

THE GROUNDWORK OF
ECONOMIC THEORY

THE GROUNDWORK OF ECONOMIC THEORY

BY

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PREFACE

THIS book is intended for students in the early stages of economic studies. No previous knowledge of economic theory is assumed and no better acquaintance with the economic world than is normally accessible to an intelligent observer of our complex society and to an interested reader of the many descriptive works which authors and publishers have made available.

I have had in mind the needs of serious students who do not shrink from the effort of sustained attention and systematic thought, and have sought to present with reasonable brevity the central propositions of modern economic theory which form the essential groundwork on which more realistic and more advanced work must be based. Some of this analysis is not easy, and it is often evaded in books for beginners by a deliberate vagueness of exposition. It is no doubt desirable not to bewilder the student with an over-elaboration of abstract analysis; nevertheless, it has been my experience that a complex analysis does not repel the student but is rather an exhilaration so long as the purpose of it is grasped and so long as it is related to its assumptions, its setting and its corollaries. I have, however, been less interested in spinning out all the threads of argument than in weaving the main strands into a broad pattern. The confusion of the beginner is due not so much to a failure to understand the individual propositions but rather to a failure to grasp their inter-relations and their coherence in a systematic body of theory. The student who derives the different propositions from the reading of a number of different specialised studies, each with its own assumptions and its own development, will usually experience some bewilderment and confusion of thought through failure to co-ordinate distinct lines of approach and to bridge unsuspected lacunae. This work

seeks to eliminate this difficulty, and in order to restrict the treatment to a length permitting a readier comprehension of the whole, I have frequently resorted to brief tabulation where the common sense or everyday experience of the student can readily fill in the details. Of course, it may be said that all economic reasoning is merely systematic common sense; but some is more obvious than the rest.

It will be objected that the treatment of the subject is abstract, "unreal,"—but so also are the theorems of Euclid, yet few will deny their relevance to the "real" concrete physical world. The economist is concerned to build up a coherent system of propositions which, though abstract and "unreal" in themselves, shall be none the less relevant to the social life of man. Scientific treatment is necessarily abstract.

It has throughout been my aim to provide, not indeed a substitute for the standard works on economics, but rather a short introduction and guide to their understanding and appreciation. The student cannot be too strongly warned that he can in no way be absolved from a patient study of the masterpieces of economic literature, to which I gratefully acknowledge my own indebtedness.

My wife has given me much valuable assistance both as a patient critic and as a diligent proof-reader.

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CHAPTER I

THE ECONOMIC SYSTEM

A. THE SUBJECT MATTER OF ECONOMICS

1. Economics is a science: its function is to define, to analyse and to trace the sequences of actions and events, not to pass judgment upon them.

2. Economics is most typically concerned with the activities of men living in communities: it is a social science. Often, however, it studies the behaviour of isolated man as forming a simple approach to the analysis of the behaviour of groups.

No study of group activities can be soundly based which does not start with the activities of the individuals who form the group, and the approach via the individual is typical of economic analysis.

3. It studies human behaviour in a particular aspect. It is not concerned with the properties of matter and force nor with the technology of the various arts and craft of except in so far as human beings, reacting to a particular set of circumstances, avail themselves of those knowledges, properties and of their command of technology to solve the special problems which interest the economist.

4. The aspects of human behaviour which interest the economist arise out of man's efforts to satisfy his wants. Human wants are the mainspring of human activity. These wants are unlimited: the "ends" of conduct are multiple. It is a characteristic of consciousness that as one want is satisfied, its urge weakens (temporarily) and other wants rise in consciousness to supplant it as the motive of activity. There is always an "unsatisfied fringe."

5. The means of satisfying wants vary in abundance. Some are unlimited in supply and everyone can satisfy the relevant wants, when, where and to whatever extent he

pleases, without restricting in any way the ability of others to satisfy their wants. No economic problems arise.

6. Most means of satisfying wants are, however, limited in amount: they are scarce in relation to the wants they can satisfy. Hence, a choice is imposed upon man: some wants must remain unsatisfied and many wants only partially satisfied. It is man's reactions to this situation which constitute the behaviour which an economist studies.

7. Furthermore: most means of satisfying wants have alternative uses. If each resource had only one possible use, the only choice necessary would be the simple one of use or non-use, and economic problems would scarcely emerge. But actually almost all resources have many uses, can be applied in different ways, directly and indirectly, to satisfying different wants. Hence further choices are imposed upon man: for what particular purpose and in what particular ways are the relatively scarce resources to be used? These are economic problems.

8. Thus, in a sense, economics is the Study of Scarcity: the study of the motives and reasons which determine human behaviour in utilising resources which are relatively scarce for the satisfaction of multiple human wants.

9. In another sense, economics is the Study of Wealth: in the sense that it studies human behaviour directed towards appropriating and producing wealth (i.e. scarce resources) and disposing of it to satisfy varied wants.

10. The essence of economic behaviour is the necessity of choice: between ends and between means; and every act of choice can be thought of as an act of exchange—the surrender of A for B. Hence it is sometimes called the Study of Exchange.

11. "Economics is the science which studies human behaviour as a relationship between ends and scarce means which have alternative uses." "The subject matter of Economics is essentially a relationship—a relationship between ends conceived as tendencies to conduct, on the one hand, and the technical and social environment on the other."¹

¹ L. Robbins: *The Nature and Significance of Economic Science* (Macmillan, 1931).

12. *Economic Problems and Technical Problems.*—It is necessary to distinguish between two types of problem:

(a) A Technical problem of doing something with maximum efficiency regardless of cost, i.e. disregarding the resulting scarcity of resources for satisfying other wants: the end is single and the means are multiple.

(b) An Economic problem of distributing scarce means among multiple ends: so that the whole range of wants is harmoniously considered.

Undue attention to technical optima generally results in economic waste, because it implies a disregard of the psychological phenomenon that people prefer to have many wants partially satisfied rather than to have one or two wants satiated and the rest starved.

If attention is concentrated on one particular human want then it is technically relatively simple to satisfy the whole world. When, however, the enormous number of human wants is considered, together with the relative scarcity of means available to satisfy them all, then the economic problem emerges of mediating between the two.

B. GOODS AND WEALTH

1. Any resource which can be used in the satisfaction of a want is said to have *Utility* and is called a *Good*.

Goods which are unlimited in supply are called *Free Goods*, and their application raises no economic problems.

Goods which are scarce relative to the wants which they are capable of satisfying are called *Economic Goods* or *Wealth*.

2. Economic goods cannot be defined in terms of their technical quality, coal so deep underground as to be inaccessible is not wealth. An increased technical output does not imply an increase of wealth, e.g. diamonds.

3. Economic goods must be defined with reference to time and space. Goods of the same technical kind at different places or available at different times, are not the same economic goods, e.g. strawberries at Christmas and at Midsummer.

4. Economic goods consist of:—

- (a) Material resources.
- (b) Other people's services.
- (c) One's own time.

If these are scarce in relation to ends, they can be regarded as economic goods.

5. Economic goods have utility. This implies that the good exists in a place and time such that it can perform the service of satisfying a want. Fundamentally, it is the service which has utility. To the hungry explorer in Central Africa, the existence of an orchard in Worcester brings little satisfaction. Strictly speaking, the present wealth of an individual consists of his ability, here and now, to utilise the services of men or things.

It is more obvious in the case of people that it is the services they perform which constitute wealth, and not the personal qualities which enable them to perform those services. A man cannot, at any given moment, choose to have or not to have any personal quality or capability, but he can choose whether he makes use of it, i.e. whether he employs his time performing any particular service.

6. *Relationships between Goods.*—Close relationships exist between goods and they can be divided into classes in many different ways as the point of view changes from which they are considered.

(a) Goods related as Substitutes, e.g. butter and margarine. Since all wants compete with one another in the focus of consciousness as the dominant motives to action, the goods which minister to those wants can also be considered as rivals, or substitutes for one another as objects of desire. Degrees of rivalry vary. Goods which satisfy the same or similar wants are close substitutes, while items of the same good are perfect substitutes—items existing in the same time and place.

Thus for any item of a good there exists a very wide range of more or less satisfactory substitutes; and causes which affect one good will also have effect on the whole range of substitutes.

(b) Goods related as Complements, e.g. pens and ink.

Some goods items are so closely linked as to be considered as one unit of invariable composition, e.g. the right and left glove of a pair. In other cases complementarity is more flexible, e.g. a house and its furniture. The fortunes of each item of such complementary groups are more or less closely bound up with the fortunes of the other items and a close interaction of mutual influence is inevitable.

↑ A degree of complementarity exists among goods which are associated together in one productive process, e.g. hammers and chisels; and any change affecting one of them will affect also the associated goods. Usually any one of such goods will have alternative uses, and the greater the range of alternatives the less significant will be any one complementary association;

(c) Specific and Non-Specific Goods. Specific goods are capable of serving only one end and are rare, e.g. an individual birth certificate. Practically all goods have some conceivable alternative uses, but in many cases the alternatives are so relatively insignificant as to be not worth consideration, e.g. the scrap value of a ship. The degree of specificity of any good is often very important, especially in times of change. As applied to workers, the distinction is the same as that between a specialist and a jack-of-all-trades, and is usually called Technical Mobility.

(d) Production Goods and Consumption Goods. A good which exists in a form and time and place such that it can directly satisfy a human want is called a Consumption Good. (Natural resources are not often of this kind but usually have to be submitted to some change of form or time or place. This process is called Production (of wealth). Any good which is employed in any stage of the productive process previous to the arrival of the consumption good into the hands of the final consumer is called a Production Good and is said to have indirect or derived utility.) Only consumption goods in the hands of final consumers have direct utility.

Note that the distinction between production and consumption goods is not technical; the same good may be

either, e.g. coal, which can be burnt in a factory boiler as a production good or in a household grate as a consumption good.

(e) Joint Products, e.g. wool and mutton. One productive process often turns out more than one product, e.g. wheat grains and straw. Where one product is primary the others are called by-products, e.g. cotton seed, linseed oil, and they may be merely waste. Often the proportions between joint products can be varied. Their fortunes are obviously closely linked.

C. WEALTH AND WELFARE

Welfare is a much wider term than wealth. Wealth consists of economic goods which satisfy wants and, from the economic point of view, all wants of an individual are relevant; it is not the function of the economist to pass judgment on their respective worth. Welfare is rather the economic circumstances conducive to happiness, and since ideas of happiness vary, an ethical judgment is involved and no opinion can be final or scientifically objective.

In considering welfare as distinct from wealth:

1. Free goods must be taken into account since they vary from place to place.

2. Internal wealth or personal qualities are relevant.

3. The health of individuals and their general environment are important not only because they affect productivity but also for their own sake as direct influences on the well-being of the individual. In this connection, collective wealth in the form of drainage systems, free medical services, public recreation grounds and so on, are important, and so is a sound legal system. These services are usually financed by taxation which reduces private incomes but which may be amply compensated by the increase of public welfare.

4. Generally speaking, an increase of produce per head is conducive to an increase of welfare, but the two do not always vary together:

(a) Labour may be excessive or disagreeable. A reduction of hours of work may reduce output but increase

welfare. The mode of employment of the leisure may be relevant.

(b) The distribution of the produce among the producers may not be optimum. It is reasonable to assume (but it cannot be proved) that gross inequalities of income result in less welfare than would the same total income more evenly shared out, hence a reduction of inequality may increase welfare even if produce per head is unchanged.

(c) The nature of the output and hence of the consumption must be considered. An increase of produce per head may be due to an expansion of output of goods generally considered harmful to welfare. In war-time, the vast expansion of war material may increase produce per head, yet welfare is reduced.

D. CONSUMPTION AND PRODUCTION

1. The process of satisfying a want is known as Consumption. Consumption does not necessarily imply the immediate destruction of the good consumed: to read a book and to wear a hat are forms of consumption. The goods which are the object of desire vary enormously in perishability: some can be used only once, perishing in the act of consumption, e.g. foodstuffs, but many can be used repeatedly and only slowly perish through usage and the passage of time.

2. Some human wants can be satisfied by goods in their natural state (e.g. air), and all the activity required is the act of consumption. Generally, however, some preliminary activity is required to transform the raw materials of nature into a form capable of satisfying a want: wheat is harvested and threshed, coal is brought to the surface, wine is made and stored until matured. This process is known as Production and consists typically of changing the form, place or time of natural resources. Note that production is not the creation of matter but the addition of utility (or rather the addition of value), the process of giving things the quality of being more suitable for satisfying wants.

Thus wants are satisfied by the consumption of goods which are produced by means of natural resources and human effort (which are known as Factors of Production).

3. *Goods and Services.*—In the typical case of production, human labour is applied to natural material resources, fashioning, combining, transporting, storing them into forms, places and times in which they can be directly applied to satisfying human wants. The human effort or labour-power becomes embodied in the transformed material article.

In a large and increasing proportion of cases, human effort is applied directly to the satisfaction of wants, e.g. the service of a hairdresser; of a transport worker. These direct services of workers only come into existence in the act of consumption, the economic good is the service which the worker performs and the customer consumes simultaneously.

Such economic goods cannot be produced beforehand and stored until required except in the sense that the education and training of workers competent to perform such services creates a potential source of supply.

This last distinction does not sharply separate all services from all material goods, since many material goods are extremely perishable and unfit for storage.

4. The processes of production thus involve the use of factors of production of various kinds. Modern methods are characterised by extreme division of labour; thus factors of production become more and more specialised to a narrow range of functions and the number of different kinds of factors consequently increases.

E. FACTORS OF PRODUCTION

1. Economic goods are of two kinds:

(a) Consumption goods: those which have direct utility, i.e. which exist in a form, time and place such that they are available for the direct satisfaction of a consumer.

(b) Production goods: those which have derived or

indirect utility, i.e. which are valued as a means to the end of obtaining consumption goods, namely:

- (i) Unfinished consumption goods.
- (ii) Plant and Equipment produced and established for the production of consumption goods.
- (iii) The simple resources, parts and raw materials which are to be assembled, fashioned and transformed into the more complex forms of goods.

Together with human labour these constitute the Factors of Production.

2. Factors of Production are thus the elements out of which and by means of which consumption goods are made available for consumers.

A strict classification into groups would limit each factor to a group of items homogeneous and interchangeable, and there would thus be a very large number of factors. This is necessary for some analytical purposes.

For many purposes, however, broader groupings are sufficient and various lines of demarcation are possible. The broadest grouping is into the two sections Human Work (or Labour) and Material Resources (or Capital).

3. *The Difficulty of Definition.*—In some discussions, the whole of productive activity is separated into two parts: the production of consumption goods and the production of production goods; and reference is made to the factors engaged in each part. In cases such as these it is evident that the writers are considering Plant and Equipment as ends of production rather than means, and are excluding them from the category of factors:

This illustrates a general difficulty: that no terminology or definition is inviolable. Different writers, and often the same writer in different discussions, will use terms with different shades of implication and diverse definitions. This is quite legitimate (often the inevitable consequence of the limitations of language and of the mutability of phenomena and institutions) so long as such usages are made clear and explicit. Failure to do so often causes confusion or betrays confusion of thought.

4. Labour.

(a) Activity and Labour. Not all human activity is a factor of production. "Labour" excludes the activity of consumption or the effort exerted directly or indirectly as play or pleasure. Labour is intended to produce value and comprises human effort undertaken in the expectation of (economic) reward. It may result in the production of a material or in the rendering of a service. Its volume depends not only on supply but also on efficiency.

(b) Peculiarities of Labour as a Factor of Production.

(i) Labour or labour-power is inseparable from the worker. Other factors can be used in production by others than their owners; not so labour. Hence workers retain a vital interest in "Conditions of Work." The "Mobility of Labour" also emerges as a special problem (see Chapter VIII, Section E).

(ii) Labour is perishable. Unless applied when and where required it is lost for ever. This effects the "bargaining power" of workers in the labour market: they have only limited possibility of holding out for a better price.

(iii) Producers and Consumers. Labour is a factor of production and, *ceteris paribus*, the greater the supply of labour the greater the output of produce. Labour, however, is rendered by workers, and workers are not only producers, they are also consumers among whom the output of production is shared. Hence they are interested not merely in total output but also in output per head.

An increase in total output secured by an increase in numbers of workers (e.g. immigrants) may be accompanied by a decrease in output per head. Again, an increase in total output secured by an increase in labour supply arising not from an expansion of the total population but from an increase of the numbers of working members (e.g. from an absorption of women and children) or from a lengthening of the hours of work, will also increase output per head but may diminish general welfare.

Consequently, there are special considerations affecting

the interests of labour which do not affect other factors of production, and there is room for much opposition of interests and for much dispute concerning correct criteria of policy.

(c) The Division of Productive Occupations:

(1) Industrial Occupations.

(a) Extractive Industries.

(i) Exploitative, e.g. mining.

(ii) Genetic, e.g. agriculture.

(b) Manufacturing Industries.

(2) Commercial Occupations.

(a) Transport Industries.

(b) Distributive Industries.

(c) Banking and Insurance.

(3) Public services and direct services to consumers.

5. *Kinds of Material Resources.*

(a) Natural Resources *in situ*, whose volume depends on:

(i) Nature of the soil and its mineral content.

(ii) Climate—suitability for human habitation and activity, and for animal and vegetable life.

(iii) Geographical area, division and relief—land and sea communications, water power, etc.

(b) Basic Materials.

(i) Raw Materials—natural products in their crude state.

(ii) Auxiliary Materials—fuels, manures, etc.

(c) Unfinished Goods.

(i) Goods in process, i.e. technically uncompleted.

(ii) Goods technically completed but commercially unripe, e.g. merchants' stocks, goods in transit, etc.

(d) Plant and Equipment—machines, transport systems: resources produced and accumulated for use in the production of wealth.

F. THE DIVISION OF LABOUR

I. It consists in subdividing a productive process into separate parts and concentrating specialised factors on particular tasks. Production is split up among industries, trades and professions, and workers into crafts and occupa-

tions; then further subdivision is made within each section, often to a minute degree.

2. The greater the division of labour the more complex becomes the problem of the co-ordination of parts and the co-operation of factors. A complex organisation is more easily dislocated and the consequences of dislocation more serious (e.g. unemployment). Hence the increasing importance of the technique of organisation and management, and the dominance of the entrepreneur—the specialised factor responsible for the organisation of production.

3. Division of labour is associated with the great extension of the use of machinery or specialised equipment. Subdivision of a process into simple components enables the simple operations to be taken over by mechanical devices. A vast range of invention has been directed towards this end. But the adoption of machine production does not automatically follow upon invention; only those machines are adopted which reduce costs of production per unit of output. Thus, where alternative factors, such as labour, are very cheap, relatively few machines are employed! Nevertheless, there has occurred a vast expansion of the demand for mechanical equipment.

4. The possibility of the division of labour is associated with the progress of invention and the use of machinery. It is also bound up with the size of the market for the product concerned. Invention may enable a process to be subdivided, and specialised factors to be concentrated on each operation; but if the demand for the products is not extensive, it may not be possible to keep these specialised factors regularly occupied for a normal working period, and so it may be uneconomic to employ them!

5. Division of Labour complicates the problem of Distribution. When the output of production is the result of the co-operation of a vast network of diverse factors, means have to be devised of distributing equitably the wealth produced as income-shares among the producers. Various methods exist or are advocated. This is known as the problem of Imputation—the imputing to each factor of the value of its contribution of productive service!

G. THE ENTREPRENEUR

1. So soon as production is carried on by the co-operation of different factors, the need emerges for a co-ordinating and controlling agency. This function of "organisation" is performed by the entrepreneur, who constitutes a separate factor of production, a special subdivision of labour.

While the entrepreneurial function is definite and indispensable, the precise mode of its exercise and the form of organisation through which it is displayed can vary very widely. The dominant system in Western industrialised countries is the so-called Capitalist. Much economic analysis is directed towards this system, but merely because it is dominant: there is no implication that it is the only possible nor that it is the best.

2. Under Capitalist organisation, the entrepreneur is supreme. He organises production by buying the services of other factors—purchasing or hiring material factors from their owners, paying wages or salaries to human factors. The claim of these other factors to a share of their joint output is usually completely discharged by the receipt of this agreed payment. The payments made to the factors of production to remunerate them (or their owners) for their productive contribution are known as Costs of Production.

The output is then the property of the entrepreneur who sells it on the market. His own remuneration (profits) consists of the difference between the sum of his payments to other factors and the receipts from the sale of the products. The difference may be negative (losses).

Since, however, the entrepreneur is an essential factor, he is entitled to a positive share of the products and will presumably cease to function if he does not receive a share. That remuneration which is just adequate to secure the continuance of the services of the entrepreneurs in any line of business is known as Normal Profits, and it is usual for total costs of production to be taken to include Normal Profits as well as payments to other factors.

3. Under this system payments to other factors are fixed by an agreement between the entrepreneur and each other

factor, and these are known as "contractual incomes." The earnings of the entrepreneur consist of the difference between total contractual incomes (total Other Costs) paid for a given output, and the total receipts from the sale of the output. The entrepreneur receives a "residual income" or Profits, which (since the Other Costs are paid out usually before the receipt of the proceeds of the sale) may, in any given period, be less than or greater than Normal Profits.

H. ECONOMIC ANALYSIS

Economic analysis seeks to reveal how men behave in particular situations typical of the real world, and how their behaviour will modify those situations. It bases itself upon the actions of individuals inferred from introspection or experience, and builds up theories of the conduct of men in communities.

The elements of the economic theorems which it builds up are derived by a process of abstraction inherent in all systematic thought. A precise set of relevant circumstances is postulated as data and it is inferred how an individual will behave when confronted with this situation in isolation; and in what ways the situation itself will be modified by the conduct of the individual; and what will be the characteristics of the equilibrium between the individual and the situation which will tend to be established. Starting from simple sets of data, it gradually adds complicating circumstances and builds up complex relationships between men and economic phenomena constituting imaginative "systems of equilibrium," real in the sense that they are typical of the actual world, but unreal in the sense that they are shorn of all features irrelevant to economic studies.

Economic analysis thus leads to the formulation of economic theories which are presented as typical or inevitable patterns of human activity in particular circumstances, with the assertion that if the particular data which have been theoretically postulated are actually present in any real situation, then one impulse of the individual concerned will be to act in the manner defined by the theory.

The patterns of human activity thus are presented as representing the reactions of men to some particular complex of economic circumstances. It is not asserted that the actions of men are governed by economic motives alone, but it *is* asserted that in so far as the set of economic data is one element in the situation, then the particular reaction which the theory has defined will be one tendency among the various impulses which do determine conduct.

These patterns of conduct thus serve as mental tools which enable the economist to recognise the fundamental elements and forces in a complex real situation, and to infer what tendencies to change are implicit in the situation and what consequent developments are probable.

CHAPTER II

THE THEORY OF VALUE

A. THE RÔLE OF VALUE

1. Consumption and Production are necessarily associated; individuals consume the goods which are produced; the productive system seeks to turn out goods which will give satisfaction to consumers.

It is possible to imagine a community in which producers are dominant and in which consumers have no direct voice in the control of the productive system. Alternatively, consumers may dictate to producers on what goods they are to devote their activities.

In most actual communities, producers and consumers are the same body of individuals, and this sharp division of authority does not exist. The distinction does, however, reveal itself: as when producers fail to turn out goods which consumers want; or as when consumers refuse to consume goods on which producers have devoted time and resources.

Ultimately, in any community, consumers must have the final word: they always retain the ultimate choice of refusing to consume any particular commodity. Since, moreover, the consumers of any one particular commodity may be quite distinct individuals from the producers of that commodity, it is evident that acute disharmonies may arise between production and consumption unless some system exists of keeping the two sets of individuals in touch with one another, or, in general terms, of harmonising the economic community in its dual aspect.

2. It is Value which constitutes the link; Value serves as a nervous system to the economic organism, transmitting messages to and fro between the consuming mouth and the producing hands. It is impossible to analyse realistically the organisation of the economic system without considering

values, since they indicate the incentives, guides and rewards which give motive, direction and justification to production.)

The productive system is not concerned, strictly speaking, with making things; and an association of factors which turns out a quantity of some particular article does not necessarily benefit mankind (or its own members) in proportion to the physical volume of its output. The productive system may be master in the sense that goods will not be forthcoming at all unless some producer takes positive action, but it is ultimately the servant of the consumers. Goods are not produced according to the caprice of producers, but because it is anticipated that people will want to consume those goods. To produce things which people do not want and cannot be taught or coaxed to want, is to produce things which cannot have value, and is just waste of time, materials and energy. Production is justified only if it creates value.

Hence it is necessary to examine closely what is meant by Value and to investigate how it permeates the whole economic system giving it meaning and direction.

B. MARGINAL UTILITY AND VALUE

1. *Utility and Value.*—The Utility of a good is its capacity to satisfy a want of a consumer. Utility is a subjective quality, the significance of a good to an individual which makes him desire it.

Value is a ratio: a relationship between goods. The value of one good is measured by the amount of other goods which people are prepared to give in exchange for it. Value is not an inherent quality of a good; it emerges only when an act of exchange is contemplated.

2. *The Paradox of Value.*—What is the connection between Utility and Value? To possess any value, a commodity must have utility: someone must desire the commodity and be prepared to give something in exchange for it. A commodity which has no utility can have no value.

It is the Paradox of Value that goods which have great utility often have little or no value (e.g. water).

3. *The Satisfaction of a Want.*—A want is satiable: as it is satisfied by the consumption of a good, its urge weakens temporarily and other wants rise to supplant it in the focus of consciousness. There is a constant ebb and flow of the urgency of different wants. Thus the significance to a consumer of any definite quantity of a good will depend upon the period of time during which that quantity will have to be consumed.

Hence, if we imagine a potential consumer weighing up in his mind how keenly he would enjoy consuming, in a definite period of time, different quantities of a particular good, it is apparent that his estimates of the amounts of satisfaction will not vary exactly in proportion to the quantities of the goods he contemplates himself as consuming. If his mind systematically reviews and compares the attractiveness of a range of quantities each greater by one unit than the preceding, that attractiveness will rise as the quantity increases but at a slower rate: as between any two quantities, the increase in satisfaction derived from consuming (in a particular period of time) the larger rather than the smaller will be less than proportional to the increase in quantity.

This is not a law of Economics, it is a characteristic of human physiology and consciousness.

4. *The Consumption of a Good.*—A good has alternative uses, it can minister with greater or less efficiency to a number of wants differing in urgency in the mind of the individual.

The range of uses to which an individual will put a good, and the quantity of his stock which he will devote to each use, will depend upon the total quantity at his disposal in the time considered.

Consider the consumption, in a fixed period, of a stock of water. A small stock would be reserved for drinking only. There will be a certain size of stock such that the individual will consider that a portion devoted to cooking would give more satisfaction than if used for additional drinking. If a still greater stock is available, still more will probably be used for drinking and cooking, but the individual

will also consider that a portion used for washing would give greater satisfaction than if otherwise consumed. And so on.

In any given limited period, each increment (or additional unit) of a particular good is less significant to the individual than its predecessors. An individual will grade in his mind the significances of the range of alternative uses of a good, and the more his stock is increased the less urgent will be the particular wants to which he will apply the additional amount; and so his urge to possess an additional unit will be less keen according as the number of units already possessed is greater.

5. *Diminishing Marginal Utility.*—The (Total) Utility of a certain stock of a good is the total satisfaction which an individual expects to derive from the consumption of that amount.

