of the new corporation. It did mean tremendous profits to all those involved directly or indirectly in its organization. But those who conceived and carried out the reorganization created a tremendously efficient

production unit. Their profits were huge but so was the organization they brought into being.

One of the most prolific causes of stock-watering, real and supposed, is to obtain the profits of promotion. When a business is overcapitalized for this purpose through malice aforethought it is of course criminal. But the organization or reorganization of corporations is by no means a light task, often a colossal one, and those who are able to carry it out must be paid for it. And it is usually better that they should be paid in stock of the companies they aid in forming as this tends to fix responsibility where responsibility belongs, for a time at least. But whether paid in cash or stock the amount of their payment should be based on the cost of their exertions on the one side and the productivity of the organization they bring into being on the other. Both of these are difficult to estimate, productivity is a thing of the future. Both are apt to be overestimated through self-interest or optimism. Nevertheless the elimination of such profit or its too rigid curtailment would no doubt discourage the organization of new enterprises and lead to depression.

The capitalization of a corporation represents or should represent its value as a factor in production. There is a considerable difference in practice and a still greater disagreement in theory as to the basis on which the valuation of a corporation should take place. The four bases of valuation are: original cost of assets, cost of reproduction or replacement and earning power. There is a tendency in theory to base value on cost alone and disregard productivity. But the value of a corporation like that of a machine or a building depends not only on cost but also on productivity. No matter what a machine has cost, no matter how valuable the materials of which it is conducted, if it cannot be put to a productive use it is of little value. Similarly with a corporation, no matter how costly its assets, no matter what its land, buildings, equipment, materials, patents, trademarks, services entering into its construction have cost, it is of little value unless it is able to produce its commodity or service at a price that will bring at least a profit that will cover its cost of operation. The corporation itself, distinct from its constitu-

ent parts, has a value as a productive unit. In actual practice earning power is the basis of valuation and the business world is justified in taking it into consideration. The valuation of a corporation should rest on both cost and productivity. But whatever the basis of valuation it will always be a matter of very uncertain estimate. The value of the capital assets of a business, especially of its intangible assets, is a matter of conjecture. It is in connection with these intangible assets that overvaluation frequently occurs, yet they are often the most valuable. Moreover, the assets change rapidly, either appreciating or deteriorating. Even if the capitalization of a corporation is equivalent to the value of its assets at its inception there is no guarantee that they will remain so. Should they appreciate the concern will be undercapitalized; should they deteriorate it will be overcapitalized. Capitalization is thus a very elusive thing and it is difficult to tell whether watering has occurred or not. Fraudulent valuation is remarkably easy and overcapitalization is too common, as a glance at the quotations on the great exchanges show. The market price of a stock is generally speaking a pretty fair test of its value and the large number of stocks selling below par is an indication of the prevalence of overcapitalization. There is need for great conservatism. Better accounting methods, more publicity in regard to the details of promotion and organization of new enterprises and reorganizations, a more rigid governmental control in the issue of new securities, the removal of par value from common stock certificates, these will materially aid not only in preventing fraud but in reducing overcapitalization in general.

## TEST QUESTIONS

1. What is profit?
2. Why is the payment of profit essential in our economic system today?
3. What is the relation between risk and responsibility to profit?
4. What function does profit perform in industry?
5. Mention some of the qualities on which the entrepreneur's ability depends.
6. Name some of the expedients used to conceal profits.
7. What are the bases for the valuation of corporation assets?

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