The Marginal Utility of a certain stock of a good is the gain in satisfaction which an individual estimates he would feel by the addition of one unit to the stock under consideration. More simply: Marginal Utility of x units is the difference between the Total Utility of x units and the Total Utility of (x plus 1) units.

The greater the stock of a good held by an individual, the greater (up to a point) will be its Total Utility to him but the less its Marginal Utility.

It is possible that the stock of a commodity might be so great that an increase would lessen its Total Utility: it would begin to encumber and become a nuisance. Its Marginal Utility would then be negative: the individual would gain satisfaction by getting rid of some units of the good.

6. *The Marginal Utility Theory of Value.*—Since Value is an exchange relationship between goods, it follows that Value must always refer to the value of a definite quantity of a commodity.

The Value of a given quantity of a particular commodity to an individual will depend upon its Marginal Utility to him.

Value is always unit value or marginal value. This resolves the Paradox of Value. That water has greater

utility than diamonds is a vague statement presumably referring to the total quantity in existence. The utility of the total amount in existence of many commodities must be infinite since human life would be impossible without them. This, however, is not necessarily in contradiction with the statement that one drop of water is less valuable than one small diamond. There are so many drops of water that its marginal utility is nil: any particular drop is insignificant, its loss would not be noticed.

C. THE PROCESS OF VALUATION AND EXCHANGE

1. The value of a certain amount of a good to an individual will depend upon its marginal utility to him.

2. The offer of other goods which an individual makes to secure possession of one unit of a particular good will depend upon the amount of the particular good which he already possesses. The greater is his existing stock, the less significant will be an additional unit and therefore the less of other goods will he be prepared to forgo in exchange for it.

3. If a quantity of a commodity is put up for exchange and he is asked to make an offer, the magnitude of his offer will not be proportional to the quantity for which he quotes. The attractiveness of a large quantity is not proportionally greater than the attractiveness of a smaller quantity' (it is assumed that the only reason for acquiring the commodity is to consume it). Hence if he quotes an offer per unit of the commodity he will offer less per unit for a larger than for a smaller stock. His valuation per unit will depend upon his estimate of the marginal significance of the total quantity under consideration, i.e. the quantity he quotes for plus the quantity of that good which he already possesses.

4. If an individual is offered an indefinite amount of a particular good at a fixed rate of exchange with the other goods he holds, how much will he acquire? For every unit he receives he must sacrifice the satisfaction to be derived from consuming the definite amount of other goods which he will have to give up. The more he acquires, the more of other goods must he give up. As he acquires more

of the particular commodity, the less will be its marginal significance; the more he gives up of other goods the greater will be the marginal significance of what remains to him. There will be (at that definite rate of exchange) some particular volume of exchange such that, if completed, the marginal utility of the new stock of the particular good will be equal to the marginal utility of the remaining stocks of the other goods (measured in units equal in exchange value); or at least the marginal utilities will be so close that to have acquired, by exchange at that rate, one unit more, would have reduced total utility: the utility of the extra unit gained would have been less than the utility of what was sacrificed for it.

5. *Prices and Demand.*—It is evident that the higher the rate of exchange per unit of the particular good (the higher the price), the more rapidly will the stock of other goods shrink as exchanges continue and so the more rapidly will their marginal utility rise. Hence the point of equilibrium will be more quickly reached. The higher the price the less quantity will the individual buy.

Similarly, the lower the fixed rate of exchange between the other commodities and one unit of the particular commodity, the more slowly will stocks of the other commodities fall as exchanges continue and the more slowly will their marginal significance rise. Hence a relatively large volume of exchange will be required to attain the point of equilibrium. The lower the price, the more will the individual buy.

D. THE SCALE OF PREFERENCES

The utility of a good always means its utility to an individual. Utilities of different goods or of different amounts of goods are compared in the mind of an individual who can distinguish which is the greater to him.

The Marginal Utility Theory of Value is based upon the assertion, as a characteristic of human consciousness, that each individual can compare the satisfactions which he anticipates he will derive from the consumption of different quantities of different commodities, and thus grades them

in a Scale of Preferences,' so that when confronted with any two alternatives he will know which he prefers at that particular moment. .

It is not implied that utilities can be measured, but only that they can be compared. Value does not measure utility, it is the outcome of a comparison of anticipated satisfactions in the mind of an individual. There is no unit of satisfaction or utility in terms of which measurement is possible.

It follows that the utility of a particular commodity to different individuals cannot be compared. The significance of an article to each individual is a state of mind, and states of mind are not measurable. In so far, of course, as the state of mind is a determinant of action (leading, for example, to the acceptance of a particular exchange-offer), the actions of individuals which are the outcome of their estimates of utility can be compared. In so far as the urge to possess an article leads an individual to make an offer of an amount of his possessions in exchange for that particular article, then comparison is possible of the values which different individuals place upon the particular good.

E. INDIVIDUAL WEALTH AND VALUE

The value of a unit of a particular commodity to an individual is measured by the amount of other goods he is prepared to give up in exchange for it.

These other goods have their own utility to him and the exchange contemplated involves the sacrifice of the satisfactions of the goods offered for the sake of gaining the satisfaction of the good acquired.

The utility of the other goods offered will depend upon the amount of them he possesses: the greater the amount, the less their marginal utility. Hence, the greater the amount of other goods he possesses, the less will be the sacrifice of satisfaction involved in giving up a definite portion of them. Hence, the greater the amount of his possessions, the greater the amount he will be prepared to offer for the unit of the particular good on the market.

Hence the value of a certain quantity of a particular good to an individual will also depend upon the amount of his total possessions.

This illustrates further the impossibility of comparing utility as between individuals. If two individuals make offers to acquire a certain article it does not follow that it has greater utility to the higher bidder. The higher bid may be merely the reflection of the greater wealth of the bidder and may involve a very small sacrifice of satisfaction.

F. EQUIMARGINAL SIGNIFICANCE

Consider the behaviour of an individual possessing a stock of one particular good and confronted with a market of dealers holding a variety of goods offered at fixed rates of exchange in terms of his own good.

Each exchange which he accepts will increase his stock of the good acquired and lower the stock of his original good: marginal utilities will change inversely. So long as the utility of the units of the good acquired is greater than that of the units of his own good sacrificed, exchange is advantageous. The aim of the individual will be to dispose most advantageously of his original stock, i.e. by exchanging portions to maximise the Total Utility of his possessions.

At the fixed ratios offered, some exchanges will be more attractive than others, i.e. a unit exchange (the unit may be of his own good or of the other good, depending on the mode of quotation of the rates) with each dealer would bring him varying gains of utility. He will choose the most attractive. Each exchange effected will change marginal utilities and will alter the degrees of attractiveness. He can be pictured as successively weighing up the possibilities and accepting in turn the most attractive exchange.

A time will come when no further exchange will attract him, i.e. the utility of the units of each good obtainable would not equal the utility of the units it cost. Moreover, if he has bought sensibly, no cross exchanges among the goods he has newly acquired would be advantageous.

This most advantageous holding which makes the Total

Utility of his possessions the maximum possible under the given conditions (fixed original stock and fixed rates of exchange) will be the point when his various possessions have Equimarginal Significance, which may be defined in two ways:

(a) His holdings of each good will be of such a magnitude that the marginal significance of each (the significance of one unit of each—the different goods have dissimilar units) will be proportional to their ratios of exchange. If the goods are arranged (mentally) in order of marginal significance, the order will reproduce the order of values in the market.

(b) His holdings of each good will be of such a magnitude that he considers that those small portions of each which are rated of equal value on the market are of equal utility to himself; and of greater utility than equivalent value-portions of any good he has not acquired.

G. SOME ASSUMPTIONS AND LIMITATIONS

I. *The Instability of the Scale of Preferences.*—The Scale of Preferences, which determines an individual's behaviour in an exchange situation, is not a stable and permanent scale. On the contrary, it is constantly varying. His behaviour is determined by that scale which is valid to him at the moment of exchange.

This is the explanation of some apparent contradictions of the Law of Diminishing Utility. It is alleged, for example, that the satisfaction derived from drug-taking increases with consumption. In this case, the wants of the individual are changing: the intensity of his craving is affected by habituation; hence his scale of preferences changes. Nevertheless, even to the drug addict, valuation takes place at a moment of time, and at any given time and place a scale of preferences will be valid which reflects the diminishing utility of each commodity as its characteristic quality. The process of evaluation remains unchanged even though the scale of preferences varies in detail from time to time. For any particular individual, in any given time and place

and set of circumstances, the marginal utility of a larger stock will be estimated at less than that of a smaller stock.

2. *The Divisibility of Commodities.*—The theoretical analysis of the operation of marginal valuation is based on the assumption that commodities are divisible into small units—so that, for example, a given stock of resources can be allocated with sufficient accuracy to achieve equimarginal significance. Many commodities, however, are not divisible into small units. In such cases, accuracy of adjustment being impossible, there will often be a relative excess or deficiency of such commodities, a ragged unevenness of the fringe of satisfactions.

Similar difficulties arise owing to artificial obstacles—the sale of commodities in customary or legal units, e.g. coal per hundredweight; or limitation of sales to definite hours, as by the Shops Hours Act.

The theoretical allocation must be taken as the ideal to which practice strives to approximate.

3. *Durable Commodities.*—The case of durable articles presents difficulties. It is a stream of satisfactions and anticipated satisfactions which consciousness evaluates, and the constituents of the stream are adjusted to secure equimarginal significance. In the case of a durable article, like a house, it is possible, by renting or hire, to compare a present stream of satisfactions from occupation or use, against a present stream of outgoings in the form of periodic payments. No difficulties arise since the comparisons are direct: satisfactions acquired from occupancy or use against satisfactions forgone by payments.

If, however, the article must be bought outright, a present payment (and sacrifice of alternatives) is being compared with a stream of future satisfactions. The buyer must estimate the probable duration of the article and the intensity of future satisfactions, and evaluate the present worth of the combination.

This involves a choice between present satisfactions and future satisfactions; the buyer is sacrificing present utility to be derived from alternative present purchases, for the sake of a conjectured stream of future satisfactions. The

ratio of exchange will be strongly influenced by the degree of uncertainty of the future and also by the supply of present wealth (since a relatively heavy sacrifice now will necessarily cut deeply into present Total Utility).

Of course, buyers are accustomed to this complex process because of the very great range of durability of everyday goods and the customary need of buying goods in anticipation of wants:—stocking the larder. Ratios of exchange are based upon evaluations which are normally forward-looking.

4. *Estimates and Satisfaction.*—In an exchange situation, conduct is based upon conjecture, probabilities, estimates. The buyer must imagine what will be the utility of the units of the commodity which he contemplates buying and must act upon estimates.

If the article in question is one which he is accustomed to buy and consume, these estimates will accurately reflect the actual satisfaction derived from consumption. But in the case of a commodity long disused or never before consumed, then mistaken estimates are common; having tested his estimates by consumption, the buyer may regret the bargain. Re-exchanges may partially undo the harm, but more often the regret can only influence the next occasion, and the scale of preferences will be adjusted in accordance with the lesson of experience. Nevertheless, the next exchange will again be based upon estimates, though this time more surely based.

In so far as these estimates are determinants of conduct (and it is the conduct of individuals in which economics is interested) it is the process of estimation and evaluation which is relevant, and not their accuracy.

5. *The Initial Distribution of Wealth.*—Scales of Preference and Values are strongly affected by the wealth or income of the consumer. All his values are affected if the wealth of the consumer changes. It is a commonplace of experience that a sudden increase of the wealth of an individual upsets the coherence of his scales of value and may lead him temporarily to absurdities of conduct and to crude irrationalities of valuation until experience has taught him to adjust his scale of preferences and to extend it to include

the new commodities now attainable, which his smaller income previously placed out of his command.

It follows that in the systematic analysis of the conduct of individuals living in a closely knit society, which forms the basis of economic study, it is convenient to assume that the individuals concerned have incomes of definite magnitude and moreover that their incomes have stood at those levels for sufficiently long to enable the consumers to attune their scheme of values to them and to remove the cruder irrationalities.

If, therefore, it is asserted at any point that a particular line of conduct will lead to the maximum benefit to the individuals concerned in a given situation (as when they adjust their holdings of goods on the principle of equi-marginal significance), this assertion must always be understood to refer only to that given situation, one of whose data is the initial wealth of the individuals. It is not implied that the benefit is the maximum conceivable under any circumstances, but only the maximum for those individuals with their given initial wealth and in those given conditions. There has been much misunderstanding of this point among both exponents and critics of equilibrium theory.

6. *The Rationality of Behaviour.*—It will be objected that the Theory of Value is based upon an analysis of human motive and behaviour which is highly abstract and unreal; that in fact this elaborate reasoning and deliberation is not the usual determinant of human behaviour.

It will readily be admitted that men often act foolishly and on impulse. Nevertheless, it must be noted that:

(a) Economics is concerned with analysing only certain relationships and forces, those which are the outcome of the limitation of the means available for satisfying human wants; and man's reactions to that particular situation. It is not denied that other types of situation and other types of forces also enter into human motives and affect human behaviour. A man may act in a manner which is foolish economically, and yet which may be sensible in view of all the circumstances. In so far, however, as the

economic force is real and present, it will exert its influence on behaviour even though not always a decisive influence; and so it is justifiable and necessary to analyse it.

(b) An impulsive act is never wholly divorced from an individual's previous experience nor from the set of his mind. It will occur most usually in a situation which is novel or unexpected, and will be akin rather to a decision taken in a situation where the data are not such as to make accurate anticipation or estimate possible, yet where circumstances demand that some decision be made and action taken.

(c) To the extent that a situation is familiar or that deliberation is possible, man acts rather rationally than irrationally; and the Theory of Value is based upon an analysis of the process of decision and of the determinants of conduct in situations where valuation and exchange are relevant/

CHAPTER III

THE THEORY OF MARKET PRICE

A. THE MARKET

1. Attention has been directed to the mental processes of an individual in an exchange situation, and to the behaviour which results therefrom. It is now necessary to examine how the actions of different individuals react upon one another, and how the different valuations which individuals place upon different quantities of different commodities are merged into uniform market valuations for each commodity when those individuals are associated together under certain conditions to form what is called a Market.

2. *The Market.*—A market is constituted when individuals (buyers and sellers) interested in the exchange of a group of commodities are in such close association that the commodities dealt in are equally available to all of them and that each individual is aware of the actions of all other individuals, and, in particular, of the prices which other individuals are quoting.

It is not necessary for any market to be located in a particular place. The close association may be via telephone and cable, and the commodities may be available via an efficient transport system.

When money is used, it is possible for a market to be established in a single commodity, i.e. exchanging money against the commodity.

3. *The Assumptions of the Market Analysis.*

(a) The supply of each commodity is fixed and known.

(b) The initial distribution of the supply of each commodity among the dealers is also known. Each individual has a definite volume of possessions at the beginning of the market and cannot alter it except by exchanges.

(c) The wants of the individuals remain unchanged

during the course of the market in the sense that the scale of preferences of each individual is unaffected by any consideration except the prices of the commodities in the market and his own exchange transactions.

(d) The market is isolated in time. All the commodities are bought and sold with reference only to their subsequent consumption and not with a view to any subsequent re-marketing and re-exchange.

(e) The market presented is thus simplified to facilitate analysis. Complications will be added later in turn, and a more realistic complex built up.

It can perhaps be pictured as a market in a primitive economy. A country of scattered population, with no permanent marketing centre, whose inhabitants, engaged in diverse occupations, assemble for one day per year at a convenient centre, each bringing his year's produce and hoping by exchanges to secure possession of those goods which he does not produce himself but which, if he can secure them on acceptable terms, he would like to have and consume during the coming year.

B. VALUES AND PRICES. THE USE OF MONEY

1. *Barter and Money*.—The processes of valuation and exchange hitherto discussed have been based upon a Barter System: the exchange of commodities for commodities and a direct comparison of their utilities in the mind of each potential consumer. Difficulties of exposition arise if we try to maintain this in analysing a market situation; moreover, such a barter market is rather unusual and unreal. It is tempting and usual to introduce the use of money. Some caution, however, is necessary.

Barter exchanges are very clumsy in practice. They require a double coincidence of wants and possessions: an individual who owns (say) potatoes and is willing to exchange some for some wool, cannot even have a chance to make his preferences effective unless he meets another individual who not only possesses wool but is also willing to exchange some for potatoes.

The efficiency of a market is greatly improved if a general agreement exists among dealers to quote exchange ratios in terms of some particular "third commodity" (the exchange of A against B is facilitated by quoting the value of each in terms of C), and still more if buyers and sellers are willing to give and receive quantities of this third commodity in all exchange transactions. This universal third commodity acting thus as a Unit of Account and Medium of Exchange is known as Money, and values quoted in money are known as Prices.

2. *The Nature of the Money.*—Two kinds of money, however, may be distinguished:

(a) *Commodity Money* has utility in itself, as distinct from its function as a money medium; it can be consumed and give direct satisfaction instead of being used as a medium of exchange.

(b) *Fiduciary (or Pure) Money* has no utility apart from its function as a money medium; its sole utility is derived from its services as money.

The possibility and characteristics of these kinds of money will be discussed in the Theory of Money. They are mentioned here merely to direct attention to the fact that, in a market such as we analyse at present, it is evident that only *Commodity Money* can be used. Since the market is considered in isolation, the transactions which take place must be considered as complete in themselves and uninfluenced by considerations of other or future markets and exchanges. *Fiduciary Money* would thus be unacceptable; since it has no utility except as money, it would become useless to each individual so soon as further exchanges no longer interest him, and thus, at least towards the end of the market, everyone would seek to get rid of all of it, and its utility would sink and it would cease to be an efficient money.

Commodity Money, however, would remain efficient and would be subject to the same exchange motives as other commodities: each dealer would endeavour to retain possession, at the close of the market, of just sufficient to give it equimarginal significance, in its direct uses, with all other commodities.

3. *The Value of the Money.*—One particular influence must be noticed. The money commodity, at least in the early stages of the market, would have a double utility: that of its direct use and that of its use as a medium of exchange. There might thus be a particular eagerness to secure possession of it to facilitate exchanges which would increase its value at first. This extra incentive would fade as more and more individuals achieved equilibrium with the market and ceased to be interested in exchanges and money. The equilibrium prices at the beginning of the market might thus be rather lower than those at the end of the market. This refinement of analysis will be disregarded in the subsequent argument.

4. To sum up: in the market about to be analysed it can be imagined that one commodity (say, grains of wheat) is used as the standard of value and medium of exchange; prices of all commodities are quoted in terms of grains of wheat. Thus the farmers who bring in the wheat to market may be considered the original buyers, and the craftsmen and others with their wares are the sellers. Of course, as each craftsman sells portions of his wares and secures wheat, he in turn may become a buyer of the wares of the other craftsmen.

C. THE INDIVIDUAL IN THE MARKET

1. The individual buyer has a definite volume of possessions, grains of wheat, and is confronted with a range of commodities each quoted in fixed prices (so many grains of wheat per unit).

In order to increase the total utility of his possessions he will buy quantities of different goods so long as the utility of the units he acquires is greater than the utility of the grains of wheat he hands over. He will cease exchanging when he has attained equimarginal significance of all his possessions (including wheat); and at that point the total utility of his wealth will be maximised (within the given conditions of price and initial wealth). His final stocks of each commodity will be of such a magnitude that, given

his scale of preferences, the relative utilities of a unit of each separate good are proportional to their market prices.

Alternatively expressed: his final stock of each different good will be of a magnitude such that, given his scale of preferences, he will anticipate equal satisfaction from the consumption of that amount of each good which is the value-equivalent at market prices of a definite (small) quantity of wheat (say, ten grains).

2. *An Alternative Formulation.*¹—The tastes of a consumer of given wealth, or his disposition towards the goods offered in the market, can be expressed as a series of potential buying schedules stating the number of units of a standard commodity (say, grains of wheat) which he would be prepared to forgo for different amounts of each of the goods offered for exchange. These ratios would express equivalences of anticipated satisfaction to be derived from consuming the particular amounts of the two goods compared, and the series of ratios between the different amounts of a good and the wheat grains can be called the Substitution Function for that good, from which can be deduced the Marginal Rate of Substitution between the good and the wheat corresponding to each conjectured holding of that good.

A consumer, therefore, with given tastes expressible as substitution functions for the commodities in the market (in terms of a standard commodity wheat) and confronted with a given system of market prices for each good, will maximise the benefit he can derive from an initial stock of wealth by buying, or obtaining by exchanges, that precise amount of each commodity which will result in the marginal rate of substitution of each commodity being in proportion to its market price.

3. Hence, given the individual's initial possessions and given the prices he encounters, he will buy (acquire by exchange) a definite amount of a certain number of commodities (and retain a certain amount of wheat).

Had his initial possessions been greater, he would no doubt have bought more and in greater variety (and probably

¹ See footnote to page 81.

retained more wheat for himself). ! Still more important: if the price of any one commodity had been appreciably higher, he would have bought less of that commodity; had the price been lower, he would have bought more of that commodity.

D. THE EQUILIBRIUM PRICE

1. The conclusions of the last section apply to every individual in the market. Given the initial distribution of possessions and given the prices quoted in the market, each individual will acquire a precise amount of each commodity; and hence the total amount of each commodity acquired by all individuals together will be of definite magnitude.

That total amount acquired by all individuals (i.e. possessed by them at the close of the market) cannot be more nor less than the total amount which was available at the beginning of the market. Therefore, in order that the market should be in equilibrium, it is necessary that the price which is fixed for each commodity should be at such a level that the total quantity which all individuals together desire to hold at that price will equal the total supply which is available in the market!

2. Thus it is evident that the prices which confront the individual buyer, and which he imagines are fixed by the seller, are in reality fixed by the play of market forces. The function of the seller of a particular commodity is to anticipate the demands of the buyers and to estimate at what price he will just be able to dispose of his stock (except for that portion which, given the price he can get, he would prefer to retain for his own consumption). The larger the total supply of that commodity on the market, *ceteris paribus*, the lower the price he can get for his own holdings; the smaller the total supply, the more, *ceteris paribus*, he can charge for his own wares.

If sellers fix too high a price, they will be left with more on their hands than they want for their own use. As soon as each seller realises this, he will lower his own price to ensure that it is not any of his own stock which will be

surplus; the movement will spread and price will fall towards equilibrium.

If the price is fixed initially too low, sellers will receive, if it is maintained, less in exchange than they could have got; buyers will be prepared to buy more than is available, and when each buyer perceives that someone is going to go short, he will offer a seller better terms (a higher price) in order to ensure that he, at least, gets what he wants; others will do likewise and price will rise towards equilibrium.

3. The Equilibrium Price is that price which equates the demand for a commodity with the supply available. Other things being equal, the greater the supply of any commodity which is available, the lower will be the equilibrium price. The less the available supply of any commodity, the higher will be its equilibrium price.

4. It is interesting to note one corollary which will be relevant to the Theory of Money. The value of the wheat on the market will also be influenced by the volume of its supply. The larger the supply, *ceteris paribus*, the less will one unit be worth. That is, if the supply of wheat were larger, the holders of it would have to give more units of wheat for a unit of another commodity, i.e. prices would be higher. The higher level of market prices would be the reflection of the lower value of wheat units. Similarly, the smaller the supply of wheat, assuming everything else unchanged, the lower would be the general level of prices.

E. THE EQUILIBRIUM OF THE MARKET

I. We have seen that the market price of a commodity is influenced by:

- (a) The scales of preference of the individuals.
- (b) The supply of the commodity on the market.
- (c) The total supplies of all commodities and their distribution among individual owners.

It is necessary to note two additional influences:

- (d) The price of possible substitutes and complements.
- (e) The prices of all other commodities on the market.

2. *The Influence of Substitutes and of Complementary Goods.*—The supply of possible substitutes and hence their price will affect the price obtainable for any prime commodity. For, if two markets be compared which are identical in all respects except that in one a substitute for a prime commodity is present in greater abundance than in the other, then, since the substitute will be cheaper in the first market (being more abundant), it follows that the prime commodity will also be cheaper. The cheapness of the substitute will make it more attractive and will tempt buyers to acquire more of it and less of the prime commodity. This will mean a lowering of the place of the prime commodity in the scales of preference of individuals, and sellers will have to fix a lower price in order to dispose of it.

Similarly for complementary goods: if their supplies on the market are in different proportions from those usual in consumption, then the relatively deficient complement may realise a very high price and the relatively surplus complement a very low price.

3. *The Influence of Other Prices.*—Similarly it can be shown that the price of any one commodity will be affected (though in varying degrees of remoteness) by the price of every other commodity in the market.

Apart from the fact that there is a very wide degree of substitution of commodities possible, and therefore that commodity prices are influenced to a greater or less degree by the prices of other commodities which are better or worse substitutes, it is also to be noticed that every exchange an individual completes (every purchase he makes) is presumably only the most attractive at the moment among a wide range of alternative exchanges presented by every other commodity in the market. Had any one of these alternatives been otherwise (e.g. more attractive because of a lower price), this particular exchange might have had a different appeal. Furthermore, the more cheaply he can secure what is higher on his scale of preferences, the more resources he has left to buy other things lower down on the scale and the more widely he can spread his purchases (e.g. if a family can buy food more cheaply it may afford to buy more clothing).

Thus it can be seen that all the prices in a market form an interrelated system and the concept of Market Equilibrium is very complex.

4. *The Removal of the Assumptions.*—At the beginning of this chapter four assumptions of the market analysis were stated.

The first assumption of fixed supplies is important to remember. It implies that the amounts of each commodity cannot alter during the course of the market. If the market were a continuous one and the daily supplies could alter in response to the influence of the prices obtainable in the market, a more complex situation would arise which will be analysed in the next chapter.

The second and third assumptions are merely conditions imposed by the necessity to make the problem precise. To remove them adds complexities which do not alter the nature of the problem. If individuals received or gave presents during the market, that is, altered their holdings without an exchange transaction, or if their tastes changed (say, as a result of reading a persuasive advertisement), then their scales of preference would alter. The new equilibrium would be different from what it would otherwise have been, but it would be arrived at by the same process.

The results of removing the fourth assumption of an isolated market (but without removing the first assumption) can be considered immediately.

F. THE CONTINUOUS MARKET

I. Consider the case of a market which exists from day to day, dealing in goods which are non-perishable and storable at little or no expense, so that they can be held over from day to day: the market is thus dealing with a flow of goods, not a stock. Note, however, that the daily supply arriving on the market is still fixed in the sense that if it alters it is due either to the carry-over of stocks or to changes which are not a reaction from the market prices themselves (that would involve the first assumption)—the changes in supply arise from extraneous causes, they are exogenous changes.

2. (There are two kinds of change in an economic system: endogenous changes which are the results of the working of the system itself, the actual pull and strain of the economic forces as they settle down into that complex state of balance we call equilibrium; and exogenous changes which come from "outside," accidental or spontaneous changes such as those due to the changes of the weather.)

3. *A Stable Flow.*—If the flow of goods is stable and known to be so, the same amount of each commodity per day, equilibrium will be unaffected, i.e. prices and quantities will be as in the isolated market. If a seller holds a quantity of any commodity off the market on any day, today's price will rise and his rivals will gain. Tomorrow's price will fall when the reluctant seller unloads his carry-over, and he will receive less per unit than if he had sold his full supplies each day. Similarly, if a buyer postpones purchases until tomorrow, today's price will fall, but tomorrow's will rise and the originator of the fluctuation will suffer.

4. *Known Fluctuations of Supplies.*—If the flow of goods is irregular but the changes are foreseen: suppose a reduction in supply is expected tomorrow. Sellers will hold over some stocks to secure tomorrow's higher price; buyers will seek to buy more today in order to secure tomorrow's needs at lower prices. Hence today's prices will be higher than they would otherwise have been and tomorrow's will be lower. If the situation is understood and the change in supplies correctly anticipated, the result will be a levelling of prices today and tomorrow. Anticipatory market dealings will counteract the irregularity of flow.

5. *Uncertain Fluctuations of Supplies.*—Suppose the flow of goods is changing but uncertainly.

The equilibrium price of a good will be known only when the market opens and the volume of supply is ascertained. It will vary from day to day as supplies change. Speculation will intervene to counteract the changes.

Suppose tomorrow's supply is expected, by everyone except one dealer, to equal today's supply. If that dealer anticipates a fall in supply (a rise in price tomorrow) he will

enter the market as a buyer—an additional buyer seeking to secure a stock, not to consume, but to hold over to sell at tomorrow's higher price. His intervention will raise today's price to an extent depending upon the importance of his dealings. If his anticipations are correct, tomorrow's short supply will be augmented by the speculative supply he now unloads. Hence tomorrow's price will be lower than otherwise it would have been. The operations of the speculator will lessen the fluctuations of price. His gains are the reward for this service.

This same result will follow if many speculators operate so long as the correct forecasters outweigh the inefficient; as will be usual, since inefficient speculation is expensive and disheartening.

6. *Marginal Rates of Substitution.*—A continuous market is the typical market of the real world and the wealth of individuals is characteristically represented by a flow of income expressed in money terms. If we assume stable conditions, including a reasonable stability of the prices of the various commodities dealt in, then the consumer will have acquired some definite idea of potential satisfaction derivable from spending a unit of money. His substitution function for each commodity can then be expressed in terms of money units. His real income will consist of a flow of satisfactions derived from consuming streams of different commodities per unit of time. The Marginal Rate of Substitution of a commodity will reflect the rate of change of satisfaction as the flow of that commodity changes in magnitude per unit of time: rate of change of total satisfaction per unit change of flow of commodities.

G. ELASTICITY OF DIRECT DEMAND

1. It has been shown that as price falls, more is demanded; as price rises, less is demanded. The relationship between price changes and changes in the quantity demanded by consumers (individually or in a market) has been standardised in terms of Elasticity of Demand.

2. If a small change in price causes a proportionately

equal (and opposite) change in the quantity demanded, elasticity of demand is said to be unity.

If a small change in price causes a more than proportionate change in quantity demanded, then demand is said to be elastic.

If a small change in price causes a less than proportionate change in quantity demanded, then demand is said to be inelastic.

3. It follows that:

When elasticity of demand is unity, small changes in price cause no change in the total market outlay on the commodity.

If demand is elastic, a rise in price causes less total outlay and a fall in price causes more total outlay to be spent on the commodity.

If demand is inelastic, a rise in price causes more total outlay and a fall in price causes less total outlay to be spent on the commodity.

4. In order to dispose of a given increase in the customary supply of a commodity, sellers will need to lower prices only a little if the demand is elastic; but will have to lower prices substantially if demand is inelastic.

In the elastic case they will obtain greater total receipts from selling the increased supply; in the inelastic case they will obtain less total receipts from selling the increased supply.

5. In order to secure a share of a commodity whose market supply has shrunk below normal, buyers will offer only a little higher price if their demand is elastic; but if their demand is inelastic their anxiety to maintain their customary rates of consumption will lead them to offer substantially higher prices, and they will be prepared to pay a larger total sum for the smaller quantity available than they did for the old quantity.

6. The concept of elasticity of demand is very important, but it must always be understood to refer to elasticity at a given price level, and can refer only to small changes in price. Little useful can be said or predicted about the effects of large changes in prices.

7. The demand for a commodity will be elastic:

(a) If there are many and good substitutes. A rise in price will cause consumers to transfer to a substitute; a fall in price will cause consumers to abandon a substitute in favour of the given commodity.

(b) If the article is a luxury good, satisfying no deep urge. Social display is often a powerful motive, but it can be satisfied in alternative ways.

(c) If the price is high relatively to the income of the consumer. To purchase it will make rather big inroads into income, and the consumer will weigh up more carefully possible alternatives. It follows also that elasticity may be different among different income groups of the consumers.

(d) If the good is non-specific or not merely a complement to another good; a wide range of alternative uses will cause its market to widen rapidly as price falls.

(e) If it is a durable good, giving service over a period of time and so permitting a flexible choice of the moment of replacement. A rise in price will cause postponement of the replacement. This will affect short period elasticity.

8. *An Exogenous Change in Supply.*

(a) If now the supply of one commodity changes through outside influences (such as the weather) what will be the effect on the equilibrium of the market?

The effect on the price of that commodity will depend upon its elasticity of demand at the ruling price.

The alteration in this one price will disturb the whole equilibrium system since marginal rates of substitution (or marginal utility) of the different commodities to each consumer will no longer be in proportion to the new price scheme. In particular, of course, the demand for and the prices of substitutes and complements will be affected.

(b) Another important line of analysis must be considered. If supply increases and demand is elastic, sellers will receive greater total receipts and so have more to spend; buyers as a whole will have spent more on this commodity and will have less to spend on other com-

modities. It is improbable that the commodities on which buyers now spend less will be the same exactly as the commodities on which the sellers direct their surplus gains; this being so, the repercussions on the other commodity exchanges will be complex. Since, moreover, the elasticities of demand of the other commodities will also be various, the precise result on the prices of other commodities will be uneven.

Similar lines of reasoning can be applied to the case of inelastic demand, and to the analysis of the result of a decrease in supply. What is important to notice is that theoretically every price in the market may be affected by the change in rate of supply of one commodity!

H. THE MONOPOLY OF A CONSUMPTION GOOD

1. The receipts from the sale of a good depend upon the quantity of the good sold and upon the price per unit obtained.

With consumers of definite tastes, it has been seen that the higher the price the less quantity will be bought, and the lower the price the greater the quantity bought.

2. Under competitive conditions the total quantity available is sold, because each seller acts independently. Although price would rise if the quantity thrown on the market were diminished, it is not in the interest of any one seller to hold off: the effect of a diminution brought about by the action of one seller would be small and would not compensate the individual for the loss of receipts from the unsold portion.

If, however, all the sellers acted in co-operation, or if the whole quantity were controlled by one seller, then monopoly conditions would prevail and so the possibilities would change.

3. The examination of elasticity of demand showed that the relationship between prices and quantities is not uniform:

(a) If demand is of unit elasticity, changes of prices and quantities compensate each other; the total amount

spent on the commodity by consumers is the same irrespective of (small) changes in price.

(b) If demand is elastic, a rise in price causes consumers as a whole to spend less on the commodity and a fall in price causes them to spend more.

(c) If demand is inelastic, then a rise in price is followed by an increase in the total expenditure on the commodity and a fall in price by a decrease.

4. From the point of view of a monopolist seller, total receipts from sale of product are more important than price per unit or than the quantity sold. Two lines of action are open to the monopolist:

(a) He may place on the market less than the quantity available and secure a market price higher than in competitive equilibrium.

(b) He may fix market price arbitrarily higher than the equilibrium price, and sell the quantity that consumers will demand at that price.

It is important to note that these alternatives are mutually exclusive: the monopolist may either fix the price or fix the quantity; he cannot do both since he cannot dictate the reactions of consumers, which depend upon their scales of preference.

5. The possibility of gain from monopolistic action will depend upon the elasticity of demand for the commodity:

(a) If demand is of unit elasticity, no gain can be derived from monopolistic control of sales.

(b) If demand is elastic, it will be in the interests of the monopolist to sell all the quantity available. To fix a market price higher than equilibrium, or to sell less than the total quantity available, would in either case diminish total receipts.

(c) Hence the possibility of monopolistic gain is limited to the sale of commodities for which the demand is inelastic. In this case, since to raise prices above equilibrium, or to limit the quantity marketed, will increase total receipts of the seller, there will be an incentive to form combinations of sellers to secure these monopolistic gains.

J. MONEY IN A CONTINUOUS MARKET

1. In a continuous market such as this, there would be a continuous succession of exchanges and so a steady demand for money. Hence the commodity which was used for money would retain a premium: an extra attractiveness due to its use as money in addition to its use for direct consumption.

2. *Money as a Store of Value.*—A new function of money would augment this attractiveness. Since supplies of commodities might fluctuate through exogenous reasons, it might become desirable to store wealth to even out the flow. This storage function might be taken over by specialists, while other people would perhaps find it more convenient to store only the commodity used as money. Even if supplies of goods were relatively stable, money might still be stored. Since the flow of an individual's own productions (his source of income) might not coincide with the ebb and flow of his wants, he might on any one day be in a position to acquire more goods by exchange than he desired to consume. He might then find it convenient to complete only half the exchange: to sell his produce for money and to hold some of the money until convenient to re-exchange for goods to consume. This use of money as a Store of Value would cause complex reactions on the equilibrium of the market.

3. *The Use of Fiduciary Money.*—A further point emerges. In such a market it is conceivable that fiduciary money be used. Since the demand for money is continuous, money will always retain its value and be desirable to hold. It may be discovered that fiduciary money is more efficient than commodity money, partly because it can be made in a form more convenient to handle and store (paper money), but also for another reason.

Since it is possible in a continuous market for the flow of supplies of a commodity to fluctuate, it is possible that the supplies of commodity money may fluctuate: a good harvest may increase the supply of wheat (and vice versa). This will cause prices in the market to fluctuate; and if

fluctuations of the commodity money are frequent, the resulting dislocations may be very injurious. One remedy will be to adopt as money a commodity whose fluctuations of quantity are infrequent and small (e.g. gold). Another is to use a fiduciary money whose supply can be regulated according to circumstances, and the market may gain in efficiency.

CHAPTER IV

A SIMPLE PRODUCTION SYSTEM

A. THE ANALYSIS OF PRODUCTION

We have analysed the process of valuation and the Equilibrium of the Market on the assumption that the rate of supply of each commodity was fixed. Some consideration was given to possible changes in supply but only those which arose from causes outside the system, exogenous changes in data. It is necessary now to consider how the prices obtained on the market will themselves affect the rates of supplies of commodities.

The supplies of commodities originate as the result of productive activities; goods are the output of factors of production which combine their services in particular lines of production. Production is carried on in the expectation of receiving a reward. A producer will usually concentrate on performing one particular service, but he expects eventually to be able to claim a share of the output of a variety of commodities.

The whole process is complex and, in the real world, bewildering in its diversity. To equip the mind for the task of analysis, we shall be concerned primarily with building up a mental concept of the main elements of the system; we shall pick out what seem to be the major influences at work, trace out the paths along which they make their presence felt and show how the whole is closely interwoven into patterns of human behaviour which can serve in the appropriate circumstances as norms by reference to which the mind can apply itself to economic analysis.

We shall build up various concepts of Equilibrium, each a working model, so to speak, of an economic system which would exist (and run smoothly without any tendency to change) in certain simplified conditions. The Equilibrium of the Market was the first of these.

Proceeding by stages, we shall first analyse a simple productive system in which there is only one factor of production to be considered, the labour factor; all others are so abundant that they are Free Goods. This will reveal certain simple characteristics of the economic system and so lead up to the consideration of the complexities of Joint Production by different factors.

Furthermore, we shall develop the argument by first assuming that the total supply of each factor is fixed: the amount of each factor engaged in producing any one commodity can indeed vary, and so the rate of supply of each commodity on to the market is flexible; but any increase in the amount of one factor engaged in any one line of production must be counterbalanced by a corresponding decrease of the amount of that factor engaged in other lines of production. This will be seen to imply that, under these conditions, an increase in the supply of any consumption good coming on to the market (apart from variations due to exogenous changes of data) will entail a contraction of the supply of some other consumption goods, i.e. in order to secure more of one good, it is necessary to have less of some others: real costs are alternatives forgone. It will later be necessary to examine the possibility of changing the total supply of factors; and to consider what modifications of the theoretical conclusions are imposed by this possibility.

B. SIMPLE PRODUCTION WITH ONE FACTOR

1. In this simple production system it is assumed that all factors are free goods except labour. Production is carried on by craftsmen and peasants who, by a process of simple division of labour, each produce one commodity and bring it to market, as pictured in the Commodity Market.

In order to appreciate the fundamental tendencies first, we make temporary assumptions so as to make precise the condition that the total supply of factors per unit of time is fixed, namely:

- 1 (a) Each worker is of equal efficiency in each task.
- (b) There is a fixed number of workers.
- (c) They work with equal and unchanging intensity for a fixed number of hours per day.
- (d) They are freely mobile, technically and geographically, i.e. they can readily transfer from the production of one good to the production of another.

2. The producers bring their commodities to the market and sell them at market prices. Note that the expectations of the producers have no influence on these prices, but only the tastes of the consumers and the supplies of the various commodities. The earnings of a producer depend upon his particular output and on the market price which the whole supply of that commodity realises. If now a producer discovers that his produce sells at such a price that his income (measured ultimately by the amount of commodities he receives in exchange) is inadequate or below expectations, what courses are open to him? We eliminate, for the time being, the possibility that he may work more or less, since that is ruled out by the major assumption of fixed factor supply.

He brought to market an output of goods whose volume depended upon the number of hours each unit required to produce (which was the same for all workers in that line). The price he received depended upon the total number of units marketed and this depended upon the number of producers who adopted that line of production (the intake of factors into that industry). An alteration of his income can thus result directly only from an alteration of the intake of factors into his own line, i.e. under the conditions assumed, a diversion of producers to another line of production. In what circumstances will that take place? Under what conditions will it be worth while?

His product was the outcome of labour expended. Each unit of output can be considered as requiring so many hours work, which can be called its nominal cost of production. It is worth while looking behind this nominal cost to the real cost. If a worker chooses not to produce a unit of the commodity, he cannot just wipe out of existence the

hours it would have taken. All he can do is to devote them to something else. He has a fixed twenty-four hours per day to dispose of in one way or another. The real cost of devoting one hour to producing this commodity is that the hour is not available for leisure (temporarily ruled out as an alternative by the assumption of the fixed working day) or that the hour is not available for making something else. 'Real costs are alternatives forgone.'

The whole of this simple production system can thus be pictured as analogous to a consumer spending a fixed income. There are a definite number of hours of labour available for distribution among different lines of production. They will be most advantageously disposed of and the factor supply most efficiently distributed when the output of one hour's labour in every line of production realises the same price on the market, i.e. when the producers are so distributed among the different lines of production that the resulting output of each commodity realises market prices per unit proportional to the number of labour hours each unit took to produce (their nominal cost of production).

The only criterion whereby a producer can judge whether his earnings are adequate is to discover whether he could earn more by transferring to another line of production. In the simplified conditions assumed, if prices are proportional to costs in labour hours, then all producers will be receiving the same income. If earnings are unequal, transfers of workers will readjust supplies of commodities and hence prices will move. This will continue until prices have reached proportionality to costs of production and then incomes will be equal and the system will be in equilibrium.

C. SOME ELABORATIONS

1. *The Unpleasantness of the Tasks.*—If occupations differ in unpleasantness, the earnings of the workers will have to be adjusted accordingly. To overcome the disagreeableness of any line of production as compared with other lines equally available to the factors concerned, a higher rate of earnings will have to be obtainable. This can only be

realised by an adjustment of the intake of factors in that line so that the output of production is restricted and thus secures on the commodity market a price which will just recompense the workers for the extra disagreeableness.

2. *The Efficiency of the Workers.*—If the workers differ in efficiency and the differences are uniformly reflected in every line of production, this circumstance will be displayed by a higher output to the efficient workers: each will take less time per unit of product. This will be equivalent to unequal supplies of labour from different workers, but the rate of total supply of the factor will still be stable.

Workers will receive in each line earnings proportional to their efficiency. A worker twice as efficient as another will produce twice as much output and so receive twice the earnings.

It follows that the intake of labour in each industry will be a function of the number of workers and also of their efficiencies—an efficient worker will be equivalent to more than one inefficient. The adjustment of the intake of labour in each industry will be more complex but not different in nature.

3. *The Nature of the Service.*—We now assume that the occupations differ in the demands they make upon the workers, i.e. that some occupations require greater skill than others and that only the more gifted workers are capable of pursuing those occupations.

To clarify the analysis, let us assume that there is one difficult task which demands certain rare qualities, but that all other tasks are of equal difficulty, every worker can perform them, each with a definite efficiency.

If every skilled worker transfers to the difficult task and leaves the other tasks to the unskilled workers, the supply of each commodity will be of definite magnitude and will realise a definite price on the market. It may be found that owing to the relatively large number of skilled workers, the supply of the speciality is so abundant relatively to the demands of consumers that its price is low and skilled workers receive less than unskilled. This condition of affairs could not continue. The skilled workers always

have the alternative of transferring to the unskilled occupations. It is evident that in equilibrium only so many of the skilled workers will be engaged in the difficult occupation as makes the supply of that speciality of a magnitude to realise a price which will give its producers a rate of earnings equal to what they could earn in the unskilled occupations: no less, or more would transfer; no more, or some of the skilled would retransfer.

It might happen, however, that when all the skilled workers were producing the speciality its relatively very scarce supply realised a price so high that the skilled workers received a rate of earnings far higher than they could earn in alternative occupations. In this case, no adjustments could take place. Since all the skilled workers are engaged on this speciality, no more could transfer to reap the gains and so cause the supply of the speciality to expand. None of the unskilled could transfer since they are not capable of producing the speciality. The skilled factor is one for which there is no substitute.

The same result would follow if the restriction on the inflow of other factors were artificial—a social custom of the community that the speciality be produced only by workers with red hair, or by old boys of a certain school.

Thus it can be seen that it is possible for a factor to receive a rate of earnings indefinitely large (depending always, it must be remembered, on favourable demand conditions for the product concerned) and far larger than it could earn in alternative occupations, so long as there are limitations of substitute factors or hindrances to the intake of substitute factors.

D. SOME GENERALISATIONS

1. The earnings of factors are derived from the receipts of the sale of the product. Since the commodity price of the product depends upon the rate of output, the joint earnings of the factors concerned can be changed directly only by changing the rate of supply of the commodity.

2. The intake of factors in each line will be adjusted to

secure a rate of supply of commodity which fetches a market price adequate to remunerate the factors concerned at a rate of earnings at least as high as they could have earned by producing anything else within their capacity.

3. Factors which can be freely substituted for one another will receive the same rate of earnings, or earnings proportionate to their efficiency measured in units of output, even though they are engaged in different lines of production.

4. Where factors perform dissimilar services requiring different specialised abilities, the dominant influence over relative earnings is not efficiency but scarcity. Factors will receive a rate of earnings at least as high as they could obtain in alternative occupations, but may receive earnings indefinitely higher if there are suitable conditions of product price and limitation of the supply of substitute factors.

CHAPTER V

JOINT PRODUCTION

A. THE CO-OPERATION AND COMBINATION OF FACTORS

1. *Coefficients of Production and Substitution of Factors.*—

Production is normally carried on through the co-operation of different factors of production. The technical proportions in which they have to be combined in order to produce a particular commodity are known as the Coefficients of Production. In some cases the proportions between certain factors are rigid, determined by technical considerations, and cannot be varied without changing the nature of the product (i.e. the Coefficients are Fixed). In most cases, however, it is possible to vary the proportions of the factors (i.e. Flexible Coefficients). If, moreover, we consider the production not of a single commodity but of a group of commodities closely allied by being in varying degrees substitutes for one another (as in the case of different qualities of the same type of commodity), it will be seen that great flexibility of combinations of factors is possible and ample scope is presented for variations in productive methods.

The different factors of production, although they co-operate, are thus in varying degrees substitutes for one another (or rivals) in production. In some cases, one factor can be entirely displaced by another (e.g. the rival fuels), but more usually, in the production of a particular commodity, the presence of some particular factors is essential, but within certain technical limits their quantities can be varied. Perhaps the most important broad case of this is the substitution of capital for labour: the choice between methods using more capital and less labour, and methods using less capital and more labour.

2. *Specialisation and Division of Labour.*—The actual

combination of factors in production is an extremely complex process. The dominant characteristic of modern methods is the Division of Labour, with its attendant requirements of specialised labour and specialised capital equipment.

Broadly considered, production by division of labour consists in splitting up the productive process into its component parts, concentrating specialised factors on each subdivision and combining their output into the particular forms of consumption output required. A major difficulty of this method is to co-ordinate the different parts of the process into a coherent system. An attendant problem is to assess what contribution each factor has made towards the final output.

3. *Mobility and Specificity.*—On the one hand, factors are combined in different proportions and flexibility of substitution is usual. On the other hand, division of labour favours specialisation of function.

Thus it is important to consider to what extent any factor has alternative uses and, if displaced in one function or line of production, can transfer to another; and to what extent the requirements of specialisation impose rigidity.

This directs attention to the distinction between Specific and Non-specific Factors and to the special conditions governing the Mobility of Labour.

4. *The Law of Diminishing Returns.*—Factors can be combined in different proportions for productive purposes. In the production of any particular commodity whose coefficients of production are flexible, the efficient range of variation of proportions of factors is determined by the Law of Diminishing Returns which is revealed by an analysis of the consequences of varying the proportions of factors.

5. *The Function of the Entrepreneur.*—Complex productive processes do not run themselves. The need to combine and co-ordinate factors has caused the emergence of a specialised factor, the Entrepreneur, responsible for the final decisions and the ultimate control of production.

6. *Firms and Industries.*—To promote clearness we shall use the expression Firm to mean a technical unit producing one commodity and under the control of one entrepreneur;

an Industry will refer to all the firms which are producing that commodity for one market. Under competitive conditions the industry will be large and the firm small.

B. THE LAW OF DIMINISHING RETURNS

I. *Factor-intake and Product-output*.—Usually, in a productive process, the proportions in which the different factors are combined can be varied. The problem now considered is to analyse what are the precise results of varying the amounts of any one factor, so as to discover what are the influences which determine the efficient range of variation of proportions.

In a process with flexible coefficients of production a change in the intake of any one factor (or of a group rigidly connected) will cause changes in the volume of output of the product (changes in the "Returns"). If the one variable factor is divisible into very small units, a measurement can be made of the effect upon volume of output of unit changes in the intake of the variable factor, all other factors being kept constant. It will be found that the changes are not uniform. Broadly speaking, when a small amount of the variable factor is being employed, then the addition of one unit will cause a relatively large increase of output. When a large amount of the factor is being used, the addition of a single unit will cause only a small increase in output, and may even cause a decline.

The comparison between the amount of the variable factor and the volume of output (or Returns) may be made in two ways:

(a) Average Returns are measured by the total volume of output divided by the number of units of the varying factor.

(b) Marginal Returns are measured by the difference between total output when the intake of the variable factor is x , and total output when its intake is $(x + 1)$. Marginal Returns at any point measure the difference in total output caused by a change of one unit in the intake of the variable factor.

2. *The Law of Non-proportional Returns.*—In a process with flexible coefficients of production involving two factors used in co-operation, if to a fixed quantity of one factor an increasing quantity of the other is applied, then:

(a) (Marginal Returns):—the additions made to total output by the addition of a unit quantity of the varying factor will first increase (stage of increasing returns), reach a maximum (stage of constant returns) and then decline (stage of diminishing returns).

(b) (Average Returns):—the output measured as an average per unit of the varying factor will first increase (stage of increasing returns), reach a maximum (stage of constant returns) and then decline (stage of diminishing returns).

The changes of Marginal and Average Returns do not coincide.

3. *The Equilibrium Proportion of Factors.*—Since it is possible to vary the proportion of factors engaged in a firm (the factor-intake), we seek to discover what influences will affect the entrepreneur's decision. The major consideration will be the relationship between the total output and the intake of each factor.

If we think of the factors and of the output in physical terms: so many workers, so many tons of coal, so many finished articles, and so on, it is evident that to double the intake of every factor in the firm will double the total output—it will be equivalent to putting up a second firm by the side of the first one. This major assumption must be taken to underlie the rest of the argument.

To expand the intake of one factor only will alter total output. It may decrease total output; if so, it is evident that this particular factor, taken in conjunction with the existing intake of other factors, has reached the limit of its relative expansion and indeed that it will certainly be advantageous to contract its intake. A small expansion of intake of one factor may increase output: either in the same proportion as the factor increase (constant average returns to the factor) or in greater proportion (increasing average returns) or in less proportion (diminishing average returns).

It can be proved¹ that if from any initial proportion of factors an increase of one factor intake causes the returns to that factor to remain constant or to increase, then from that same initial proportion a small *contraction* of the other factors would cause total output to *remain unchanged* or to *increase*. Since it is not sensible to use a certain amount of some factors if a less amount will give the same or better results (the same or greater output), it follows that the initial proportion of factors cannot be stable, there will be an inducement to change, i.e. it cannot be an equilibrium proportion.¹

It follows that the equilibrium proportion of factors is one in which to increase any one factor will increase total output but will result in diminishing returns to the increased factor.¹

C. A CONVENTIONAL PRODUCTIVE PROCESS

1. The analysis can be elaborated by assuming that in a certain line of production only two factors are employed, A and B. If we then take a fixed quantity of B (say 20 units) and combine with it different quantities of A, we can measure the total output for each different combination and draw up a Productivity Chart (see page 58). In this imaginary Productivity Chart only Column (2), the Product, has been invented—all the rest has been deduced from it by simple calculations.

¹ x units of factor A combined with y units of factor B produce n units of output. And $(x+1)$ units of factor A combined with y units of factor B produce $(n+s)$ units of output.

Therefore :

x units of factor A combined with $\left(\frac{x}{x+1}\right) \cdot y$ units of factor B will produce $\left(\frac{x}{x+1}\right)(n+s)$ units of output.

$\frac{n}{x}$ measures the Average Returns to factor A in the initial proportion and s may be taken to measure Marginal Returns.

If $s = \frac{n}{s}$ (constant returns) $\therefore n = \left(\frac{x}{x+1}\right)(n+s)$.

If $s > \frac{n}{s}$ (increasing returns) $\therefore n < \left(\frac{x}{x+1}\right)(n+s)$.

If $s < \frac{n}{s}$ (diminishing returns) $\therefore n > \left(\frac{x}{x+1}\right)(n+s)$.

In this analysis, only the proportions of A to B are relevant. The output produced when B equals 20 and A equals 10 will be doubled when B equals 40 and A equals 20. An increase of A relative to B will have a similar effect

CONVENTIONAL PRODUCTIVITY CHART¹

	B is constant and = 20				A is constant and = 100				
	(1) Units of A	(2) Units of Pro- duct q	(3) Average Returns to A	(4) Marginal Returns to A	(5) Units of B	(6) Units of Pro- duct q	(7) Average Returns to B	(8) Marginal Returns to B	
STAGE 1.	1	1.0	1.0	1.9	2000	96.7	STAGE 3.
	2	3.7	1.9	3.6	1000	186.7	0.2	..	
	5	20.8	4.2	7.5	400	416.6	1.0	..	
	9	56.7	6.3	9.9	..	..	..	..
	10	66.7	6.7	10.0	200	666.7	3.3	-1.6	
	11	76.6	7.0	9.9	..	..	..	..
	14	104.5	7.5	8.4	..	..	..	..
	..	..	..	..	135	749.8	5.5	-0.1
..	..	..	..	134	749.9	5.6	0.0	
STAGE 2.	15	112.5	7.5	7.5	133	749.9	5.6	0.0	STAGE 2.
	..	..	..	..	132	749.8	5.7	0.1
	16	119.4	7.5	6.4	..	..	..	..
	18	129.6	7.2	3.6	111	720.0	6.5	3.2	
	19	132.4	7.0	1.9	105	696.0	6.6	4.8	
	..	..	..	..	101	673.1	6.7	6.3
20	133.3	6.7	0.0	100	666.7	6.7	6.7		
STAGE 3.	99	659.7	6.6	7.1	STAGE 1.
	21	129.3	6.2	-2.1	..	..	..	..
	25	104.2	4.2	-12.5	80	416.6	5.2	20.1	
	..	..	..	..	79	384.6	4.8	22.1
30	0.0	0.0	-30.0	67	0.0	0.0	45.0		

as a decrease of B relative to A. Hence it can be calculated from Columns (1) and (2) what would happen if A were constant (say, equal 100) and B were variable. This has been done in the right half of the Chart. Figures entered on any one line represent the same proportions of the two factors, e.g. B equals 20 and A equals 10 is technically

$$^1 q = \frac{20}{3} \cdot \frac{a^3}{b^3} \cdot (3b - 2a).$$

equivalent to B equals 200 and A equals 100, but on one-tenth the scale, i.e. output will be one-tenth (66.7 compared with 666.7).

Thus the two halves of the Chart represent the analysis of the same imaginary technical process, the same factors are combined, and in the same proportions. The left half examines the effect of changing proportions from the point of view of factor A; the right half from the point of view of factor B.

Columns (4) and (8) require explanation. They have been calculated and seem to present discrepancies, e.g. when A increases from 19 to 20, q increases from 132.4 to 133.3; difference 0.9. Yet Marginal Returns are shown as 1.9. This discrepancy is due to the fact that theoretical accuracy demands that Marginal Returns should be measured for very small changes in the factor (a unit should be infinitesimal) and the actual change from 19 to 20 is a big proportional change (over 5 per cent.). A simple compromise method would be to take Marginal Returns when A equals x as being the average of the changes in output as A changes from $(x-1)$ to x —which is called the Inner Margin, and from x to $(x+1)$ —the Outer Margin.

e.g. When A increases from 18 to 19, q increases by 2.8 (Inner Margin).

When A increases from 19 to 20, q increased by 0.9 (Outer Margin).

Average 1.9 equals Marginal Returns when A equals 19.

It is to minimise this discrepancy that a much bigger scale of production is represented in the right half of the Chart.

Actually the Marginal Returns measure the *rate* of increase of total output, as the factor intake rises, at any particular magnitude of the factor intake. The rate at which output increases as the factor expands can only be measured by taking some small increase of the factor, measuring the corresponding increase of output, and dividing. If we wish to measure the rate of increase of output at any given point, i.e. at any given magnitude of factor intake, all we can do is to measure the change in output when the factor changes by the smallest measurable

unit which contains that point. The Inner Margin and the Outer Margin are the nearest practical approximations to theoretical accuracy.

2. *An Analysis of the Productivity Chart.*

(a) Variations of Average Returns and Marginal Returns do not coincide.

(b) So long as Marginal Returns are higher than Average Returns, then Average Returns are increasing.

(c) The point at which Marginal Returns and Average Returns are equal is the maximum value of Average Returns, and beyond that point both Marginal Returns and Average Returns are diminishing.

(d) When Average Returns are diminishing, Marginal Returns must also be diminishing.

(e) As the proportion of any one factor rises, there is a range of proportions (Stage One) in which Average Returns to both factors increase; a range of proportions (Stage Two) in which returns, Marginal and Average, to the relatively expanding factor diminish, and to the relatively contracting factor increase; and a range of proportions (Stage Three) in which Average Returns to both factors diminish.

3. *Some Deductions.*—Assuming that the proportions of the factors can be freely adjusted, i.e. that coefficients of production are flexible, and that the factors are divisible into small units:

(a) Equilibrium (which in this context means an efficient and stable proportional combination of factors) is inconceivable when Average Returns to both factors are increasing (Stage One); since to discard a portion of the relatively contracting factor would increase total output. No entrepreneur will employ a given quantity of a factor if a smaller quantity will give increased output.

Thus, from a position of equilibrium an increase of any one factor cannot result in Increasing Returns.

(b) Similarly, equilibrium is inconceivable when Average Returns to both factors are diminishing (Stage Three); since additions to the relatively expanding factor are causing total output to shrink.

(c) Hence equilibrium is conceivable only at some point within the range (Stage Two) where an increase in the intake of a factor causes total output to increase but results in Diminishing Returns (Average and Marginal) to the expanding factor (and Increasing Returns to the relatively contracting factors).

4. *Applications of the Analysis.*

(a) These conclusions are quite general: the factors A and B are interchangeable and each can be taken to refer either to a single factor or to a stable complex of factors; thus A could refer to any one factor in a process and B could imply all the others taken together.

(b) Thus equilibrium of production is conceivable only within a limited range of variations of the coefficients of production; and from a position of equilibrium an increase in the quantity of any factor applied to the process will cause total output to rise but will give Diminishing Returns to that factor. Alternatively, a decrease in the intake of a factor will cause total output to decline, but will cause a rise in the returns to that factor.

5. *An Extension of the Analysis.*—It is important to notice that from a position of equilibrium an increase in the intake of one factor will result in Diminishing Returns to that factor, but it will increase the returns to the other factors. The productivity chart may be extended to show this:

VARIATIONS OF OUTPUT AS FACTOR-INTAKES CHANGE

Intake of A	Intake of B		
	19	20	21
17	122.8	125.2	126.7
18	125.7	129.6	132.2
19	126.7	132.4	136.4

THE CORRESPONDING MARGINAL RETURNS TO A

Intake of A	Intake of B		
	19	20	21
17	3.8	5.1	6.2
18	2.0	3.6	3.8
19	0.0	1.9	3.4

Thus, when B is 20 and A expands from 17 to 18 and then to 19, the Marginal Returns to A diminish. The same is true when B is 21, but the whole range of Returns is higher; the increase of B from 20 to 21 has raised the Returns to A all down the column.

6. *Marginal Returns and Marginal Productivity.*—Considerable attention has been paid to this analysis because it is important that the concepts of Average Returns and Marginal Returns should be clearly understood as well as the meaning of their “diminishing” and so on. These concepts occupy a central position in economic analysis.

It must, however, be realised that the analysis of Returns has been made hitherto in terms of physical quantities.

In any stable productive process each factor will have a certain rate of intake, and corresponding to that intake each factor will have a rate of Marginal Returns. The rate of Marginal Returns at that rate of intake will measure the rate of increase of product if that factor is slightly increased (and the others remain unchanged). Since it is only the one factor which has increased, the increase of product can be said to be caused by the increase of the one factor and is said to measure the Marginal Productivity of that factor at that rate of intake.

It is now necessary to develop the implications of this analysis to the whole productive system and to consider also what modifications will be necessary if Returns and Products are measured not in physical terms, but in value terms.

CHAPTER VI

THE EQUILIBRIUM OF NON-CAPITALISTIC PRODUCTION

A. JOINT PRODUCTION

1. The analyses of market equilibrium and of the equilibrium of simple production are merely steps preparatory to the analysis of the Theory of Equilibrium. They serve to isolate some simple tendencies and to make clear processes of valuation and economic adjustment, the understanding of which is a necessary preliminary to the main task of equilibrium analysis: which consists in tracing in particular environments a pattern of human behaviour, each thread of which, though representative, is more uniform perhaps than is found in human society, but whose ensemble is sufficiently complex and realistic as to constitute a norm which will assist the mind in tracing the ramifications of reality.

2. We proceed to the analysis of an economic society consisting of a precise number of individuals each of definite disposition and tastes. They are the source of supply of a precise variety of factors of production which are organised into a productive system turning out a certain variety of commodities by definite and unchanging technical processes. We seek to know what scheme of prices, quantities and distributions of commodities and of factors in such a system would be stable: such that the system would be in equilibrium in the sense that nobody could gain anything by changing any of those prices, quantities and distributions.

3. An examination will first be made of the principles underlying the combination of factors in a productive process. Thence it will be inferred how those principles influence the conduct of entrepreneurs in organising joint production. Then the consequences of that organisation will be investigated in the commodity market and in the

factor market; and hence the schemes of prices and outputs of commodities and of factors which result and whose interrelations maintain the complex of equilibrium.

4. Temporary assumptions will be made as the argument proceeds merely to provide starting points of reasoning and which will be removed so soon as their purpose has been fulfilled. Certain broad assumptions, however, which will persist throughout must be borne in mind:

'(a) The use of money will be taken for granted.' It must be emphasised that the use of money would actually lay the system open to disturbances. Since we must take our hurdles singly, it will be convenient to assume that money is controlled in such a way as to create no disturbances: money is Neutral, and the economic system functions as though it were a barter system without any of the inconveniences of barter. The kind of monetary assumptions that this implies, the possibilities of the occurrences of monetary disturbances and the nature of the equilibrium of a monetary economy, are all problems to be discussed in the Theory of Money.

'(b) It is assumed, for the time being only, that production is organised in firms each directed by an entrepreneur who hires factors for money payments and sells the product for money receipts, and yet that so uniform is the system, so changeless the environment and so evident the consequences of actions, that the entrepreneurial function is simple enough to be performed by any individual and is not considered to be a separate factor receiving any earnings of its own. The services of an entrepreneur are a free good.

'(c) It is a timeless world. The unit of time repeatedly referred to covers an instantaneous cycle of production existing as a mental concept only. Into this productive cycle are fed the factors and out of it appears instantaneously the product. Labour has no tomorrow to motivate action since the outcome of its behaviour is at once apparent; raw materials flow in endless streams of determinate rates; and equipment is everlasting and never obsolete. There are no problems of Capital and Interest.

B. PRODUCTION FUNCTIONS AND MARGINAL PRODUCTIVITY

1. A commodity is produced by the co-operation of different factors of production. The proportions in which factors are combined to produce one unit of the commodity are known as the coefficients of production and the normal case which will be assumed is that these coefficients are flexible, i.e. that it is possible to use more or less of any factor without changing the nature of the product, but changing only the volume of output. (The case of Fixed Coefficients is examined later.)

2. The relationship between the various complex associations of the different factors and the volume of output is known as the Production Function for that line of product and is evidently dependent upon the technique of production. A change in technique can only mean that a new relationship is set up between output and factors, i.e. that the production function changes.

3. In a continuous productive process employing given technique (i.e. with given production function), if the intake of one particular factor is varied in successive cycles of production while the other factors are kept stable, the output will also vary. A relationship can be observed between factor and output which is known as the Marginal Productivity of the varying factor. This measures the connection between the change in the rate of factor intake and the change in the rate of output, i.e. at any given rate of intake of a particular factor, it has a marginal productivity which measures the potential effect on the rate of output of the product of a very small change in the rate of factor intake. Since the smallest change observable is one unit of the factor, marginal productivity is for convenience measured in number of units of output change per unit change of the factor. Thus the marginal productivity of the factor, at any given rate of intake x , is the change in the number of units of output which would result from altering the intake of the factor to $(x+1)$ or $(x-1)$. (Theoretical accuracy requires that the change in intake be infinitesimal; the measurement per unit of the factor

is only an approximation and $(x+1)$ or $(x-1)$ are the nearest practical alternatives.)

In other words, what is the difference between Total Output when the factor is x and Total Output when the factor is $(x+1)$, other factors being unchanged?

4. Though the intake of any one factor can be altered, there are limits to the flexibility of the coefficients. No entrepreneur will employ (if he can avoid it) so much of any one factor that by discarding one unit of it he could expand output, i.e. the marginal productivity of each factor must be positive. This being so, it has already been demonstrated that (where the factors are divisible into small units) an equilibrium situation is conceivable only if the intakes of the various factors are such that an expansion of any one of them will expand the volume of output but will lower the marginal product of that factor: in equilibrium, an expansion of the rate of intake of any factor in any line of production causes its marginal productivity to diminish; a contraction causes its marginal productivity to increase.

Furthermore, since an expansion of the intake of one factor has the same effect upon proportions as a contraction of the intake of all the others, and since only the proportions of factors are relevant to their marginal productivities, it follows that the marginal productivity of any one factor depends also on the volume of intake of all the others. An expansion of the intake of one factor will bring about a rise in the marginal productivity of each of the others for all the rates of their intakes. One application of this is seen in the analysis of the connection between the efficiency of labour and its productivity. The productivity of labour does not depend only on its supply and efficiency, but also on the rate of intake of the other factors associated with it in any line of production.

C. THE ENTREPRENEUR IN THE FACTOR MARKET

An entrepreneur is engaged in a certain line of production whose production function is such that the output changes

X: a

in a determinate manner as he varies the proportions of the factors. It has been shown already that an unlimited variation of proportions is not compatible with an efficient organisation of production. Nevertheless, a certain latitude of proportions is still possible. Which will the entrepreneur adopt?

Within the efficient range of proportions, to increase the intake of any one factor will certainly expand rate of output, but it will reduce output per unit of that factor. Each increase of any factor is progressively less worth while. Where will the entrepreneur stop?

His decision will depend upon the prices of the factors. All the producers in different lines of production are competing for the services of the supply of factors, and the individual entrepreneur finds himself confronted with a complex of market prices of factors.

On the assumption that the entrepreneur will seek to maximise the output of his firm for a given expenditure on factors, it follows that he will hire factors in definite proportions: namely, that relative quantity of each which will cause the marginal productivity of the factors engaged to be proportional to their prices.

The marginal productivity of a factor at any rate of intake measures the difference in output when the rate of intake is changed slightly. With any efficient proportion of factors, to increase any one of them by one unit would cause an increase of a definite number of units of output. That extra factor unit would cost its market price. Thus the increase in output can be measured per unit of expenditure on an extra factor. It is obvious that the efficient entrepreneur will so distribute his expenditure on factors that an extra unit of money spent on any one of them would increase his output by the same number of units. Otherwise it would be possible for him, without changing total expenditure on factors, to expand output by withdrawing money from the purchase of one factor and transferring it to the purchase of another.

Thus, operating a process with a given production function, and faced with a supply of factors whose services are obtain-

able at definite market prices, an entrepreneur will hire factors in definite proportions in accordance with the rule of proportionality of marginal products.

D. EQUILIBRIUM IN THE FACTOR MARKET

1. The factor market is made up of a number of firms bidding for the services of a certain range of factors (each with a supply at present assumed fixed) to be used in lines of production each of given technique.

The problem is to discover a criterion of the equilibrium price for each factor, and how much of each factor will be hired for each line of production. The procedure of analysis is to assume an arbitrary range of prices, to work out the consequences and so to infer what range of prices will produce consequences which conform to the conditions postulated.

2. Producers in each line will hire factors in definite proportions depending upon the prices which confront them. A producer who had thus achieved proportionality between marginal products and factor prices would, however, still maintain it if he exactly doubled his intake of each factor. Marginal productivity of the factors depends upon the proportions of factors and not upon the scale of production. Hence any given complex of factor prices is compatible with different intakes of factors in any one line of production. It has yet to be shown how they also determine the absolute quantity of each factor engaged in each line of production and so ensure that the fixed total supply of each factor will be cleared, as equilibrium requires.

3. Another element in the situation has hitherto been left out of consideration, and what that element is can perhaps most readily be inferred if another criterion of the efficient organisation of production is considered. Efficiency demands not only that entrepreneurs should maximise output with given resources but also that each factor should be most advantageously employed. Since the price of the factor is the same to everyone, this will evidently be achieved when the marginal product of the factor is the same in each line of production. Otherwise, an expansion in the output

of the whole system could be secured by transfers of units of this factor from lines where its marginal product was less to lines where its marginal product was more.

The marginal product of the factor in each line of production is represented by a certain number of units of commodity. How can these groups of diverse commodities be compared in magnitude? Obviously only through their values. Thus we are led to an essential link between the factor market and the commodity market (a second will become apparent at a later stage). A factor will be most advantageously used when its marginal product in each line of production sells for the same price on the commodity market. Thus a new element in the situation is apparent. Each factor has a Marginal Value-Product—the value at market prices of its marginal physical-product—and the entrepreneur in each line of production will compare the price of each factor, not with its marginal physical-product, but with its marginal value-product.

4. If, having made marginal physical-products proportional to factor prices, the entrepreneur finds that the marginal value-product is higher than factor prices, it will pay the entrepreneur to expand the scale of his operations by increasing all factors in proportion; since an expansion of output will bring in more from sale of product than it costs in factor prices. This will apply to all the firms engaged in that industry. Hence the supply of that commodity will expand. The result of this will be that its price will fall on the commodity market. The equilibrium scale of production of any industry will be that which causes the resulting volume of output to realise a price per unit on the commodity market just sufficient to make the marginal value-product of each factor equal to the price of that factor. This will consequently determine how much of each factor is engaged in each line of production.

5. Hence the prices of the factors, which have hitherto for convenience of exposition been assumed to be fixed arbitrarily, are now seen to be the resultants of the complex forces of the production markets, and if equilibrium of the system is to be attained, they must be established at such

levels that when each entrepreneur has adjusted his own intake of factors in conformity with them and when each line of production has been adjusted to the scale which brings the price of its product also in conformity with them, then exactly the whole supply of each factor is just cleared.

6. A clearer insight into the complexity of this equilibrium will be gained if an analysis is made of what would happen if a temporary equilibrium had been established which left certain units of one factor unemployed. Since it is an assumption of the patterns of economic conduct which we are constructing that all the factors must be absorbed, adjustments must be made before a final equilibrium is established.

In order to absorb this surplus, some firms must expand their intake of this factor. But that will cause its marginal productivity to diminish, and if the rule of proportionality is to be maintained, as efficiency requires, this will only be possible if the price of this factor falls. Also, an increase of the intake of this factor will cause the marginal productivity of the factors associated with it to rise; hence their owners can demand and secure a higher price.

Another consequence must also be noted. The expansion of intake of this factor will cause output of the relevant products to expand. If they are to be absorbed on the commodity market their prices must therefore fall. This fall in price will (by reducing marginal value-product more than marginal physical-product) accentuate the fall in price of the original factor; but it will mitigate the rise in price of associated factors. The fall in some prices on the commodity market will have repercussions on other prices in that market, with consequent repercussions (via marginal value-products) on the factor market. While the fall in price of the original factor and the slight rise in price of associated factors will also have repercussions (via the rule of proportionality) on each industry and each firm which uses their services, with consequent repercussions (via volumes of output) on the commodity market. Thus the final equilibrium will be the resultant of complex inter-related oscillations.

7. *Fixed Coefficients.*—It has been assumed hitherto—what is most usual in the long run—that coefficients of production are flexible. Is equilibrium determinate if coefficients of production are fixed (as they very frequently are in the short run owing to the time required for adjustments to disequilibrium)?

If there are two factors which must be combined in fixed proportions whenever productively used, then if the total supplies of these factors do not bear to each other that same proportionate relation, there must be an unemployed surplus of one of them. Its price will fall, owing to competition from the unemployed units, and if the supply does not shrink as the price falls, then there is no level above zero at which it can stop: the factor will be a free good, the supply exceeds any conceivable demand. Furthermore, even if the supplies were adjusted so that no surplus existed, the two factors in their fixed proportions must be treated as one complex factor block, earning a reward based on the marginal productivity of their joint contribution. Theoretical analysis can suggest no means of determining how that joint price will be shared among the units of the block: it will depend upon bluff and bargaining between them.

This case is probably merely a theoretical curiosity; nevertheless, fixed coefficients are practical realities and not merely imaginary concepts. Equilibrium is, however, determinate if we assume (the actual phenomena) that while the proportions between two factors may be rigidly fixed in any one industry, they differ as between industries (even though fixed in each industry).

The equilibrium price of each will be that at which the given supply of each factor is exactly and only just absorbed into productive use.

Suppose that, at existing prices, there is an unemployed surplus of one factor. How can any more be absorbed if there is no surplus of the partner-factor? Competition among the units of the surplus factor will cause its price to fall. Although the coefficients of the two factors are everywhere fixed, the ratio is different in different employments or industries. The fall in price of the first factor

will benefit most those industries which use relatively much of this factor. They will have an incentive to expand output since costs will now be below prices. Since a greater intake of this factor will raise the marginal product of all the other factors, these industries will be able to offer a higher price for the partner-factor. Since they use relatively little of this partner-factor, its higher cost will be more than offset by the lower cost of the more abundant first factor. The consequent rise in price of the partner-factor will hit most hardly those industries which use relatively much of it. Their costs will rise and they will be forced to contract output to raise prices. This will release supplies of the partner-factor which will transfer to the expanding industries and enable greater supplies of the first factor to be absorbed there. The consequent release of small supplies of the first factor from the contracting industries will be absorbed as a result of a small additional fall in its price and a further transfer.

Thus the price of the originally surplus factor will fall and the price of the partner-factor will rise. Industries using relatively much of the surplus factor will expand and industries using relatively much of the partner-factor will contract. These movements of prices and scales of output will continue until equilibrium of prices and intakes of the factors is attained and there is no further gain to be achieved from any further change.

The alterations of scales of output will cause changes of prices of the commodities produced by the affected industries and hence of all the engaged factors. These changes will proceed as previously analysed and will not be peculiar to the two factors with the fixed coefficient.

Hence even with fixed coefficients, equilibrium is determinate.

E. THE COMMODITY MARKET AND THE FACTOR MARKET

1. Although for convenience of exposition these two markets have been analysed separately, they are of course part of one connected system. The commodities which are

bought and sold on the one market are produced by the activities of the factors which are hired on the other market. It is now necessary to see how these two markets are connected and how they interact on each other.

2. One essential link has already emerged in the course of the analysis. The supplies of the commodities which were provisionally assumed to be fixed are now seen to be the output of the productive system and to depend upon the rate of intake of factors into lines of production with given production functions. The supplies of the commodities encountering the fixed tastes of the consumers are sold at definite prices which are, in turn, determinants of the organisation of the productive system through their influence over marginal value-products. The organisation of the productive system in turn decides how great are the supplies of the commodities. Thus there is a close triangular interaction.

3. There is a second essential link. The consumers in this system, which we are creating as a pattern of thought, are themselves the source of the factors. Factors are supplied by consumers either because the consumers allow their property to be used productively or because the consumers themselves supply productive services. In return for this supply of factors, the consumers receive the earnings of the factors hitherto discussed as factor prices.

Thus the incomes of the consumers which were also provisionally assumed to be fixed in the analysis of the commodity market are in reality made up of the receipts from the hiring of factors. The income of each consumer depends upon the amount of each factor that he supplies and the price he receives for each unit. Hence the total income of all the consumers equals the total payments to all the factors and each equals the total sum realised from the sale of the commodities.

4. To use a mechanical analogy, we have now a connected system of three fixed pulleys and several movable pulleys which settle down into equilibrium. The fixed supply of factors is distributed as intakes among the lines of production. In conjunction with the fixed production functions

this determines the output of commodities. The intake of factors taken in conjunction with their prices decides the earnings of the factors, which sum, now featuring as the income of consumers, determines, in conjunction with the fixed tastes of the consumers, at what prices those supplies of commodities will be absorbed.

F. STATIC EQUILIBRIUM IN NON-CAPITALISTIC PRODUCTION

The equilibrium which has just been analysed with the supply of factors assumed to be fixed, is known as Static Equilibrium. It is useful as a pattern of thought to assist the mind in analysing systematically the interactions of an actual productive system when a period of time is considered so short that the supply of factors has, in fact, no opportunity to change.

If, for example, some exogenous change in the economic data occurs—a change in the tastes of consumers as the result maybe of an advertisement campaign, or a change in a production function through an invention—then the short period effects of this change, before the supply of factors can adjust itself, may very well be quite distinct from the long period results when the initial reactions have been modified by the adjustment of rates of factor supply.

It is next necessary to consider what the patterns of those modifications will be when we assume that the supply of factors is flexible. This constitutes the analysis of Stationary Equilibrium.

G. THE SUPPLY OF FACTORS

1. It has hitherto been assumed that the rate of supply of each factor is stable. It is necessary now to remove that assumption and consider what modifications will result if the rate of supply of factors adjusts itself in response to the prices they receive in the factor market (exogenous changes, spontaneous or arbitrary fluctuations arising irrespective of price influences, are of course excluded).

2. Before this is done, it will be as well to consider what possible form these changes can adopt. Material factors are of great variety: some are simple and quickly adjustable in rate of supply; others are complex and obviously require time to construct. Since we are here considering an equilibrium timeless and instantaneous in adjustment, we must at once rule out the possibility of any variation in the supply of many factors.

Furthermore, we are here considering an absolute increase in the rate of supply of any one factor. We have seen that an increase in the rate of intake of a factor to any one line of production, a rise in the intake of a factor at the cost of a reduction in intake elsewhere, is one of the normal adjustments of equilibrium and does not constitute an absolute rise in the rate of supply. Another possibility, however, must also be ruled out. Some factors are complex assemblies of simpler factors. It would be possible to increase absolutely the rate of supply of a complex factor by diverting simple factors from other lines and applying them to producing it.

This must also be ruled out for two reasons:

(a) This would not constitute an absolute increase in the rate of total supply of factors but only a transformation of kinds within the existing flow: a change of intake in different lines of production.

(b) The second reason will not be fully appreciated at this stage but must be mentioned for completeness. We are here analysing a timeless equilibrium in which the output of industry impinges immediately on the commodity market and at once induces repercussions back on the factor market. Now, the production of equipment (complex factors) is not of this sort. The output of equipment would not appear on the commodity market at all, but would be absorbed within the productive side itself, on the factor market. This fact places the production of equipment outside the concept which we are elaborating. To put it briefly, but in a manner which is not fully intelligible at this stage, the production of equipment is relevant only to the equilibrium of capital-

istic production; we are here abstracting from time altogether. (See *Capitalistic Equilibrium*, Chapter VII.)

3. Thus the problem we are here concerned with is the flexibility of supply of the primitive factors, natural resources and labour.

It is sometimes said that the supply of natural resources is fixed. The vagueness of this statement (see Chapter VIII, Section *B*) can be removed by a change of wording: there are certain basic resources, indispensable in production, the absolute volume of which in existence on the earth is fixed and cannot be altered by human activity. We are not concerned here, however, with absolute volumes; we are concerned with rates of supply, the number of units of each factor which flow into the productive system per unit of time and are available for productive use. The rate of supply of a basic factor is not directly connected with its absolute volume: the rate of supply of coal available in England can increase although the absolute volume is steadily diminishing in quantity.

We come to the crux of the problem: the possibility of increasing the rate of supply of the basic material resources. A little thought will show that fundamentally it depends generally upon the possibility of applying more labour in producing them, of increasing the intake of the labour factor in the extractive industries without diminishing the intake of labour in other lines of production.

Hence we are justified in treating the problem of the flexibility of supply of all primary factors, material as well as human, as being essentially that of the problem of varying the rate of supply of labour.

4. Two warnings must be appended:

(a) The first has already been mentioned: we are analysing an equilibrium system in which capital as such does not play a part. In capitalistic production this simplification of the factor supply rate will need modification.

(b) Secondly, it is assumed that whatever the rates of supply all the units of the factors are absorbed into the productive system. In the actual world this is not

so; there is normally an amount lying idle of available labour, resources and equipment; hence in the short period it is normally possible to expand the total output of the system by taking in idle factors. The analysis of the reasons for the existence of this unemployment among factors constitutes a special and difficult problem.

H. THE SUPPLY OF LABOUR

1. It is necessary to be clear about the limitations of the present analysis. The supply of labour depends on:

(a) The number of workers. This is a long term problem considered under the title of Population Theory (see Chapter IX, Section M).

(b) The efficiency of labour. This is again a long period problem considered under the Theory of Wages (see Chapter IX, Section G).

(c) The intensity of work.

(d) The duration of work.

We are here concerned with the total supply of labour as a factor of production and its response to the stimulus of changes in the price it secures on the factor market (wages). In the theoretical concept of equilibrium which we are building up we are interested only in the immediate responses which result from changes in price, in order to see how the total supply of the labour factor and its price will be adjusted to maintain the equilibrium of the system.

Most of the important and interesting features of the actual labour market are concerned rather with the supply of labour in particular lines of production, i.e. the intake of the labour factor, its mobility and its elasticity of supply in particular lines. These points will be considered later under the Theory of Wages analysed as a particular aspect and application of the theory of value.

2. Hence, in order to satisfy our present restricted purpose of appreciating the tendencies underlying the total supply of labour, we shall make certain simplifying assumptions:

(a) That the number of workers is fixed.

(b) That all the workers are of equal and unchanging efficiency.

(c) That they all work with the same intensity.

(d) That the total income of each worker is derived from the earnings of his labour.

Thus, variations in the supply of labour will arise from variations in the duration of work per unit of time.

3. A worker sells labour power at its market price; it is desired to explain and set out the relationship between the amount sold (the hours of work) and the price (wages).

A worker supplies labour in order to secure income. With a view to preserving unity of approach to the different markets we have analysed and thus revealing their fundamental similarities, it will be more convenient to picture the worker as buying income in terms of (at a cost of) working hours. This is necessary because we cannot, as in the commodity market, set up substitution functions in terms of units of income or units of a standard commodity, because those commodity substitution functions always assumed a stable income for each consumer; here it is income itself which is a variable.

The stable income of the consumer in the commodity market is here represented by the fixed twenty-four hours per day available for disposal by each worker, either on income (i.e. work) or on leisure (using leisure merely to mean hours not devoted to work).

As the rate of income expands, the significance of a unit change diminishes; as the rate of leisure contracts, the significance of a unit change of leisure increases. In equilibrium, when the fixed twenty-four hours are most advantageously disposed of, they will be so distributed that the diversion of one unit (say, five minutes per day) from work-time to leisure would entail more loss of satisfaction from the income forgone than gain of satisfaction from the leisure acquired (and vice versa). The real cost of acquiring an increment of income is the loss of leisure which it entails. The disagreeableness of the work which might be alleged as an influence is already accounted for in the attraction of the leisure, since the contrast, if any, is one aspect of

that attraction. Since the disposition of the worker is assumed to be fixed and since the price of leisure in terms of work-time is always unity, the point of equilibrium will be determined by the price of income in terms of work (i.e. by the rate of wages).

In other words: the number of units of work (say, minutes per day) which an individual will be prepared to spend on acquiring an extra unit of income (say, one shilling per day) will depend upon the rate at which he is already receiving income, and on the price of the income (in minutes of work), and can thus be expressed as a substitution function: a demand function for income in terms of work-time or a supply function of work-time in terms of wage units. This will be the only function required to resolve the problem since the decision to spend so much time on acquiring income automatically settles the amount of leisure available, since the two periods must total twenty-four hours.

It is important to bear in mind that the price of income is expressed in units of work (minutes per day). A fall in the rate of wages thus means a rise in the price of income; because more minutes of work per day will be required to obtain a unit of income (say, one shilling per day).

A rise in the price of income (more minutes per shilling) will be followed by a fall in the quantity acquired (the number of shillings per day). A fall in the price of income will be followed by a rise in the quantity acquired.

The quantity of income (shillings) multiplied by the price of income (minutes per shilling) will give the total price of the daily income, i.e. the length of the working day.

Hence, although a change in the price of income will cause a change in the quantity acquired, we cannot determine how the total expenditure on income varies (the length of the working day) until we know the elasticity of the worker's demand for income, which, theoretically, can be deduced from the nature of his substitution function. If, at any given rate of receiving income, the elasticity of demand for it is unity, then a slight change in wage rates will leave the working day unchanged. If the elasticity at that income is greater than unity, then a rise in its price

(a fall in wage rates) will be followed by a shortening of the working day; and so on.

The circumstances which will influence the disposition of the worker, and the practical impediments to his reactions, will be considered under the Theory of Wages. For the present theoretical analysis that disposition (and its attendant substitution function) is taken as given for each worker; while the possibility of flexible responses to price changes (variations in the length of the working day) is a postulate of the market conditions.

4. For the purposes of equilibrium analysis it is now necessary to apply these conclusions to the static system set up. The factor prices there obtained must now conform to another condition: they must be just adequate to maintain the existing rate of supply of the factors. We may reasonably assume that the possibility of divergence hinges upon the behaviour of the labour factor.

Assuming fixed dispositions of the workers, any given price will evoke a corresponding supply of labour. If that factor price hitherto accepted as appropriate to Static Equilibrium now evokes a greater supply of labour, the whole system will react. An analysis has already been made of the consequences. (Chapter VI, Section *D 6*.) The relevant change is that the labour factor price will fall. If this now brings about a fall in the rate of supply, equilibrium will soon be reached. It is possible, however, that this fall in wage rates may increase the rate of supply of labour still further. In which case the process of readjustment must continue, wage rates falling still further. An end must come, of course, even if only at the point where the existing number of workers cannot possibly expand their output of labour owing to the minimum requirements of sleeping and feeding hours; and before such a point is reached the supply would more probably have been curtailed by a contraction of the number of workers through a rise in the death rate. Such a set of circumstances implies a community so barren of material resources that the supply of labour is superabundant, scraping out a meagre existence by incessant toil.

J. STATIONARY EQUILIBRIUM IN NON-CAPITALISTIC PRODUCTION ¹

1. The central concept of the equilibrium of production may now be summarised; it constitutes an imaginative construction of the pattern of an economic system.

2. This economic system contains a definite number of individuals who:

(a) As consumers—

(i) Derive all their income from supplying factors.

(ii) Have each a scale of preferences towards commodities expressible as substitution functions.

(b) As producers—

(i) Supply factors, under the stimulus of the earnings of factors, at rates expressible as supply functions.

(ii) Combine those factors to produce, under the stimulus of the prices obtainable, a definite range of commodities whose output varies, when the technical proportions of the factors are changed, in a fixed manner expressible as production functions.

3. Thus the economic data which make the system what it is consist of:

(a) The number of consumers and their tastes.

(b) The range of factors and their rates of supply in response to earnings.

(c) The kinds of commodities and the technique of their production.

There are also two major assumptions of Perfect Markets and Neutral Money.

4. The unknowns of the system, whose values will depend upon the magnitudes given to the economic data, and whose

¹ There came into my hands, in time for me to benefit by it, a copy of *The Framework of the Pricing System*, by Mr. Phelps Brown. That admirable exposition led me to make several minor alterations in my own treatment (notably in Chapter III, Section C) and to rewrite this Section J completely. I hope Mr. Phelps Brown will take it as sincere flattery. Students who are attracted towards the more mathematical approach to equilibrium analysis are advised to consult *The Framework of the Pricing System*.

determinate values result in the equilibrium of the system, will be:

(a) The volume and price of each commodity and its distribution among consumers.

(b) The volume and price (earnings) of each factor and its distribution among lines of production.

(c) The income of each consumer and his purchases of each commodity.

5. In equilibrium each of these unknown quantities will have a determinate value:

The price of each commodity will be at such a level that customers will be induced to distribute their purchases (in accordance with their substitution functions) in a way which causes the total supply of each commodity to be just cleared.

The total receipts obtained from the sale of each commodity, constituting the total earnings available for the producing factors engaged in each line, will be distributed among those factors according to their marginal productivity (in accordance with the production functions). The factors will also be distributed among the different lines in such rates of intake that (in accordance with the fixed production functions) their marginal value-products at those commodity prices will be equal to their own factor prices.

Hence also, each supplier of factors (each consumer) will receive a definite income which, given his tastes, he will distribute in purchases among the produced commodities in such a way that the whole supply is bought at market prices.

6. The interaction of forces thus comes round full circle and a self-contained system is conceivable, each element of which depends upon every other element, so that if any one changes, the change has immediate repercussions throughout the whole system. It may be described as an economic perpetual motion system, and is known as Stationary Equilibrium.

7. It fails to reflect the actual tendencies observable in the real world, and thus needs elaboration, in two main respects:

(a) It is timeless and gives only an instantaneous snapshot of tendencies. The equipment factors engaged in it are presumably everlasting and never need renewal. The human factors take no thought for the morrow since the results of their activities are immediately available. This Stationary Equilibrium takes no account of Capital, and Interest does not enter into its operative functions.

(b) Money is used, but is Neutral. The conditions which are necessary for the maintenance of the neutrality of money, the possibility of fulfilling these conditions and the results of the monetary disturbances implied by non-fulfilment, are the subject matter of the Theory of Money.

CHAPTER VII

CAPITALISTIC EQUILIBRIUM

A. THE TIME-STRUCTURE OF PRODUCTION

Hitherto the equilibrium systems which we have considered have been thought of as existing at a moment of time: snapshots of a system working with a harmonious interrelation of parts. Actually, a productive system exists through time and the "time-structure" of production raises some peculiar problems.

In any actual productive system, two important features introduce the time-factor prominently:

1. Division of labour is successive as well as contemporaneous. The making of an article is divided into stages, groups of factors concentrate on each stage and the article is handed down from stage to stage, gradually ripening into completeness. This process is not completed until the commodity has reached the possession of the final consumer.

2. Production is carried on with the help of equipment. This equipment must itself be produced, hence a further lengthening of the productive process is necessary. If the production of an article be taken to include the production of the equipment with whose aid it is produced, then the more elaborate that equipment the longer is the period of production.

It is difficult to give any precise length to this period of production. If we trace back the history of an article through its stages, we find that at every stage equipment was used, and that in the production of that equipment, other equipment of still earlier origin was used, and so on through an ever wider and ever more remote ancestry. Since, however, the specific contribution of the more remote equipment towards the production of today's article becomes

more and more nebulous and infinitesimal, no great inaccuracy will result from neglecting it. We can conceive of a "centre of gravity" of past contributions towards today's output of the article, which will lie rather in the immediate past, and whose distance in time can represent the length of the period of production.

B. THE STAGES OF PRODUCTION

I. The Successive Division of Labour.—We can conceive of a conventional productive process as being divided into stages as follows:

Preparatory Stage: The making of the equipment.

Stage 1: The raw materials are produced (extractive occupations).

Stage 2: The raw materials are marketed, assembled and transported to the next locations (commercial, banking and transport occupations).

Stage 3: The raw materials are made up into parts (manufacturing occupations).

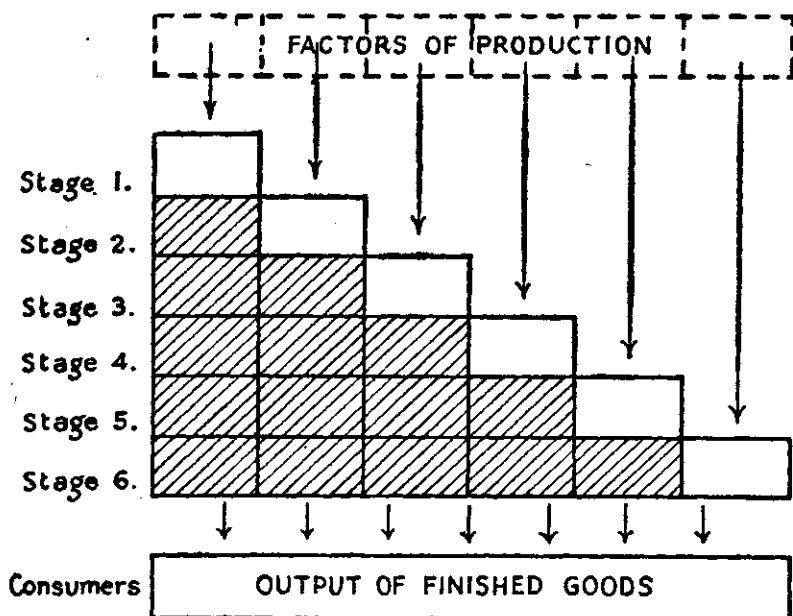
Stage 4: The parts are marketed, transported and assembled in the next locations (commerce, banking and transport).

Stage 5: The assembly of the parts into technically completed goods (manufacturing).

Stage 6: The completed goods are warehoused, marketed and transported to final consumers (wholesaling and retailing).

Although, as regards each single article, these stages are successive, in a going system these processes exist contemporaneously: the factors engaged in each stage work continuously. It is not necessary that First Stage factors, having done their share and handed on their output to the Second Stage, should then wait until the whole cycle has been completed before setting going a new cycle. All the stages work side by side and the items of commodities pass through in a steady stream—steady, at least, if the system is in equilibrium.

The process can be diagrammatically represented:



The original factors of production are applied in successive stages, each handing on to the next stage an output of uncompleted goods (intermediate products represented by the shaded portions in the diagram) one stage nearer completion than what they received. The output finally in the hands of consumers is thus the culmination of the successive partial contributions of all the original factors.

Thus, taking bread as an example, its production in simplified form can be described as follows:

Stage 1: The wheat is grown, cut and threshed on the farms.

Stage 2: The grain is assembled from the farms and sold and delivered to the millers.

Stage 3: The millers convert the grain into flour.

Stage 4: The flour is bought from the millers, transported and sold to bakers.

Stage 5: The flour is converted into bread.

Stage 6: The bread is sold and distributed to consumers.

2. *Intermediate Products.*—It is important to notice that, in a steadily continuing system, for every loaf that has just reached the consumer's possession there also exists contemporaneously: (1) growing wheat; (2) grain in transit; (3) grain in the mill; (4) flour in transit; (5) a loaf in the oven; (6) a loaf in the shop or being delivered. If all these intermediate products did not exist at the same time as the loaf in the consumer's possession, the delivery of future loaves could not be made and the system could not continue steadily.

All this mass of partially completed goods, known as Intermediate Products, constitutes the working capital of the firms engaged in each stage of production; and it is easy to see that for any given rate of intake of factors into the whole process, the longer the period of production, the greater must be this mass of intermediate goods in existence and necessary for the smooth working of the system.

3. *Equipment.*—A second feature must now be examined: the used of equipment. The farmers use ploughs; the commercial and transport services use offices, warehouses, railways and ships; the grain is ground in mills; the bakers use ovens. Part of the intake of factors consists of the services of durable equipment (or fixed capital). This durable equipment has itself to be produced. It wears out, and in a continuing system it must steadily be replaced if the system is to be maintained. Hence there must exist, parallel with the consumption goods industries just described, a productive system turning out production goods, the output of which, in a smoothly running system, reflects the total intake of equipment factors at all stages of the consumables cycle.

The scale of output of these equipment industries will depend upon the amount of equipment used in each stage and the rate at which it is replaced. If we assume a given state of technical knowledge, a range of methods will be available which gives to each entrepreneur a choice of the use of different kinds and masses of equipment, and, to industry as a whole, of a greater or less number of stages, i.e. of a longer or shorter period of production. The choice

will be determined by a consideration of the relative costs and the relative marginal productivities of different methods. In a system in equilibrium a definite volume of equipment will be in use in each of a definite number of stages of production; hence a steady rate of replacement of equipment will be necessary if equilibrium is to be maintained. Thus a precise scale of operations will also be found in the equipment industries, with its own attendant intermediate products.

Thus, in the equilibrium of capitalistic production, the total amount of intermediate products and of equipment (working capital and fixed capital) in continuous existence will be definite and constant, and its volume will have some determinate connection with the length of the total production cycle which the system embodies.

C. SOME CHARACTERISTICS OF CAPITALISTIC PRODUCTION

All the factors engaged in the equipment industries are concerned with producing goods which have no direct utility, but which are themselves used as factors of production in the consumption goods industries, and which derive their value solely from the value of the consumables which they eventually help to produce.

Similarly, most of the factors in the consumption goods industries are engaged in producing intermediate products with no direct utility. Only factors engaged in the last stage are producing direct consumables. Factors in earlier stages have an output of goods which, after leaving their hands, must pass through a further series of operations and processes before emerging in consumable state.

In capitalistic production, therefore, most factors are engaged in the handling of goods which will not emerge as consumables for a more or less considerable time after the performance of the particular service of the factor. In the meantime, however, the factors in each stage have to be paid their earnings which, in real form, consist of the finished goods which they continuously buy up and consume. These finished goods are the output of the last stage of production.

A mass of consumption goods flows out as a continuous stream and is the culmination of the whole productive cycle. The factors of the last stage merely add the finishing touches and their earnings entitle them to only a fraction of the final output. The final output is consumed by all the contributory factors in every stage, and in equilibrium it is necessary that the total earnings of all the factors per unit of time should equal the total prices of the total consumption goods which emerge in that unit of time.

Three corollaries must be noted:

(a) There is a certain inflexibility about the output of consumption goods. Its composition and volume are determined by the whole set of the productive cycle, and by its duration. Changes in final output which can be quickly made will be limited to those possible in the last stage only—speeding up or retarding completion, or changing in some degree the form and composition of output. These changes, and still more any drastic enduring changes, will cause repercussions through the whole productive system, and the more complex that system is, and the more prolonged its duration, the more difficult will be the process of readjustment to a new equilibrium. Since also this flow of final output constitutes the real income of the community, it can be seen that total real incomes are somewhat inflexible.

(b) A mass of capital goods exists and must be maintained in continuous existence. Now, in the system which we describe, all this mass is owned individually or collectively. At each stage of production, someone buys the product of the previous stage, holds possession of it through his own stage and sells it to the next stage. All the equipment is also owned by someone, and either used by him or hired out for use in productive enterprise.

The maintenance of the system in equilibrium imposes the necessity of maintaining the whole mass of working and fixed capital, upon whose continuous existence depends the outflow of the consumables which constitute the source of the earnings of all the factors engaged and whose production, indeed, is the very reason for the

functioning of the economic system itself. This implies that the continuance of the system demands the services of owners of property (individuals or collective bodies) who are prepared to hold that property in forms which are non-consumable. It will be necessary to consider under what conditions or on what terms they are induced to do so. This service has been called the service of Abstinence.

(c) In an established system a flow of consumables is continuously available for the payment of the earnings of the co-operating factors. It must be noted, however, that while the system was being built up (or at any time when it is being extended), equipment and working capital must be produced before any final output is available. This implies that productive services are to be performed which are balanced, as yet, by no corresponding output of consumables. This requires that someone must perform services and be content to wait for the reward: either the factors concerned themselves, or some entrepreneur who employs them, or some capitalist who finances them. This service has been called Waiting, and the precise manner of its operation, its effect upon the whole existing system and the inducements which make it possible, are matters of much complexity. The problem does not emerge if we confine our attention to the analysis of stationary equilibrium.

D. THE VALUE OF TIME

I. Capitalistic production is a process involving the passage of an interval of time between the rendering of services by factors and the emergence of the output for ultimate consumption.

Since the process of valuation and exchange is the central nerve system of the productive process, it is necessary to examine how the time-factor influences valuation.

Wants are continuously satisfied by the consumption of a stream of goods. Ideally, the onset of the stream of goods should be adjusted to coincide precisely with the ebb and

flow of the want-urges they satisfy. This, of course, is impossible; a man must anticipate his wants and lay in provisions of goods beforehand which will be at hand for consumption at the desired moment. Consideration of the time-factor is thus imposed upon man by his own forward-looking intelligence and by the organisation of modes of living.¹

2. In analysing the process of valuation, we assumed, in order to envisage a precise situation for examination, that an individual was considering the satisfaction of wants arising in a definite and limited period of time, and that in these conditions his estimates of the value of the marginal item of a good would diminish as the amount he contemplated possessing was larger; and so, given the initial fund or rate of flow of wealth which by exchanges he wished to maximise in value, he would act in a determinate manner. If, however, the goods he acquires or retains are to be available in some cases in successive periods of time, his valuations will be modified. Any good which is durable, and particularly which is also easily storable, will have an additional appeal, and its marginal value will diminish less rapidly than that of a good which is extremely perishable and which must be rapidly consumed or else wasted.

The individual, in this more normal situation, is making valuations, here and now, on the basis not only of the wants of today (using today conventionally), but also on the basis of the wants of tomorrow. What distinction, if any, will he have in his mind between these two sets of wants?

Tomorrow's wants will be as important then as today's are now, and in suitable circumstances an individual will recognise this and act accordingly. A meteorological observer posted on a desolate island and visited with un-failing regularity by a supply ship once a month will divide his monthly provisions of durable food-stuffs into twenty-eight equal parts and will consume one part per day. Such simple and precise circumstances are probably rare. Even though tomorrow's wants will be as urgent as today's, most individuals do not normally so evaluate them here and now; and it is the opinions of men and their attitude towards

circumstances which determine conduct, and not the facts themselves.

The chances and changes of life are infinite, and men vary as infinitely in their reactions to their possible onset. In market transactions today, where goods are now being dealt in which will minister to wants arising at different moments in a near or remote future, individuals will place very different values upon the same good accruing at different moments. One man will value an item of a good which is delivered on Saturday as greater than an identical item of the same good delivered on Monday, and so on in great diversity. Rates of exchange are thus conceivable in the market between identical items of goods existing or available at different times. The cargo of oranges in a ship due in port in December may be bought in November at a price higher than that of identical oranges then in the market. One individual may be willing to exchange six oranges which he now owns for the certainty of receiving five oranges next Monday; another individual may be willing to conclude such a bargain with him.

It should be noticed that the importance of the time-factor in valuations is sharply isolated in the typical process of valuation which we are now examining and which is somewhat peculiar. Hitherto, valuation has been regarded as the assessment of an exchange ratio between items of two commodities. The present problem concerns only one commodity: the exchange relationship between items of a good x today and items of x tomorrow.

E. TIME-PREFERENCES

The disposition of an individual which determines his valuation of the time-element in wealth is known as his Time-Preference. Some individuals have time-preferences which discount the future (x today will be more valuable now than x tomorrow); others will discount the present. The dominant influences which settle the time-preferences of most people seem to be as follows:

- I. Present wealth or income. If an individual's present

wealth is small it will all be absorbed in satisfying immediate wants, and he must heavily discount the future; he cannot afford to think of tomorrow. There are many individuals who, if they tried to provide for tomorrow, would die today. At the other end of the scale there are individuals whose present wealth, or command over present wealth, is so great that they could not possibly consume it directly now.

If, therefore, we assume, as we do in equilibrium analysis, that the time-preferences of individuals are stable, or at least that the time-preferences of the market community are stable as a whole, it carries the implication that incomes are also stable: changes of income, or present wealth, must necessarily be accompanied by changes in time-preferences.

2. The uncertainty of the future. Where it is uncertain whether a particular want will actually arise in the future, an individual will discount, in his present valuations, the significance of a future good which could satisfy such a problematical want. He will offer less now to secure the right to acquire such a good in the future than if he knew that the want must arise. What is equally important: if he is buying now the right to acquire a good in the future, even to satisfy a want which must inevitably arise, but is not sure that the good will actually accrue to him, i.e. that the bargain he now makes will be fulfilled by his opposite, he will offer less now for that uncertain future right. This element of uncertainty, and the insurance discount that it carries with it, is extremely important in actual transactions. In the real world, he who gives up today's wealth in exchange for tomorrow's is giving up real and concrete goods in exchange for wealth perhaps not yet in existence: in exchange for a mere guarantee or promise that a certain volume of wealth will be forthcoming when he requires it. (We have yet to examine how it is possible for anyone to make such a guarantee and to expect reasonably to fulfil it.)

Since, however, in equilibrium analysis we are concerned with economic systems which are stable and which are expected to continue stable, we must abstract from uncertainty (at least economic uncertainty) and we must

disregard for the present this element in time-preferences. Time-preferences will exist, nevertheless, even in a stable system, since the conditions and temperaments of individuals are widely dissimilar.

3. Temperament. Some people seem to have a mental or physical make-up which leads them to take little thought for the morrow; others the reverse.

4. Age. An old man who cannot expect, in the nature of things, to see many tomorrows will discount the future more heavily than will a younger man.

5. Family responsibility. A man with a wife and family will be likely to value future wealth more highly than a man without these responsibilities. This will modify the attitude of many older men whose present valuations will take account of wants likely to arise not only in the relatively brief future of their own life, but also in the much longer future of the life of their family.

F. THE MARKET FOR FUTURE SERVICES

1. Rates of exchange between present goods and future goods are an aspect of the Theory of Interest. Time-preferences alone, however, do not constitute a theory of interest, any more than scales of preference and substitution functions constitute a theory of market price. They provide the dispositional setting of the human beings whose behaviour in particular circumstances the theories set out to explain. Time-preferences of the individuals constitute, as did scales of preference, one of the fixed data from which analysis develops.

2. It is apparent that wide differences of time-preference will be found among groups of individuals. Each good which is valued will have an added time-utility whose presence will influence individual valuations in different degrees. Items of a good otherwise identical, but considered as being or becoming available for consumption after different lapses of time, will occupy different places in the scales of preference of different individuals. In these circumstances conditions of exchange exist and market

valuations will be placed upon these items which will take the form of ratios of exchange between items of a good available today and items of the same good available tomorrow.

3. Time-preferences will indeed affect all valuations, but attention is directed to one particular ratio of exchange which is important for later discussion: what will be the present value to an individual of a stream of commodities accruing to him at an even and regular rate over a future period of time? A typical case would be the stream of future services of shelter and comfort and enjoyment afforded by the ownership of a house. What will an individual be prepared to offer, here and now, to secure the assurance of these services by buying the house outright? The house will last a certain estimated time; the first month's services will be estimated as worth so much now, the second month's at so much less, the third at still less, and so on. The sum of these diminishing estimates will represent the present worth of the house. An individual whose time-preferences are such that he discounts the future very heavily will obviously offer very little (we disregard the possibility of resale). Since the only offers which affect the market are the firm offers of a precise amount of present wealth, an individual who has command of only a small amount of present wealth will not even enter the market, except for time-utilities of the immediate future (he will offer to rent the house, not buy it).

4. 'The generalised form of a stream of future services is constituted by a stream of future income.' In a monetary economy it is conceivable that a market should exist in which present wealth is exchanged for a stream of future income. For a future income of given dimensions and given duration, holders of present wealth will be prepared to make offers which will depend upon their individual time-preferences. In so far as the future is discounted, a present market worth can conceivably be put upon a stream of future income of definite magnitude which is theoretically infinite in duration. That market ratio will be the one at which the total supply of present wealth offered is balanced

by the total demand for present wealth from guarantors of those future incomes. The prices of the market will be expressed as percentage rates. The owner of (say) a hundred oranges can exchange them for (say) an incoming stream of one orange per week indefinitely—the market price for present oranges in terms of future oranges being thus 1 per cent. per week. The generalised market dealing in money income will similarly be expressed in percentages per month or year: holders of present wealth will offer its monetary value in return for a definite periodic money payment.

5. It remains to examine how a market of this kind can possibly arise and which individuals are in a position to make offers of future income—offers of wealth not yet in existence yet whose future flow is to be guaranteed.

G. THE PRODUCTIVITY OF CAPITAL GOODS

It is now necessary to examine the situation of the individuals who acquire present wealth and give guarantees of delivery of future wealth in exchange.

The possibility of the fulfilment of these promises rests upon the function of equipment. It must be taken as a fact of experience that the use of equipment vastly increases the productivity of human effort.¹ Human ingenuity and inventiveness have devised forms of equipment whose use in production so expands the output of commodities that the result amply repays the effort required to produce the equipment itself. If a certain volume of human effort and material resources is available to produce a certain commodity, output can be expanded by first fashioning equipment and devoting the rest of the effort and resources with the help of that equipment to producing the desired commodity. This has been summarised by the statement that roundabout methods of production are more efficient than direct methods.

It is not asserted that every form of equipment devised has this result, nor that the more roundabout method is necessarily more efficient; the Patent Office is choked with barren projects of equipment which experience and informed

judgment have condemned as less efficient or at least as effective only under certain conditions not as yet fulfilled. All that is asserted is that a vast choice of equipment is available, varying in degree of efficiency and whose use involves more or less roundabout methods of production. It is one function of the entrepreneur to select that method of production which, with the resources at his disposal, makes best use of the equipment which is potentially or actually available.

There is thus a demand for equipment by entrepreneurs, who therefore seek to secure command of present wealth with which to acquire this equipment and who are prepared to offer in return a share of the augmented stream of future wealth which their firms will produce with the aid of the equipment installed. The cost of the equipment will be represented by the cost of acquiring present wealth in terms of a stream of future payments. Since the equipment in its various forms which is available will have varying efficiency and applicability to his own line of production, the more equipment the entrepreneur installs the less will be its marginal productivity. In competitive conditions he will borrow present wealth up to the point at which the amount of equipment he can acquire with it will have a marginal value-productivity equal to the cost payments he must make to the capitalist from whom he borrows the wherewithal to buy the equipment. Since he is under an obligation to repay the debt to the capitalist (in addition to the periodic payments), he must reckon the marginal value-productivity exclusive of the steady allocation of sums to amortise the equipment and repay the capital debt.

The entrepreneur will thus enter the capital market as a dealer offering future incomes in exchange for present resources. His ability to do so is derived from the productivity of the equipment for the purchase of which he requires the present resources. The better the terms on which he can acquire present resources, the greater the amount of equipment he can and will set up before its marginal value-productivity sinks to the level of the cost

of the capital. The selections of types of equipment and adaptations of installations which these differences in volume of equipment imply must be taken as almost unlimited.

H. THE EQUILIBRIUM OF CAPITALISTIC PRODUCTION

1. In a system of stationary capitalistic equilibrium there exists a mass of wealth of definite magnitude which, owned in reality by capitalists, is held by them in the nominal form of money which they have loaned as capital to entrepreneurs, who have used the money to acquire fixed equipment and intermediate products which form the real counterparts of the nominal capital, fixed and working, of industry.

2. The capitalists must be conceived as lending their capital for short periods and renewing periodically their loans to entrepreneurs: otherwise the capital market would be inflexible and imperfect. Hence an individual capitalist will periodically be faced with the choice between exchanging his present resources into future income (by renewing his loans to entrepreneurs at interest) or of consuming them by buying up commodities and securing immediate satisfactions.

Future income will present itself to him as of certain significance in accordance with his time-preferences. On the terms offered by the market rate of interest he will acquire future income up to the point where its marginal significance compared with that of other goods obtainable is proportional to its price. If any capitalist alters the amount of capital he holds, e.g. by acquiring less future income and more present consumption, it is necessary, if equilibrium is to be maintained, that some other capitalist should make an equal and opposite change. With given individuals with given time-preferences, each particular rate of interest will be accompanied by a definite volume of capital holdings.

3. This nominal money capital will have been borrowed by entrepreneurs who will hold it, as fixed and working capital, in the real forms of equipment and intermediate products. Each entrepreneur will borrow just so much

capital that the net marginal value-productivity of the capital goods he can acquire with it (after deducting costs of upkeep, maintenance and amortisation) is equal to the price he pays for it (the interest payments). This will enable him to use capitalistic methods whose productivity forms the source of these payments and will be evidenced by a particular distribution between working and fixed capital which those methods will impose. Hence each entrepreneur will have a definite intake of equipment replacements (financed as costs of production out of the proceeds of the sales of commodity output) whose summation from all firms together will determine the scale of output of the equipment industries. Thus the whole productive system will have a determinate division into consumption goods industries and production goods industries.

With this determinate scale of output the equipment industries will have definite costs of production for each item of equipment, based upon an intake of factors whose earnings must be equivalent to those open for them to gain in the alternative consumption goods industries.

4. If the system is in equilibrium, it follows that the rate of interest must be at that level which induces capitalists as a whole to maintain the volume of their capital holdings.

The net marginal value-productivity of the capital goods, which each entrepreneur brings into equality with this rate of interest, is secured by a volume of capital invested in equipment and intermediate products whose nominal money value is equal to the volume of capital held by the capitalists.

This volume of capital imposes methods of production and a degree of roundaboutness such that a definite demand arises for equipment replacements. The satisfaction of this demand requires a scale of production goods industry whose costs of production for equipment (the summation of the earnings of the factors engaged) are equal to the present capital worth of the incomes, reckoned at the market rate of interest, which the marginal productivity of that equipment enables the entrepreneurs to transfer to the capitalists.

5. It must be noted that the entrepreneur, in acquiring capital and capital goods, is involved in two markets. On the one hand, he borrows capital in a money market, acquiring loans of money for which he pays by a promise of future money incomes. On the other hand, he acquires capital goods in an equipment market and an intermediate product market, estimating the worth to him of his purchases on the basis of a marginal productivity stretching through the period of future time during which these goods will afford service; and paying for them with the money he has acquired in the money market.

The rate of interest enters both these markets; in the money market it determines the rate of future money incomes he must pay for every £100 he borrows; in the goods market it determines the present worth to him of his equipment, since he values the equipment on the basis of the capitalisation, at the market rate of interest, of its future productivity.

The theory of interest is thus bound up with the use of money, and no adequate analysis of interest theory can be followed until a study has been made of the functions of money and of the nature of monetary systems.

It will be enough to illustrate the connection between the two markets by indicating the broad results of a change of data. Suppose the time-preferences of individuals change (as by the threat of war) to cause the future to be discounted more heavily. This will lead individuals to contract their capital holdings, and entrepreneurs will have difficulty in renewing loans; the rate of interest will rise to check this contraction. The rise in the rate of interest will disturb the equilibrium adjustment between the marginal value-productivity of equipment and its costs in terms of interest payments on the capital borrowings the equipment represents. There will be a tendency to contract equipment to the more advantageous forms, raising its marginal value-productivity towards equality with the new higher rate of interest.

The higher rate of interest will lower the capitalised value of the existing equipment (based upon its actual value-

productivity) and will bring it below the old market price of equipment emerging from the production goods industries. The latter will consequently be unable to sell their output at a price which covers costs and will be induced to contract their scale of operations. There will be complex reactions on factor earnings and complex transfers of factors between industries.

CHAPTER VIII

CAPITALISTIC METHODS OF PRODUCTION

A. THE REAL WORLD OF PRODUCTION

I. *The Next Stage*.—Equilibrium systems have been set up and analysed only as patterns of economic activity representing in the pure state tendencies inherent in precise postulated situations, much as the chemist in the laboratory works out chemical equations inferred from the experimental reactions of the natural elements in the pure state.

At convenient moments the complications of the real world have been introduced and attempts have been made to indicate the relevance of the theoretical analysis. It is convenient at this particular moment to consider some further features of reality which the analysis of capitalistic equilibrium has suggested.

(a) The theoretical analysis has proceeded in terms of two types of capital goods: intermediate products and fixed equipment. Actually, writers have enumerated a bewildering range of subdivisions of material resources, and it will be useful to examine some of the more important (see Section B).

(b) The real world is not static or stationary, it is dynamic. In particular, the volume of capital is not stable but fluctuates incessantly. In modern times it has grown rapidly but there have been periods (mainly as the outcome of wars) when there has been retrogression.

This growth of capital, and especially its unevenness in time and place, raises many problems which will not be here considered, but some mention will be made of the nature of capital accumulation and of the general conditions which govern it (see Section C).

(c) Capitalistic production is also characterised by

division of labour both contemporaneous and successive. It is convenient to summarise some of its aspects although an examination of its precise theoretical significance must be deferred (see Section *D*; also Chapter XI, Section *A*).

(*d*) The dynamic world is a world of change. The main implications of this will be examined in the following chapter, but it is convenient to look at one particular feature: the manner in which factors of production can adapt themselves to change: their mobility (see Section *E*).

(*e*) The importance of machines has some special features which deserve attention (see Section *F*).

(*f*) Lastly, an examination is made of the importance of that aspect of productive efficiency which arises from endowment which is intangible: non-material equipment (see Section *G*).

2. *Capitalistic methods* are today universal; the practical choice is not between capital and non-capital methods but between methods using more or less capital.

The use of capitalistic methods arises because:

(*a*) Stability on a high standard of living imposes the need to produce in advance of requirements and to lay up stores of wealth.

(*b*) Methods of production have been invented which are more efficient: which result in a greater flow of consumables with the same expenditure of effort and resources, or in the same flow with less expenditure (i.e. less "cost" per unit of output). These methods require the use of equipment which must itself be produced. It is important to note that though much of this equipment (capital) is durable, it is all consumed (worn out, etc.) as it is used, and if capitalistic methods are to continue, the equipment must be continuously maintained (repaired, replaced, etc.).

3. *Characteristics of Capitalistic Methods.*

(*a*) The volume of wealth consumed by "final consumers" (i.e. the direct satisfaction of wants) is less than the total wealth produced: part of the productive effort and resources of the community are being directed towards the production of capital goods.

(b) Capitalistic methods are more roundabout; they are time-consuming. Between the beginning of the productive process and the emergence of consumption goods, time must be found for capital creation. The delay is justified because the flow of consumables which will eventually emerge is expected to be more ample than it would have been with non-capitalistic methods (or in practice, with less capitalistic methods). Note that the producers of capital goods must continue to consume; hence, either they devote only part of their time to capital creation or there is division of labour and they are supplied from the surplus output of those workers who are producing consumption goods.

4. *Functions of Capital.*

(a) To provide means of subsistence during roundabout methods of production: consumption goods in stock and process.

(b) To provide material resources for productive processes: stocks of raw materials, fuels, etc.

(c) To provide equipment whereby efficiency of production is increased: production capital.

B. SUBDIVISIONS OF MATERIAL RESOURCES

1. *Property (or Capital) and Income.*—This is really not a classification of factors but rather a classification of wealth.

Property consists of wealth, owned by individuals or by society, measured at a moment of time. It includes stores of consumption goods, natural resources and material equipment. It is a "stock." Income consists of wealth produced and made available for use or consumption during a certain period of time. It is a "flow."

2. *Land and Capital.*—Land consists of all Natural Resources.

Capital consists of all other material resources; or at least of all material resources which have been given a form which renders them more suitable for use in productive processes.

This distinction is a traditional one which is now tending to be discarded because it lacks significance for most problems. The implication of the distinction was that Land, being supplied by nature, is fixed in volume: its supply is inelastic. While Capital, being the result of human effort or production, can be expanded or contracted: its supply is elastic.

A certain confusion is evident here between volume and supply. What is relevant to economic analysis is the rate at which supplies of the resources become available for productive use, and this has no necessarily direct connection with the absolute volume in existence. The volume of coal in China is large but its rate of present supply is negligible: the coal is not being exploited, nor could the rate of supply be rapidly expanded. (Compare Chapter VI, Section G 3.)

This concept of Elasticity of Supply is an important one, but factors cannot be separated into rigid groups according to their elasticity of supply; it is necessary to consider time and place:

(a) In any particular area the supply of most things, natural or produced, can be changed. Factors can be imported from outside (e.g. as raw materials) or permanent modifications of conditions can be made, e.g. rainfall can be altered by afforestation, sunshine can be transformed by smoke abatement, land can be drained and levelled, plants can be "naturalised" by propagation. The line between Land and Capital becomes blurred.

(b) In any short period of time, almost nothing can be increased in supply, whether "produced" or not. The longer the period considered, the more elastic is the supply of most factors, natural or produced. Thus the distinction between "factors of elastic supply" and "factors of inelastic supply" is important mainly in "short period analysis" but it does not coincide with the traditional distinction between Land and Capital, which ceases to have much economic significance.

3. *Capital, Capital Goods and Material Equipment.*

(a) The term Capital is one of the most obscure and

ambiguous in economic theory, and, perhaps as a result, problems connected with it are often very confusing and unsettled.

Sometimes it is used as synonymous with Property or Wealth, sometimes as equivalent to Property excluding Consumption Goods, sometimes as equivalent to all Factors of Production excluding Labour (and sometimes also excluding Natural Resources) and so on.

(b) Whatever the width of its scope, it is important to bear in mind one distinction which is usually implicit in most usages: Capital Goods refers to the physical goods themselves which are included in the definition; while Capital refers to their value in terms of money.

(c) Professor Cannan has suggested¹ that economic usage should conform to business usage and that the term Capital should be used to refer to the money valuation of the property of an individual or productive unit (e.g. a company).

(d) To avoid the ambiguities of Capital, the term Material Equipment can be used to refer to all those "products of past labour which are embodied in material things and which are still in existence and useful."¹ It has been "accumulated" by man and includes all those constructions and modifications of the environment which have economic significance but which are not necessarily private property and to which it is difficult or meaningless to assess a money valuation, such as roadways, harbours, postal systems.

4. *Production Capital and Consumption Capital.*—Production Capital is that part which is used for further production, e.g. factories and machines. Consumption Capital is that part which is giving direct service to final consumers, i.e. durable consumption goods, e.g. houses and furniture in the possession of consumers.

The distinction is clear but is not always easy to apply since many goods serve, or can serve, dual functions, e.g. a motor-car used both for business and for pleasure; potatoes which can be consumed or used as seed-potatoes.

¹ E. Cannan: *Review of Economic Theory*, Chap. VI.

5. *Fixed and Circulating Capital.*—This distinction is technical, arising from the nature of any productive process.

Part of the capital of a firm is embodied in durable forms, each item of which is used in repeated cycles of production. Such are buildings and machines, the plant. This is Fixed Capital.

Another part is in the form of resources which are in movement through the production process; each item loses its identity as it is used (such as fuel) or is transformed (raw materials being processed) or quickly passes out (completed goods). This is the Circulating Capital (intermediate products).

This distinction is often important. Once the fixed capital has been set up, a firm cannot quickly change it. It is a complex system and it takes time to expand it. It wears out relatively slowly and so cannot be contracted quickly except by sacrificing the expectation of recovering its costs through enjoying its services. The circulating capital, however, is flexible in volume; but note that there is a maximum set by the capacity of the fixed capital to handle it. When an efficient firm is "working to capacity," the fixed capital is fully occupied and circulating capital is at a maximum.

6. *Sunk and Liquid Capital.*—The economic system is in a constant state of flux and it is often important for productive units (or individuals) to be able to avoid prematurely committing themselves to holding particular forms of capital or property; hence they try at times to hold wealth in forms which permit a change of mind, in "liquid" forms.

Different forms of wealth differ in "liquidity," which term refers to the ease with which any particular form of wealth can be exchanged for another form. The most liquid form of wealth or capital or property is (normally) money. Money itself, however, is in different forms (coins, banknotes, bank balances) which may differ in liquidity; and all other forms of wealth could, in any particular place or time, be graded according to their ease of exchange into other forms.

The distinction is thus not a technical distinction between

goods: liquidity depends upon circumstances. Among a party of people marooned in the Arctic, coins might (at least for a time) be extremely illiquid.

As applied to the capital of a firm, liquidity ranges from the usually least liquid fixed (non-circulating) capital through circulating capital and stocks of completed goods to the most liquid capital, cash holdings or bank balances.

As a going concern, a firm is constantly acquiring liquid capital in the form of money received from the sale of products, and devotes part of it constantly to the renewal of the flow of circulating capital and intermittently to the replacement of worn-out fixed capital. If there is uncertainty regarding future developments, or if a change of process is contemplated, a firm will refrain in part from renewing circulating and fixed capital and will hold a rising proportion of capital in liquid forms—cash, bank balances, stock exchange securities.

C. THE ACCUMULATION OF MATERIAL EQUIPMENT

1. Accumulation takes various forms, e.g.

(a) Improved agricultural land—clearing, levelling, draining, etc.

(b) Improved breeds and stock of cattle and domestic animals.

(c) Tools and machinery and production goods.

(d) Transport systems and improved communications.

(e) Stocks of durable consumption goods.

2. It is difficult to measure amounts of accumulation (or the volume of capital):

(a) To count the items of each kind would be a stupendous task and, even if possible, would be valueless for purposes of comparison, e.g. which is greater:

$$5a+4b+3c \text{ or } 4a+5b+3d?$$

(b) The "value" of each item could be stated, but, since values are merely ratios, they cannot be added together, e.g. an individual may consider:

(i) That A (a certain motor-car) is equal in value to B (a certain house).

- (ii) And that A is also equal to C (a certain garden).
- (iii) But that B+C are greater in value than A+A
(two motor-cars).

The habit of quoting values as money "prices" and adding the sums of money together merely conceals but does not negative the fallaciousness of the process.

3. The existence of capital implies that production has taken place which has not been followed by immediate consumption: output has exceeded immediate requirements, and wealth has accumulated either in the form of a store of consumption goods (which is limited by their perishability) or in the form of equipment which will serve for future productive purposes. Capital implies saving and accumulation; that is, the wants which the members of the community choose to satisfy as consumers are being satisfied by productive activity less than is actually being put forth; the surplus energy, time and resources, being devoted to producing capital goods. This implies that the individuals concerned have foresight to choose to work for the satisfaction of tomorrow's wants rather than to enjoy greater abundance or greater leisure today.

The supply of capital thus depends upon two groups of influences, which may be called the Power to Save and the Will to Save.

(a) *Power to Save* depends on:—

- (i) The existence of a surplus of wealth or time owing to the relative efficiency of production.
- (ii) Opportunities for investment depending upon skill and inventiveness in devising forms of equipment which will increase efficiency.
- (iii) The maintenance of a legal and economic organisation favouring investment: e.g. banking and monetary system, law of contract, etc.
- (iv) A system of taxation to finance collective investment, e.g. in drainage systems, roads, etc.

(b) *Will to Save* depends on time-preferences and in particular on:—

- (i) Foresight—influenced by various motives, e.g. provision for family.

- (ii) Prospect of security of investment—continuance of law and order, the property system and inheritance.
- (iii) Social status of individual wealth.
- (iv) Public spirit and sentiment of community making tolerable the burden of taxation.
- (v) Expectation of profitable returns.

4. Accumulation is generally known as Saving and Investing.

(a) Saving is the negative aspect and investing the positive aspect.

Saving consists in consuming less wealth than is produced during a given period of time. At the end of the period there must therefore exist:

- (i) A stock of consumption goods.
- and/or (ii) A stock of production goods.
- and/or (iii) Improved equipment.

Note that saving can consist in producing the same as before and consuming less, or consuming the same and producing more.

(b) Investment is the positive process of storing up the surplus consumption goods or making the production goods.

(c) The emergence of the legal relationship of debtor and creditor has enabled the processes of saving and of investing to be separated—the saver is not normally the investor: the saver “lends” his surplus to the investor, who consumes it in the production of equipment; the equipment is then what is “saved” (or accumulated).

(d) Strictly speaking, saving and investing must go hand in hand. There can be no saving without investing, and vice-versa. If the resources which the saver lends to the investor are merely consumed without any accompanying production (or investment), then no “saving” has taken place—all that has resulted is the creation of a legal debtor and creditor position—the transaction has legal significance but not economic. Conditions may occur, however, when this legal transaction has important economic repercussions.

D. THE CONSEQUENCES OF THE DIVISION OF LABOUR

1. *Reduction in Costs of Production.*

(a) Improved quality of output because each process is performed by a specialised factor.

(b) Increase in dexterity and skill of human factors (though in a narrower range) with less expense and time of training.

(c) Use of machinery is facilitated (see Section F).

(d) Saving in the time otherwise required in passing from operation to operation.

(e) Tools and equipment are economised by being used continuously by a few workers and not merely intermittently by many.

(f) Organisation of production is improved. Workers can be specialised on tasks suited to their individual capacity. Different factors can be employed in efficient proportions.

(g) Production is localised in favourable environment (see Chapter XI, Section E).

2. *Improved Methods Facilitated.*

(a) The simple components of distinct operations are often similar, and improvements in any one line are quickly adopted by others.

(b) Specialised research workers are equipped to study processes and devise improvements.

3. *Advantages to Workers.*

(a) Increased productivity makes possible a raising of the standard of living and reduction of hours of work.

(b) Extension and diversity of occupations makes possible the productive employment of a wide range of capacities. Hence economy of skill and concentration of worker on tasks suited to his capacity.

(c) Increased mobility. Specialisation means increased skill in a narrower range of operations; but to mitigate this narrowness there is close similarity of process in dissimilar industries; furthermore, the time and effort required to learn a trade are lessened.

4. *Disadvantages to Workers.*

(a) *Regimentation.* Successful production by division of labour requires organised co-operation of factors; hence the factory system and the regimentation of workers. It can, of course, be argued that as machines take over routine and automatic tasks, the activities of workers demand a higher degree of alertness, intelligence and initiative. Nevertheless, regimentation lessens their sense of responsibility and increases their sense of dependence on a soulless capitalism.

(b) *Monotony.* Specialisation increases monotony of employment. Even where intelligence and initiative are required, the range of problems to be dealt with is usually narrow. This disadvantage is real; but the specialisation which has brought it about has also made possible a higher standard of living and increased leisure. Monotony of work does not imply monotony of life.

E. THE MOBILITY OF FACTORS

1. Production by division of labour implies the use of factors specialised in function. A factor completely specialised to one use is a *Specific Factor*. One with a very wide range of alternative uses is *Non-Specific*.

Methods of production are constantly changing; in addition, there is a ceaseless variation in the relative importance of different centres of production. Every change alters the demand for factors and thus two types of adaptability of factors are important: *technical mobility*, or the range of alternative functional uses; and *geographical mobility*, or the possibility of movement between centres of production in response to changing demand.

2. *Material Factors.*

(a) *Technical Mobility*—there are wide differences in range of technical mobility: coal can be used in many industrial processes; while complicated machines may be restricted in use to the particular process for which they were designed.

Increasing specialisation seems to work in opposing

ways. It increases the use of specific complex machinery; but the subdivision of process which is its concomitant has resulted in the analysis of divergent processes into the same or similar fundamental operations or components. Thus not only is much of this specific machinery turning out products which have a wide range of market, but many machines themselves are standard types easily adapted. This is encouraged by agreements and legislation concerning standardised parts and measurements.

(b) Geographical Mobility—this is naturally bound up in large measure with the efficiency of the transport system. However, when once equipment has been set up in a particular establishment and co-ordinated into plant, it is practically immobile. Buildings cannot easily be moved; and the cost of dismantling, transporting and re-assembling machines is often prohibitive.

Hence, though the parts and units of equipment may be increasingly mobile, the more complex elaboration of their association and co-ordination increases immobility.

Note the importance of legislative hindrances to mobility: tariffs, quotas, etc.

(c) Mobility of Capital: the Rate of Replacement. If anything longer than a short period of time is considered, mobility, both technical and geographical, is vastly increased owing to the rapid rate of replacement of equipment.

Especially when invention is active and the productive system expanding, much equipment is quickly discarded as obsolescent even before it is worn out. High depreciation costs are thus regularly charged as part of the costs of production, and large funds are regularly available as liquid capital capable of being invested into those forms which correspond to the changing demands. Thus the mobility of capital (as distinct from that of particular capital goods) is high.

This mobility of capital is largely the outcome of the efficient organisation of the monetary, investment and banking system which has enabled liquid resources to be collected from wide areas and in small amounts and

concentrated under the control of industrialists and others desirous of converting them into those forms of capital equipment of the type and in the places which changing demands have made most attractive.

3. *Labour*.—The Mobility of Labour presents features analogous to that of material factors, but it is determined also by other considerations fundamentally distinct. A material factor can move from function to function or from place to place while its owner sits quietly at home, but labour must be delivered in person by the worker. The mobility of labour is a human and social problem.

(a) Technical mobility:

(i) Horizontal, i.e. between different occupations of the same grade of labour. Depends on:

(1) Degree of specialisation and ease of learning the calling.

(2) Interchangeability of technical knowledge.

(3) Artificial lines of demarcation, e.g. by Trade Unions.

(4) Adaptability of worker.

(ii) Vertical, i.e. between higher and lower grades of labour. Depends on:

(1) Social barriers—class feeling, educational facilities.

(2) Freedom of competition.

(3) Personality of worker—ambition, etc.

(b) Geographical Mobility. Depends on:

(1) Expense and inconvenience of moving—transport, housing, etc.

(2) Household ties—number of working members of the family.

(3) Local sentiment, language barriers, etc.

(4) Ignorance of the possibilities—counteracted by Employment Exchanges, Trade Unions, etc.

(5) Migration laws and regulations.

(6) Personality of the workers—apathy, etc.

(c) The Replacement Rate.

As with material factors, so with labour, the time-factor

is important. The time of training required is one aspect of this but more important is the rate of replacement.

In any particular occupation, workers are constantly being displaced by sickness, old age, death and other reasons; and new recruits replace them mainly through the apprentice or similar systems. Thus there is flexibility of adjustment of the number of workers at both ends of the scale. Where the number of recruits is a high proportion of the total numbers, this flexibility will be greater and this will be particularly so in an expanding population.

F. CHARACTERISTICS OF MACHINE PRODUCTION

1. *Reduction of Costs of Production.*—Machines are installed because it is anticipated that they will reduce costs of production, i.e. per unit of output the cost of the new factors will be less than the cost of the displaced factors. This arises because:

(a) Speed and regularity of work are increased. A machine is speedier than a man and does not require rest and sleep. This results in increased output per unit of time, and since many costs vary with time, e.g. rent of land, costs per unit of output are reduced.

(b) Accuracy of work is increased. This reduces waste. More important, it enables processes and parts to be standardised and thus widens their market. Mass production is made possible and a spreading of overhead charges over a bigger output. Furthermore, it promotes further subdivision of labour since standardised parts can be more easily assembled, co-ordinated and interchanged.

2. *Alleviation of Human Labour.*

(a) Power can be concentrated to perform tasks beyond human strength.

(b) Routine and monotonous tasks can be taken over. Subdivision reduces processes to simple components which can be performed by machines requiring little supervision.

(c) Unpleasant and dangerous processes can be taken over. This is often done for social and humanitarian reasons even where non-economic, i.e. where costs are not reduced. It is often enforced by legislation.

(d) Machines displace human labour. This result is often generalised into the statement that machines create unemployment. This needs examination:

Machine processes enable the same output to be achieved with less labour. This is a benefit to the community, not a hardship. The labour released can be utilised:

- (i) To expand the output (if the reduced costs lead to lower prices and an expansion of demand).
- (ii) To produce other commodities which the community could not afford before.

Alternatively, the benefit can be enjoyed in increased leisure.

Any change in method may alter the demand for factors: an increase for some, a decrease for others. If the decrease affects human factors, the particular unemployment is compensated by:

- (i) An increased demand for other human factors (the machine-makers, etc.).
- (ii) The generalised benefit of reduced prices for consumers, and a consequent increase of their purchases in other lines.

While the community as a whole gains, individuals undoubtedly suffer. The injury is also localised and more obvious; its extent and duration will depend upon the mobility of the labour concerned. In some cases, e.g. old men, extreme individual hardship may result. It is relevant to remark that the increased wealth of the community, resulting from the initial change, should enable provision to be made—by transfer, by training or by pensions—for these casualties of change and progress.

3. *Effect on Mobility* is difficult to assess.

(a) As regards labour: the designing, manufacture and use of machinery has upset the value of the old crafts-

manship and resulted in a great specialisation of function, which would seem to increase immobility. Nevertheless, a machine-worker specialised to deal with one kind of machine has a wide range of more or less similar machines whose handling he can readily master; the proficiency of the modern specialist is narrow in range and probably more easily acquired than the old craftsmanship.

(b) As regards capital and equipment: although standardisation makes for mobility, the increasing complexity of fixed capital equipment increases immobility. This is mitigated, especially in an expanding economy, by rapidity of replacement permitting adaptation to change.

G. NON-MATERIAL EQUIPMENT

I. *Non-Material Equipment*.—A great deal of the efficiency of production depends upon equipment which is intangible, or which is so diffused as to partake of the nature of free goods.

When a man goes to a technical college and acquires specialised training for which there is a demand, the productive system is made more effective. During his attendance at college he is not producing, and the total output of the community is short of his potential output. Furthermore, he continues to consume goods currently produced by others. From the point of view of the community this process represents an investment which results in an improved capacity to produce.

Similarly, a research worker who is supported out of the savings of the community, and who makes a discovery which results in an improvement in the efficiency of production, typifies a form of investment which increases the intangible economic equipment of the community.

Again, the knowledge of how to organise a joint stock company facilitates production. It has been acquired largely as a result of the trial and error of past generations and is dependent for its effectiveness partly on legal enactments. Such an organisation is part of the economic equipment of the community.

Thus the productive efficiency of the community depends largely on the nature and volume of its non-material equipment.

2. *The Heritage of Improvement.* Professor E. Cannan (in an article in *Economica*, November 1934, on which this section is based) has defined the Heritage of Improvement as "The net economic advantage which we possess in consequence of what has been done by mankind in the past." It consists of:—

Non-Material Equipment:

- (i) Knowledge and skill produced by research and experience and transmitted from each generation to the next.
- (ii) Organisations enabling large numbers of people to co-operate in production.

Material Equipment:

- (iii) Man-made alterations in the arrangement of matter which have made the outer crust of the earth more suitable for our needs.

Much of this Heritage is not the exclusive property of any person or institution. Most knowledge and forms of organisation are free goods; the scope of secrecy, patents and copyright is small. Even much material equipment is socially owned—roads, lighthouses, dredged waterways.

Part of the Heritage is merely the result of experience, but a large part is the deliberate product of labour, and we can control what we hand down by devoting more or less labour to the process (by endowing research, by rewarding invention, by encouraging accumulation). On the one hand, we can work hard, live frugally and hand on a greatly expanded Heritage; on the other hand, we can "eat, drink and be merry" and effect no improvement of the Heritage. From the point of view of mankind as a whole, present and future, there is some intermediate point at which the gain in the future will just be enough to balance the loss in the present. The precise place of this ideal point cannot be ascertained; we can make only wild guesses about most future requirements. We cannot even decide whether it

is better to provide for a smaller, richer population, or for a larger, poorer population.

3. *The Aggregate of Capital and the Heritage of Improvement.*—Confining the term Capital to those things which are easily valued in money terms because commonly bought and sold for money, it follows that much of the Heritage of Improvement lies outside its scope. Hence changes in the Aggregate of Capital do not always coincide with changes in the Heritage of Improvement. Improvements in the Heritage (as by inventions) may make many forms of capital redundant and valueless. Thus, loss or diminution of capital is not necessarily to be deplored from the point of view of society, though the individual owners may suffer. Loss of capital is to be deplored only when society as a whole is damaged by the loss.

CHAPTER IX

THE THEORY OF WAGES¹

A. THE LABOUR MARKET

1. The Theory of Wages is merely one aspect of the Theory of Value. Wages represent the price of the factor Labour, the demand for which is a derived demand based upon the demand for the consumption goods it assists in producing, as is the demand for all factors of production (the demand for direct personal services is an exception to this). The general case of factor prices has already been dealt with, but the labour market has some special features both on the supply side and on the demand side; and this circumstance, together with the peculiar importance of the labour market in human affairs, justifies separate treatment and some repetition.

2. Labour is a broad term for productive services of very great variety, the supply of which is necessarily complex and depends on:

- (a) The number of workers.
- (b) The efficiency of the workers.
- (c) The duration of the productive effort.
- (d) The intensity of the effort.

In the usual fashion of systematic analysis, we shall first assume that the supply of labour is fixed, i.e. that the number of workers is constant and also their individual supply of labour (in duration and intensity), and also, for a short time, that each worker is of equal efficiency. We shall thus isolate for analysis the demand conditions for labour; we shall examine the supply conditions later.

3. We shall also assume at first that the labour market

¹ This chapter is strongly influenced by an already standard work on wages, namely, *The Theory of Wages*, by J. R. Hicks, which the student is urged to consult for a much fuller and more comprehensive treatment of the whole subject.

is competitive and perfect. This will imply particularly that there is never any unemployment nor "exploitation." The price of labour (wages) must settle at that point where demand equals the supply available. If at any wage rate the demand exceeds the supply, then some entrepreneurs will experience a shortage of labour and will bid higher prices to attract more from other occupations. Since the labour units are assumed provisionally to be homogeneous, this will raise prices all round up to the equilibrium point where it no longer pays any entrepreneur to tempt an extra unit to transfer by making a higher wage-offer. On the other hand, if at any wage rate the supply exceeds the demand, the unemployed will compete for jobs by offering themselves at lower wages. Wages will fall all round to that equilibrium level which just induces all the entrepreneurs to engage all the available workers.

B. WAGES AND MARGINAL PRODUCTIVITY

Under the assumed conditions, when the labour market is in equilibrium, each man will receive the same wage, and that wage must equal the marginal value-product of the available supply of labour. Each entrepreneur will engage workers up to that point, since if the marginal value-product of labour in any firm is greater than the wage paid, an extra man engaged would raise the gross receipt from sale of output more than his wages would raise costs, and so profits would expand. If wages were greater than the marginal value-product of labour, then the dismissal of a man would reduce output and hence gross receipts by an amount less than the reduction of costs, and hence profits would again be increased.

It follows that the number of workers engaged by each entrepreneur will depend upon the wages payable. If at any given wage rate the total intake by all the entrepreneurs does not absorb all the workers available, the unemployed will offer themselves at less wages to supplant the employed. To retain their jobs all workers will have to reduce their supply price. The fall in wages will make the existing

marginal value-product of labour exceed the new wages, hence entrepreneurs will be induced to engage more workers. This movement of wages and of the consequent volume of labour intake will continue until equilibrium is reached with all the available workers engaged at a wage which will equal their marginal value-productivity.

This broad analysis assumes that the amount of labour engaged by each entrepreneur is freely flexible. It is necessary to examine this assumption and to see by what process the adjustment is made.

C. THE FLEXIBILITY OF THE INTAKE OF LABOUR

1. To alter his intake of labour in response to wage movements (say, a fall in wages induced by a surplus of labour), an entrepreneur must either change his methods of production, substituting a method using more labour and less other factors, or he must alter his volume of output, expanding his scale of production and so increasing his intake of labour. He may of course do both, but, for the sake of clarity, we will look at each possibility to the exclusion of the other by making a simple supposition.

2. *Changes in Methods.*—If we assume that each entrepreneur is working at the maximum scale of output he is capable of controlling efficiently, his only reaction to a fall of wage rates would be to change his methods. He will, when possible, increase the intake of the cheapened labour and decrease the intake of other factors. The substitution will proceed up to the point of equimarginal productivity for each factor per unit of costs, i.e. up to the point where marginal products are proportional to the prices of the factors (we are assuming fixed total output and hence fixed price of product). The extent of the change-over in response to any given initial fall in wage rates will be affected by the possibility that the discarding of other factors may cause their prices to fall and so check the substitution sooner than otherwise.

As regards the particular industry as a whole, the result will be that for this given output, costs of production will

fall, partly from the direct result of substituting a cheaper factor for a dearer, and partly from the secondary reaction of a fall in the price of other factors forced to seek less advantageous employment elsewhere. Marginal value-products will be proportional to, but higher than, the prices of the factors; the old prices of output will be higher than new costs per unit, and entrepreneurs will be making profits above normal. This will attract other entrepreneurs into the industry and the output of the commodity will expand. This expansion will increase the demand for all the factors engaged and will set limits to the fall in their prices. The expansion of output will cause a fall in price of the commodity produced. The extent of the expansion will depend upon the elasticity of demand of the product. If its price falls only slowly as output expands (elastic demand), then the expansion will be greater than otherwise. It will proceed until the resulting fall in marginal value-products as prices fall is in equality with the prices of the factors, now somewhat higher than in the immediate short period response to the initial surplus of labour.

Thus the extent of the fall in wages which will be required to induce a change of methods adequate to absorb a given surplus of labour will be mitigated by any rigidity of prices of other factors and by the possibility of expanding output without sharply reducing commodity prices.

This analysis, based upon flexible coefficients of production, is applicable to the long period method of adjustment to a surplus of labour.

3. *Changes in Output.*—If we assume that the coefficients of production in any one industry are fixed, i.e. that methods of production are inflexible, then the only way in which the surplus of labour can be absorbed in response to a fall in wages will be by an expansion of the scale of production.

The first reaction to a fall in wages will be that costs fall. Since output and prices are unchanged, entrepreneurs will make abnormal profits and there will be an incentive to expand. Even if we assumed again that each entrepreneur is controlling his maximum output (as the strict equilibrium situation demands), expansion can proceed by the entry of

other entrepreneurs into this line of production seeking to reap these higher profits. Output will thus expand and prices fall until the profit level is again normal. What applies, however, to this one industry, applies to all: 'the fall in wages will cause a rise in profits everywhere. If we neglect the possibility of changing methods and assume that coefficients of production are everywhere fixed (as they will be in the short period), different industries will, nevertheless, be differently affected. Those industries which use relatively much labour per unit of output will gain from the fall in wages more than those which use relatively little. Hence, entrepreneurs seeking to maximise their own earnings will transfer from those relatively less favoured industries to those using much labour. This contraction will release factors and will be the means of enabling the relatively more prosperous industries to expand their intake of factors and so absorb the surplus labour and increase their output. Every unit contraction will release more other factors than labour; every unit expansion will absorb more labour than other factors; thus the initial surplus of labour will be absorbed. (Compare Chapter VI, Section *D* 7.)

There will thus be a determinate wage which will equalise the available supply of labour with the demand for it, arrived at by adjustments of the scales of output (with all their attendant reactions) between industries all of fixed coefficients of production but using different proportions of labour per unit of output.

4. Thus, changes in wage rates will cause shifts in equilibrium prices and quantities by two paths: by changing the scale of production of different firms and industries; and by causing changes in methods of production by inducing the adoption of methods using more labour or less labour in proportion to other factors according to the direction of the initial change in wages.

5. It is now necessary to examine the assumptions which have underlain the analysis hitherto and to observe what modifications must be made to arrive at a pattern of conduct more in keeping with actual conditions. The main assumptions which will be examined are:

(a) That wages alone constitute the measure of the earnings of labour.

(b) That small changes in the intakes of labour are possible, as assumed by the marginal analysis.

(c) That workers are of equal efficiency.

(d) That the labour market is perfect in the sense that it reacts rapidly to changes in prices and quantities so that:

(i) The same grade of labour receives everywhere the same earnings.

(ii) There is no unemployment.

(e) That the supply of labour is fixed.

D. MONEY WAGES, REAL WAGES AND NET ADVANTAGES

1. The Theory of Wages will be discussed in terms of wages which imply real wages.

The actual wage is paid in money. The real income of the worker is the stream of satisfactions derived from the services and commodities which he can buy with that money, and this will depend upon the prices of those goods. If the prices of those things which he habitually buys are rising while his money wage remains unchanged, then his Real Wage is falling. And vice versa. Since stable prices have not been a characteristic of modern times, this difference has often been important and has considerably modified, on occasions, the conduct of workers.

No adequate consideration of this possibility can be given without some understanding of the Theory of Money. Since, moreover, the modifications necessary are not vital to the analysis, this refinement will be neglected by assuming stability of the relevant commodity prices and identity between changes of Money Wages and of Real Wages.

2. (a) It has been assumed that the earnings of labour which determine the conduct of workers in the labour market are represented by the wage which is offered: that workers will readily move from a lower-paid employment to a higher. This is not always the case. Labour

is unlike other factors in that it must always be delivered in person by the worker. He is thus vitally interested in conditions of work as well as in earnings. Jobs differ in the non-monetary advantages they offer. Some jobs involve heavy and exhausting toil, others are dirty and offensive; some require manual dexterity and others mental agility; and so on. Workers differ in their disposition towards these characteristics (quite apart from differences in ability later to be discussed), and some workers will prefer a job they like, even at a lower wage, to a job they dislike. Again, some jobs are lonely, others involve a crowd; some involve distant travelling, others are compatible with settled home life; some employers have attractive personalities, others are repellent. These personal aspects appeal differently to different workers of the same ability and they will behave distinctively.

(b) Perhaps as important as any other influence is the social esteem in which a job is held (although much of this is the reflection of the earnings it secures). Some jobs have a prestige attached to them: the blackcoat against the overall, the surgeon as against the butcher, the schoolmaster as against the prison warder. So that, even if these jobs required the same grade of ability (which is the unreal assumption on which we are at present working), it is certain that, at the same wage rate, the esteemed job would attract more applicants than the other.

(c) These intangibles do not exhaust the matter; more concrete influences may be at work. There may be differences in the cost of living between different areas; in particular, house-rent differences are often considerable and obvious. One job may impose relatively heavy travelling expenses, or the provision of special clothing or uniform. In some jobs it is customary for the worker to provide his own tools, e.g. the hewer often pays for his own explosives. All these and many other differences must be considered by the worker in addition to the gross money wage offered. Even the methods of payment, piece-rates or time-rates, weekly or monthly, commissions

or flat rates, although they may work out the same in the end, will have different appeals to different temperaments.

(*d*) Finally, workers will be influenced by the uncertainty of the wages offered, the possibility of fluctuations and the chances of unemployment in that particular calling.

3. The earnings of labour must not, therefore, be taken as the crude gross money wage which the worker receives, but rather as the Net Advantages of the job and its setting and peculiarities.

Thus, although the Theory of Wages will be argued in terms of "wages," this will be merely for convenience of exposition. In all cases these less precise Net Advantages must be understood to be decisive from the workers' point of view (the supply side) rather than the simple money payments.

Similarly, the benefits which entrepreneurs derive who offer these advantageous jobs, by securing at any given wage a more ample or more able supply of labour than they otherwise would, will also be disregarded, though it must be appreciable.

E. THE UNITS OF LABOUR

The marginal productivity analysis assumes that it is possible to make small (infinitesimal) changes in the intake of labour. If we neglect changes in the supply of labour from the individual worker (arguing that entrepreneurs will usually exact, as a condition of employment, a specified duration and intensity of labour) and also neglect the possibility of one worker supplying his labour in parts to more than one entrepreneur, then the actual adjustments of intake will be limited to changes in the number of workers; which, if the total number of workers in any one firm is not large, will represent big increments or decrements of labour-intake. Thus the inner marginal product (the difference in total output when the intake changes from x workers to $x-1$ workers) may be appreciably greater than the outer marginal product (the difference in total output

when the intake changes from x workers to $x+1$ workers). Wages would thus seem to have a range of indeterminateness between those two nearest approximations to the theoretical marginal product. Hence from any given equilibrium position, wages might rise or fall by some definite amount without inducing any change in the intake of labour.

This practical discrepancy from theoretical accuracy might be appreciable in the case of one firm, but it is not the demand of one firm which determines wages (for a given supply); it is the demand of all the firms together which employ that kind of labour. The wage must be at that level which just induces the entrepreneurs as a body to absorb the total supply of labour available.

Now, different firms will differ in circumstances, making use of slightly different methods, with different efficiencies. Hence their inner and outer approximations to marginal productivity will also differ. The actual wage will lie between the smallest inner and the greatest outer marginal products, and if there are many firms the range of indeterminateness will be negligible. Thus any very small change in wage rates will cause the wage to exceed or fall below the marginal value-product of some firm or other and so will induce (so far as other conditions are suitable) a change in the intake of labour.

When, in addition, the differences in the individual supply of labour of separate workers is also taken into account, it is evident that this apparent unreality of the theoretical analysis can be disregarded.

F. EFFICIENCY WAGES

1. Workers differ in efficiency. From the economic point of view, the test of this must be an objective one: entrepreneurs are not directly concerned about intelligence quotients nor examination successes, but about output. Efficiency will show itself in different ways: there will be a range of jobs a particular worker cannot do at all, his output will be nil; while among those he can do, he will be more productive in some than in others. As regards any

particular job, in a given time and in given conditions, one worker will produce a greater output of given quality than another. It is this objective productivity in given conditions which will be taken by the entrepreneur to measure the efficiency of the worker and in relation to which wages will be adjusted.

2. With a developed division of labour we can conceive that jobs could be classed in groups in order of difficulty or demand for special faculties. The available workers could also be grouped in grades and against each class of job could be ranged its equivalent grade-group of workers. The supply of labour available for each class of job would then be made up of the total number of workers able to do that class, from the parallel grade and from all above it: the higher on the scale the less would be the total supply.

If we assume that workers in each grade are homogeneous, then all would receive the same wage, irrespective of their particular firm or industry, since substitution would be possible. The intake of workers into each separate firm and industry, and consequently the outputs and prices of products, would be adjusted to equalise marginal value-productivity, and so wages.

We could not, however, assume that the wage would equal the marginal value-product of each grade of worker separately, working only in its own parallel class of jobs. A complex interaction between grades and classes would occur. Each job can be done by members of the equivalent grade and by all those in higher grades. Each worker can do the jobs in the equivalent class and also all those in lower classes. The possibility of this complex substitution would complicate matters.

No worker would (in conditions of mobility and flexibility) work in his appropriate class of jobs if he could earn more by working in a lower. No entrepreneur would engage a worker from a specific grade if he could get a worker from a higher grade at the same wage or lower.

Thus, if we assume that initially each grade of workers is engaged in its equivalent class of jobs, and receives the equivalent of the marginal product of that supply in that

class of jobs, it is very unlikely that the market will be in equilibrium. Individuals will find that they can benefit themselves by transferring downwards. Each transfer will alter the available supply of workers in two classes of job, raising the marginal product in the abandoned grade and lowering it in the chosen grade. Transfers will continue until no further gain can be secured and each worker in whatever class he is engaged will then be receiving a wage equal to, or greater than, that he could earn in any other class of job open to him.

It is not denied that in actual conditions there are many hindrances to this movement which are examined elsewhere (see Chapter VIII, Section *E*). Nevertheless, that this movement does take place, albeit sluggishly, is unmistakable.

3. Despite these differences in efficiency, in any one type of job which absorbs any considerable number of workers, most individuals engaged will be of average ability (the average varying according to the job). Hence, to that extent they are homogeneous and the marginal analysis applies. It is this fact which makes possible the payment of a "standard rate" of wages.

There will always be a fringe of better and worse workers. Each of these special cases will have an individual productivity and their wages will be adjusted accordingly. Otherwise the better workers will move elsewhere to other lines where their abilities will find more ample scope; while the entrepreneur who is paying standard rates based on the marginal product of the average worker will not employ a sub-normal worker (if he knows him to be so) unless he can get him more cheaply.

Thus each of these special cases will receive a wage which will lie between two limits: an upper limit set by the wage of the next better worker and a lower limit set by the wage of the next worse worker.

4. The existence of Trade Union scales of pay does not negative this analysis. Trade Union rates are not completely rigid. Most negotiated scales are multiple, dividing the workers into different grades; and they also permit of certain reductions from those standard rates in the case

of old or "slow" workers; while better workers receive a direct or indirect bonus. Furthermore, the sub-normal worker is more readily laid off in slack times while the better workers have the steadier jobs and thus their net earnings (say, per annum) are different.

5. Thus, as between jobs requiring the same ability of workers, standard wages will be equal. The wage, however, is not solely a function of the supply of the relevant labour. The earnings of any factor are derived from the prices obtained for the commodity eventually produced. Hence the scale of output of each kind of commodity and the methods of production will be adjusted to enable a rate of intake of labour to be absorbed which will permit the firm to pay the market rate of wages for that grade of labour; otherwise workers would transfer.

6. It also follows that the wages paid have no necessary correlation with the social worth of the commodity produced (if any meaning can be given to that vague concept). Labour, in common with all economic goods, obtains prices which are a reflection of the scarcity of the service it renders. Measured against a standard demand, services, no matter how admirable, which a large number of workers can render, will be lowly valued, while services, no matter how despicable, which few can render, will be highly valued. This possibility of high earnings for the suppliers of services requiring rare ability will apply also to those services of which there is an artificial scarcity imposed by barriers of custom, law, prejudice, privilege or power, and whose persistence, real or imagined, is so provocative of social discontent. (Compare Chapter IV, Section C 3.)

G. THE EFFICIENCY OF LABOUR

1. The efficiency of labour does not coincide with the productivity of labour. Productivity is the outcome of the collaboration of many factors of production and the efficiency of the labour is only one influence which affects it.

The efficiency of labour depends upon:

- (a) Natural ability.

- (b) Physical vigour.
 - (c) Environment.
 - (d) Education.
2. Natural ability is made up of:—
- (a) General ability, influenced by:
 - (i) Good stock.
 - (ii) Home environment.
 - (iii) Education.
 - (b) Specialised ability, influenced by:
 - (i) Traditions of trade and locality.
 - (ii) Education and training.
3. Physical vigour is influenced by:
- (a) Climate.
 - (b) Standards and habits of living suited to the nature of the work and to climate.
 - (c) Healthy environment both at work and in leisure.
4. Environment is made up of:—
- (a) Physical environment, influenced by:
 - (i) Standard and habits of living.
 - (ii) Duration and conditions of work.
 - (iii) Progress of medical science.
 - (iv) Health and social legislation.
 - (v) Conditions of town life.
 - (b) Moral environment, a main element of which is the intensity of social discontent and the need to lessen it by removal of social and class barriers and distinctions, the promotion of ease of transference between industrial grades and the reduction of inequalities of income.
5. Education is of two broad kinds:—
- (a) General, which should promote:
 - (i) Mental vigour.
 - (ii) Intelligent and recuperative use of leisure.
 - (iii) Mobility of labour.
 - (b) Vocational, which should develop:
 - (i) Manual dexterity.
 - (ii) Familiarity with particular materials and processes.
 - (iii) Specialised skill.
 - (iv) General ability.

H. EFFICIENCY AND PRODUCTIVITY

1. Efficiency and productivity are closely allied concepts. From the point of view of the individual entrepreneur, productivity is the basis of estimating efficiency. Nevertheless, even in this case other criteria are valid. Any worker who, although efficient himself, is an irregular, unreliable or disgruntled worker, or who is the cause of inefficiency in others by being a disagreeable associate or by provoking discontent, disputes or underwork, will have a net productivity which may be low. Thus, "victimisation," although sometimes based solely on political or personal grounds, may have economic justification despite the individual efficiency of the victim.

2. Efficiency and productivity are distinct though associated concepts. Their kinship is dependent upon stability of other conditions. The productivity of the worker depends not only on his appropriateness to the given task but also on the efficiency and rate of intake of the associated factors; while his marginal value-productivity is also a function of the intake of other similar workers as well as of the output and price of the product. Since these other conditions may vary greatly, the wages of the worker may bear little relationship to his efficiency as measured on any basis other than productivity. A section of workers may have low productivity and low wages if their employers are inefficient and their own mobility is low. Able workers using bad equipment may produce less than poor workers using good equipment. It is this circumstance which may explain serious differences in productivity between similar workers in different countries and not necessarily any inherent superiority of national or (so-called) racial types. The problem is, however, complex.

3. *The Efficiency of the Entrepreneur.*—Entrepreneurs differ in efficiency, and the more efficient can make better use of any particularly able workers. Hence the more efficient employer can afford to pay the better worker a higher wage. The Gospel of High Wages is a gospel according to the efficient. If the whole range of relevant

employers are of poor calibre, the wages of their workers might be depressed since their productivity, depending as it does partly on the efficiency and organisation of the co-operating factors, might be everywhere low. This case may be important (and its alleged existence inspires much social discontent) where the supply of entrepreneurs is restricted by artificial barriers and where there are thus impediments to the operation of the principle of substitution as applied to entrepreneurs. (Compare Chapter X, Section E.)

J. LOCAL VARIATIONS IN WAGES

The Theory of Wages as expounded implies that efficiency wages for jobs of the same class will be uniform over the area covered by the labour market. This is not so in practice, and the reasons are many.

1. Differences in Other Advantages may compensate for differences in money wages and so equalise Net Advantages.

2. *The Time-Lag of Adjustment by Entrepreneurs.*

(a) Adjustments take time to effect. The intake of labour depends upon the methods of production, the intake of other factors and the scale of production. These cannot quickly be changed. Merely to curtail sales will impose expensive stocking; to expand sales may require a marketing campaign. Other factors may not be readily available. Fixed equipment cannot economically be discarded until it is amortised. Hence, if an entrepreneur would prefer to employ more labour and less or different equipment, he may have to wait until the amortisation of his existing equipment has proceeded sufficiently far to make the change profitable. This time-lag will vary as between firms: a firm newly equipped before the change was anticipated will be at a disadvantage as compared with one whose equipment is old.

(b) To synchronise with changes in labour costs or labour supply, adjustments must usually be anticipated. Entrepreneurs differ in foresight, and one test of entrepreneurial ability is the capacity to adapt productive methods so as to anticipate correctly changes in conditions.

(c) Firms vary in efficiency: some are expanding, some are contracting. The prosperous firms will be more prompt to grant a rise in wages and more reluctant to antagonise workers by reducing wages. The persistence of lower wages in some firms may be one sign of their decay: they are unable to afford to pay higher wages, and the resulting movement of the efficient workers away from them may be one means of accelerating the elimination of the inefficient firms.

(d) Changes in economic conditions vary in duration. Great differences will be found (at first) in entrepreneurs' estimates of the duration of any change. Most conduct is based on estimates and, as they differ, conduct differs. In given circumstances one entrepreneur, anticipating that a change will be permanent, will alter wage rates; while another, considering the change to be of short duration, will maintain wage rates.

3. *The Mobility of the Workers.*—Thus the wages offered by different firms will not be uniform for any particular grade of labour. Theoretically, these differences should quickly be evened out by movements of the workers and competitive substitution. Of course, workers do constantly move in response to these inducements, but the movement can never be sufficiently rapid to overtake the changes owing to the relative immobility of the workers (see Chapter VIII, Section E).

K. WAGES AND UNEMPLOYMENT

The second main implication of the perfect labour market is that the market price must be low enough just to clear the whole available supply and leave no unemployment. Hence, if there is any unemployment, wages will fall and lead to its absorption.

The persistence of unemployment seems so flagrantly in contradiction to this assumption that it calls for explanation. It must, however, be emphasised that we are not concerned to present a theory of unemployment. We are here examining only one aspect of that problem; namely, the

causes which make some unemployment compatible with stable wage rates. It is not asserted that if wages did fall all unemployment would be cured.

1. *Technological Unemployment.*—So long as the economic system is changing, one aspect of this change will be the movement of workers from firm to firm, from job to job, from place to place, in endless vain pursuit, so to speak, of an ever-moving equilibrium. Firms and industries wax and wane, markets expand and contract, goods rise and fall in their appeal, methods of production come and go; accident, age, miscalculation, invention and natural fluctuations necessitate endless adjustments of the economic system. Every age is an age of transition, and the more rapid the rate of change, the greater will be the rate of labour turnover as one type or location of labour becomes less advantageous and a new one supplants it. This represents not so much a change in the total demand for labour as rather a change in its composition: a firm which is changing its methods or has arisen to supplant another may employ more labour than was employed before, but it will bring about the dismissal somewhere of labour now less desirable either in type or location. The more immobile the displaced workers, technically and geographically, the higher will be the accompanying percentage of technological unemployment. It will exert no direct pressure towards wage reduction and indeed, if the economic changes which induce it are upward, it may be the accompaniment of a rising level of wages.

2. *The Sub-Normal Worker.*—Since most workers in any occupation are of the average ability appropriate to that job, standard rates of pay reflect average marginal productivity. Accurate adjustments of wages to individual productivity would not be worth the trouble of ascertainment and would probably cause dispute and discontent.

Distinct divergencies, however, will be evidenced in some cases and will call for adjustment. There will be some workers, who, through old age, incapacity or temperament, are obviously not worth the standard rate, and these men will have difficulty in obtaining employment and still more

in retaining it. Where the worker concerned cannot or will not transfer to a lower-grade job, he may be subject to chronic bouts of unemployment, since he will be the first to be dismissed if changing conditions call for any contractions.

This type of unemployment is unlikely to affect the standard wages of the average workers.

3. *Voluntary Unemployment.*—In addition to that substantial proportion of the population which does not enter the labour market at all—children, old people, women engaged in the home, and the leisured classes—and whose numbers depend upon the social and economic institutions of the country concerned, there is also at any moment a group of individuals who have given up employment voluntarily, in the expectation of obtaining a better job: the ambitious, the restless, the hopeful. Their numbers are likely to swell in good times, when the prospects of improvement are more rosy, but they are a normal accompaniment of any dynamic system whose chances and changes affect in different ways the expectations of men infinitely varied in individuality.

4. *Casual Unemployment.*—There exist many services the demand for which must inevitably vary rapidly from day to day: those of firemen, of lifeboatmen, of street cleaners after a snowstorm. The onset of many demands of this kind is not easily subject to human control and so cannot be regularised. Various devices are adopted to deal with them, the most common being the combination of a steady job with that of the part-time casual job, and the appeal to voluntary service. They also permit the existence of a class of casual worker dependent upon the rendering of no specific labour but whose members offer themselves for a wide range of general unskilled jobs irregular in their incidence. These workers are necessarily intermittently unemployed and a percentage of them would continue to be so even were conditions stable, including wage rates.

In some cases, however, the onset of a particular demand, whilst irregular, is of sufficiently frequent occurrence to afford the prospect of a whole-time occupation, and a

particular calling develops to deal with it. Many professional and consultative jobs are really of this kind. The typical case, however, which has directed attention to this type, is that of the quayside dockers. The arrival of ships at port, so long as tramp steamers ply their irregular trade and so long as the vagaries of the weather cannot be counteracted with sufficient certainty, must continue to be irregular; and yet it is of sufficient frequency in any large port to afford a continuous demand for dockers' labour.

The number of workers who attach themselves to a calling of this sort seems to depend rather on the peak demand than on the average, and consequently there must almost always be a pool of unemployment. Even in times of brisk demand, imperfections of information and of mobility will permit of a shortage of labour in one location and a surplus in another. Many of the workers can, of course, only by courtesy be called dockers, being merely casuals who perform docking services when the occasion offers. They will reduce their spells of unemployment by combining other casual jobs.

Labour such as the dockers will, however, most usually be paid at a standard rate based upon average conditions of supply and demand. Rapidly changing wage rates, modified quickly to suit changing conditions, are a source of irritation to the workers and are troublesome to the entrepreneur. Customary standards develop and the payment of "fair wages" ensures the goodwill of the workers and will advantage the entrepreneurs in the long run. Hence, the volume of unemployment which is normal to such semi-casual jobs does not necessarily indicate any steady pressure towards falling wage rates.

5. *Seasonal Unemployment.*—A vast number of human wants vary with the seasons and set up a seasonal demand for labour: the coal trade and the ice-cream trade are typical. Even where human wants are steady, another seasonal rhythm is dictated by conditions of production: as in agriculture.

Various devices counteract this ebb and flow of demand (see Chapter XI, Section C 6), particularly in the first type

where, though the wants are seasonal, production need not be so.

The second type of seasonal demand cannot be so easily controlled and the worker must adjust himself to it. Seasonal jobs of complementary rhythm may be combined by one worker; or a commodity in steady demand may be produced during the off-season (witness the peasant wood and metal workers in the agricultural winter idleness); or peak seasonal demands may be performed by casual workers under the supervision of a skilled permanent nucleus; and so on.

Even where such adjustments are not easy, the fact of rhythmic demand is known by all engaged in the trade and their conduct is influenced accordingly. The ebb and flow of work, and possibly wages, is one of the Other Advantages which the worker considers in addition to the money payments, and wage rates will be adjusted in a manner satisfactory to both worker and entrepreneur. Where the earnings of the calling are necessarily the main source of income of the worker, and where the calling imposes the giving of hostages to fortune by the acquirement of specialised skill, then the number of workers will be so restricted and the methods so adapted that the rate of wage in the active season is high enough to give an average income comparable with that obtainable in the alternative regular occupations open to that grade of worker—taking into account the attraction or otherwise of regularity to different types of individuals.

Human ingenuity thus devises arrangements to suit the case, and wage rates will be based upon the whole agglomeration of circumstances and will not oscillate abruptly according to the temporarily varying incidence of demand or unemployment. A permanent core of seasonal unemployment will thus be consistent with steady or even rising wages.

6. *Slump Unemployment*.—The major problem of unemployment is connected with those economic fluctuations known as Booms and Slumps. Not much will here be said about them, but a few observations are relevant concerning movements of wage rates:

(a) A firm has individuality, the interrelation of the functions of the personnel are complex. Any change in personnel causes dislocation during the time that the new worker is settling down. Entrepreneurs are thus normally anxious to retain their old staff. This will curb dismissals in slack periods. Also, to maintain friendly relations with workers and to gain a reputation as good employers with a view to safeguarding future supplies of labour, entrepreneurs will not always impose reductions of wages so soon as a slack period sets in. This makes for stability of wages.

(b) The movement of wages in a slump will also depend upon the expectations of entrepreneurs. Hoping, as they normally do at first, that the slack period will be temporary, they will maintain wages at their old level. A short slump might thus pass without any effect on wage rates though unemployment may be in evidence as output is restricted to suit market conditions.

(c) The fall in commodity prices characteristic of a slump, taken in conjunction with maintained wage rates, will entail reduced profits and maybe losses; partly because methods cannot always be adjusted on the reduced scale of output so as to raise the marginal productivity of the smaller intake of factors to a degree sufficient to offset adequately the fall in prices; and partly because of reduced output itself. Few firms can long maintain this situation, since, in any case, few firms control large amounts of liquid capital. Hence, as time goes on and the slump persists, some firms will yield to circumstances and cut down costs, including wage rates. Once the downward movement starts it will quickly spread. Firms are competing on a falling market and cutting prices in an endeavour to maintain sales; the firms which cut costs by reducing wages will gain a competitive advantage which will be quickly imitated.

Thus, wage rates may be maintained at the beginning of a slump even while unemployment is rising, but the longer the slump lasts the more certain will be a general movement towards a reduction in wage rates.

L. THE ELASTICITY OF DEMAND FOR LABOUR

1. *The Supply of Labour*.—The analysis has been restricted hitherto to the demand influences on wages on the assumption that the supply is fixed. It is necessary now to analyse the conditions of the supply of labour and its connection with wage rates.

The argument will follow three main lines:

(a) How will changes in the supply of labour affect wage rates?

(b) What conditions determine the supply of labour from the individual worker, and in particular how do changes in wages affect the individual supply?

(c) What conditions determine the total supply of labour, and how do wage rates influence that total supply?

The first problem is not really a supply problem at all since the wage changes resulting from a change in labour supply will be determined by demand conditions: it is the problem of the Elasticity of Demand for labour. An allied problem is, however, a supply problem: namely, how a change in the supply of labour will affect, not wage rates, but the total wages paid to all labour. Only a formal answer to this problem can as yet be given since the result depends upon conditions not yet fully considered.

The second problem concerns principally the question of the Elasticity of Individual Supply of Labour, to which a formal answer has already been given (see Chapter VI, Section H).

The third problem involves Population Theory, which is only in part an economic problem.

2. *The Influence of a Changed Intake of Labour on Wage Rates*.—This problem is merely a development of the question of the flexibility of the intake of labour. (Compare Section C.)

(a) The analysis will be restricted to the effects of an increase of labour on wages.

An increased intake of labour will cause diminishing marginal productivity of labour and so lead to a fall in wages. How rapidly will wages fall for a given increase?

More labour can be absorbed by increasing the scale of output and by changing methods. Each case will be examined to the exclusion of the other, though actually the two will often be combined.

(b) An increase in scale of output.

Increased output implies increased sales to consumers. This will entail reduced prices. If consumers rapidly expand purchases when prices fall slightly (elastic demand), then output can expand without requiring any heavy fall in total costs, including wages. If consumers cannot be induced to expand purchases except by making substantial reductions of price (inelastic demand), then expansion will be possible only if total costs also fall substantially, including wages.

Increased output, with unchanged methods, requires an increased intake of other factors: by absorbing unemployed other factors, by enticing a transfer from other lines, by inducing an increased absolute supply of other factors. If supplies of other factors are readily forthcoming in response to a slight rise in their earnings (elastic supply), then an increased intake of labour may be possible without a heavy fall in wages.

If, however, supplies of other factors are not forthcoming in sufficient quantity unless substantial rises in their earnings are made (inelastic supply), then a relatively heavy compensatory fall in wages must be made. In this case it follows that if wage costs are a large proportion of total costs, then the actual fall in wage rates needed to compensate a given rise in the small intake of other factors may not be absolutely large. But if wage costs are a small proportion of total costs, then the actual compensatory fall in wages would have to be catastrophic.

(c) A Change in Methods.

In the short period, methods are usually rigid (fixed coefficients of production) and no increase of labour-intake is possible except by increasing the scale of output. In the long period, methods are flexible as equipment is gradually amortised and replacements permit of adaptations to new circumstances. The length of the period

will depend upon the age of the existing equipment and will vary from firm to firm and from industry to industry.

Where methods are flexible a small reduction in labour costs will lead to substitution, the intake of labour rising and of other factors falling for a given volume of output. This will be most apparent where the decreased intake of other factors does not lead to a rapid fall in their prices also (elastic supply).

(d) Elasticity of Demand for Labour.

Where a small change in wage rates leads to a more than proportional change in labour-intake, the demand for labour is said to be elastic.

Where a small change in wage rates leads to a less than proportional change in labour-intake, the demand for labour is said to be inelastic.

Unit elasticity (the standard against which the others are compared) exists where a 1 per cent. change in wage rates leads to a 1 per cent. change in demand (more accurately: where price multiplied by quantity demanded is constant).

(e) Conditions favouring Elastic Demand for Labour.

Where the demand for labour is elastic, a given increase in the supply of labour can be absorbed with little fall in wage rates. A decrease in supply will not lead to much rise in wages. This condition will tend to be found:

- (i) In lines where methods of production are flexible.
- (ii) In the production of commodities whose consumer demand is elastic.
- (iii) Where the supply of the co-operating factors is elastic.
- (iv) In the long run everywhere.

(f) Conditions favouring Inelastic Demand for Labour.

Where the demand for labour is inelastic, a given increase in the supply of labour can be absorbed only if wage rates fall substantially; while a decrease in supply will sharply raise wage rates. This condition will tend to be found:

- (i) In lines where methods of production are inflexible.

- (ii) In the production of commodities whose consumer demand is inelastic.
- (iii) Where the supply of co-operating factors is inelastic, unless their intake is also small compared with labour-intake per unit of output.
- (iv) In the short run everywhere.

M. THE TOTAL SUPPLY OF LABOUR

1. *The Supply of Labour.*—The supply of labour depends upon:

- (a) The number of workers.
- (b) The duration of productive effort.
- (c) The intensity of the effort.
- (d) The efficiency of the workers.

The efficiency of workers has already been considered (Sections *G* and *H*). The question of the intensity of work seems to be rising sharply into prominence nowadays owing to increasing complaints that modern belt systems of workshop organisation are leading to unhealthy strain and premature breakdown of workers in cases where the urge to reduce costs induces excessive speeding up of the pace. Theoretically, the measurement of intensity is akin to that of efficiency (compare Sections *F* and *H*), while its connection with the supply of labour is similar to that of the duration of work.

2. *Duration of Productive Effort.*—This is dependent upon the duration of working life, the extent of annual holidays, the existence of involuntary unemployment, and hours of work, daily and weekly.

The connection between hours of work and productivity is not simple. It cannot be assumed that the longer the hours of work the greater the volume done:

(a) Excessive hours and undue fatigue increase proneness to accident, causing loss of materials and loss of working time.

(b) In the long run excessive hours cause ill-health and a shorter working life.

(c) Greater leisure generally results in greater alertness and efficiency during working hours.

Thus, theoretically, there is an optimum working day whose establishment would result in the greatest output of work over the whole life of the worker. In practice, of course, considerations of productivity are not the sole influences which determine working hours. There is a point, as productivity increases and the standard of living rises, at which individuals prefer increased leisure to increased consumption of wealth: as when workers choose a shorter working day rather than an increase in wages.

3. *Numbers of Workers.*—Numbers of workers depend on:

(a) Size of population.

(b) Age and sex distribution.

(c) Social conditions, e.g. attitude towards the work of women and children; existence of leisured classes; maintenance of large armed forces, etc.

For most economic problems the first two considerations are usually taken as given (economic data) because, apart from migration, they are, practically speaking, unalterable. Historical changes in them, from generation to generation, seem, furthermore, to be due to causes and motives largely non-economic.

4. *Population and Productivity.*—Human beings are both producers and consumers and much controversy has raged round the relationship between the needs of consumers and the power of producers, and as to whether large or small populations are desirable.

Malthus (*circa* 1800) held that from any initial situation, the potential rate of increase of population (consumers) is much greater than any possible rate of expansion of the output of food-stuffs. Later elaborations of his theories explained that this was due to the operation of the Law of Diminishing Returns. Hence, everywhere and at all times, population is restricted to its actual limits by the relative scarcity of the means of subsistence available. The worker is maintained merely at subsistence level and this poverty must continue since any rise in production and

consequent rise in the standard of living will be followed by an expansion of population which will once more reduce output per head to subsistence level.

Population, it was maintained, has always been restricted by the operation of *Positive Checks*—famine, disease and war. It should be the aim of policy to substitute *Preventive Checks*—later marriages, smaller families. Only thus could poverty and misery be abolished.

Various criticisms of these doctrines can be made:

(a) The Law of Diminishing Returns is a static conception and cannot be applied to historical developments. The law is applicable only at a given time and in given conditions, one of which is that the methods of production are fixed. No sound generalisations can be made, on the authority of the Law of Diminishing Returns, concerning the results of an increased supply of any factor, such as labour, over an historical period of time during which methods of production will inevitably change. The results of the increased intake of factors will depend upon the nature of the changes in methods, concerning which no safe predictions are possible.

(b) Malthus' views were pessimistic. He had little faith that his Preventive Checks would ever come into operation. He feared that birth rates would always be at a maximum and that actual population would be determined by the death rates. Modern experience, however, reveals a rapid fall of birth rates accompanying a rise in the standard of living.

(c) Malthus' pessimism as regards expansion of productivity was unjustified. He seemed to consider that the production of food-stuffs was governed by "natural" laws beyond human control. An increase in numbers does, indeed, accentuate the relative scarcity of natural resources, but the actual obstacles to productivity are not primarily the lack of natural resources but rather the lack of knowledge, ability and capital equipment to enable us to exploit the resources. An increase in numbers may actually facilitate division of labour and improved technique, and be itself the cause of increased output per

head. Increase of population is thus not necessarily a misfortune.

(d) It is futile to speculate on what the condition of the world would be today if population had been less and other things the same; because other things would not be the same. Man tackles the actual problems which confront him, and the trend of production and the progress of invention have been directly influenced by the actual numbers of consumers and by their wants.

5. *The Optimum Theory of Population.*

(a) For any given area, with given resources and at a given stage of development, there is a certain density and distribution of population which is optimum—such that output per head is at a maximum.

From the optimum position, any alteration in numbers (e.g. by immigration or catastrophe) would, *ceteris paribus*, diminish output per head. Over- or under-population refers to a population greater or less than the optimum.

(b) The optimum is a theoretical concept. No satisfactory means of measuring it for any given area have as yet been devised. Furthermore, it is constantly shifting. Every new development or discovery or change which directly or indirectly affects the economy of the area will shift the optimum up or down.

(c) The population of any given area at any given moment cannot be dissociated from the population which preceded it nor from the population which is to follow. Furthermore, economic conditions are only one set of influences over Vital Rates. Thus in economic analysis the existing population is usually taken for granted, and economic policies concern themselves rather with the supply of other factors, and especially capital. As regards population, economic policy can affect, and that very slowly, only the population of the future.

(d) Migration. So long as the interpretation of the optimum population remains statistically elusive, all policies advocating immigration or emigration must be

closely scrutinised. In particular the existence of unemployment is no proof of over-population. Since, moreover, emigrants are usually active and enterprising members of the community in the prime of life, emigration usually reduces the quality as well as the quantity of the population.

6. *The Influence of Changes in Labour Supply on Total Wages.*—A formal statement can be made of the connection between the supply of labour and wages.

It follows from the definition that if the demand for labour is elastic an increase in the total supply of labour will be followed by an increase in the total wages paid to labour as a whole.

If the demand for labour is inelastic, an increase in the total supply of labour will be followed by a fall in the total wages paid to labour as a whole.

The implications and applications of these statements cannot be made until an examination is made of the circumstances in which the various determining conditions enumerated in the last section will be fulfilled.

N. THE MONOPOLY OF A FACTOR

The scope of activity which is available for a monopolist who controls the supply of a factor can be inferred from the analysis of the elasticity of demand for labour (see Section *L*).

If the supply of any specialised type of labour were controlled by an association such as a Trade Union, the monopolists could fix the supply of that labour made available for production and, by restriction of supply, e.g. by reduction of hours of work, raise its marginal productivity and so the price it could command per unit. Alternatively, they could fix the price at which the labour was made available and could spread the resulting demand among their members by adjusting hours of work or by any other method. They could follow either of these policies, but not both simultaneously. (Compare Chapter III, Section *H*.)

The benefits to be derived from such action can be inferred from the elasticity analysis, and it should be apparent that monopolistic gain would be possible only if the demand for that factor were inelastic. The cases in which this is so have also been analysed in the discussion of elasticity.

This formal argument is applicable to the analysis of the powers of Trade Unions.

CHAPTER X

THE ENTREPRENEUR AND PROFITS

A. THE AIM AND SCOPE OF THE ENTREPRENEUR

The entrepreneur in the capitalist system may be expected normally to endeavour to maximise his own net receipts or residual income. It would seem that he can do this in two ways: either by raising prices of the product and/or reducing costs of production per unit of output, or by altering the volume of output.

1. *The Relation between Prices and Costs.*—If his own productive unit (or firm) is the sole or main producer of the commodity concerned, the entrepreneur will be able, directly or indirectly, to control prices. The limitations of this monopolistic control are studied separately in the Theory of Monopoly (see Chapter III, Section H).

Normally, however, his firm will be only one of many. The situation is conventionalised in the Theory of Equilibrium (the main aspects of economic theory here considered) to imply that the output of one firm is only a small proportion of the total output of that commodity. In such a situation the entrepreneur cannot, by individual action, appreciably influence the prices of the product.

Thus his power (apart from control of volume of output) will be limited to reducing costs per unit of output. The obvious way to do so is to reduce the contractual payments he makes to any one (or each) factor. If he is the sole employer of any such factor, or if any factor is quite immobile, he will have monopolistic power to do so. There may be social or legal limitations.

It is the normal assumption of equilibrium theory that factors are mobile and that any one entrepreneur engages the services of only a small proportion of the total supply of any factor. In such a case the payment made to any factor will be determined by the general demand for that

factor over all industry, and any attempt by one entrepreneur to reduce his own payments will cause that factor to avoid his own firm and seek employment elsewhere.

Thus the scope of the entrepreneur (in this theoretical situation) will be restricted to increasing the efficiency of his firm, i.e. to organising the services of the different factors in such a way that for a given cost of production their joint output is at a maximum.

2. *The Volume of Output and Profits.*—It would seem at first sight that it would be in the interests of the entrepreneur to expand output indefinitely. Various obstacles present themselves:

(a) The difficulty of securing adequate supplies of the factors. Some factors are less abundant than others; as his scale of production expands, increasing resistance from all other entrepreneurs who use those factors will reveal itself in sharply rising prices of those factors, i.e. rising costs of production under conditions of inelastic factor supply.

(b) There may be a particular difficulty in securing adequate supplies of capital at any price. This arises because of the peculiar association between the entrepreneur and the capitalist which is a characteristic of the capitalist system (see Section E).

(c) The effect of expansion on the prices of the product. An indefinite increase of output implies an indefinite increase of the quantity of the commodity to be disposed of on the market. The reluctance of consumers to increase purchases can be overcome only by lowering prices. If commodity demand is inelastic prices will fall sharply.

(d) The incidence of diminishing returns to the firm itself. Even were these other difficulties negligible, there would still be a limit to expansion set by his own capabilities. There will come a point when increased scale of production will cause a rise in costs per unit of output because the limits of efficient entrepreneurial control have been reached. The connection between the scale of production and the efficiency of production, i.e. costs per unit of output, is discussed later (see Chapter XI).

3. *The Emergence of Profits.*—The earnings of the entrepreneur, as such, are known as profits. They can emerge only when there is divergence between the total costs of a firm and the total prices received from sale of products. Equilibrium analysis has been concerned to show how any such divergence would set in force movements to cancel it, and how any divergence of this kind would indicate maladjustment in the economic system. Thus profits must appear as a short-term phenomenon, the product of change and dynamic conditions, and it is necessary to widen considerably the scope of the enquiry when an attempt is made to include profits within the theoretical framework.

It must, of course, be borne in mind that the business profits of commerce and industry are a conglomerate of many earnings in addition to the pure profits of the entrepreneur. It is necessary to pursue some analytical investigation before the contents of the portmanteau of business profits can be revealed.

B. THE THEORY OF NORMAL PROFITS

1. The determinants of profits can best be analysed if we assume at first that each entrepreneur is a single individual performing the whole entrepreneurial function for his own firm.

2. *Profits and Equilibrium.*—It can be argued that in equilibrium profits are zero. The total costs of the firm, made up of the total earnings of the factors, will equal total prices obtained for its output, and there will be nothing left over for the entrepreneur. This reasoning implies that the entrepreneur himself is not a factor of production and can be justified if we give a strict interpretation to equilibrium conditions and picture an economic system stable and co-ordinated, a changeless figment of the imagination, free from any impulse or need to make adjustments. If it be objected that in analysing the equilibrating process we have repeatedly referred to adjustments made by the entrepreneur, it will be a sufficient explanation to indicate that a convenient method of approach towards an under-

standing of equilibrium was to postulate dis-equilibrium and to infer what reactions would be induced which would restore equilibrium. The process of reaching equilibrium, the process of smoothing out the maladjustments, would need the services of the entrepreneur; and those very maladjustments would be revealed by discrepancies between prices and costs and hence the existence of profits. Once, however, equilibrium is reached (imaginatively), then no maladjustments exist, and, since all economic data are fixed, none can arise, and hence no profits can emerge and no demand for the services of an entrepreneur.

In order to permit the entry of the entrepreneur as a real agent of production, and the emergence of profits, it is necessary to allow for some changes of economic data. It will be sufficient perhaps if we picture a world where the major economic data—the sources of supply of factors, the wealth and tastes of the consumers, the methods of production—are stable in the aggregate; but where the ordinary vagaries of natural phenomena—seasons, weather, natural catastrophes—and of human and social existence—disease, accident, fire—render necessary constant minor adjustments not involving any radical transformations but imposing the need for entrepreneurial decision and hence for entrepreneurial earnings.

3. *Normal Profits.*—The marginal approach can be applied to the analysis of profits by considering all the Other Factors as a complex group co-operating with the entrepreneur in the firm, and in this way there emerges the idea of the marginal productivity of the firm (hitherto we have considered the marginal productivity of the factors). As the firm expands, output will also expand. The entrepreneur will continually modify the organisation to cope with the increasing intakes of factors. There will come a stage beyond which the complexity of the task begins to escape efficient organisation and diminishing returns to the firm will set in. This implies that the marginal returns to the Other Factors as a whole will be less than their average returns; and since their earnings will be determined by their marginal value-productivity, it follows that the total

costs of these Other Factors will be less than the total receipts from sale of output, and a residue will exist which constitutes the earnings of the entrepreneur; profits are positive.

Normal Profits are those earnings of the entrepreneur which are just adequate to maintain the supply of entrepreneurs in that industry. Their level will be set by two limiting comparisons (assuming, for initial simplicity, that all entrepreneurs are of equal efficiency and hence that all firms in any one industry are of the same size). On the one hand, no entrepreneur should be able to benefit himself by transferring to another industry; nor, on the other hand, could he gain by ceasing to be an entrepreneur and becoming an employed factor instead. This condition will serve to restrict the number of entrepreneurs in any one industry and hence the number of firms: there must be so few of them that the factors available in each line of production, in order to secure employment, must be agglomerated into firms so large that diminishing returns to the firms are the characteristic of equilibrium and hence positive profits. The number of active entrepreneurs and so of member firms within each industry will be so restricted that the output of each product will command commodity prices at a level which, taken in conjunction with the volume of output, will equalise normal profits as between industries.

4. *The Marginal Productivity of the Entrepreneur.*—In what sense can the earnings (normal profits) of the entrepreneur in this concept of equilibrium be represented as measuring the marginal productivity of the entrepreneur? Since in each firm there is only one entrepreneur, then the marginal analysis becomes meaningless: to diminish in each firm the entrepreneur by one unit would wipe out the firm.

If, however, we look at the particular industry as a whole, the application is possible. If one entrepreneur drops out, the unemployed factors of his old firm will be forced to seek employment among the other firms. Since these are all producing under similar conditions of diminishing returns to the firm, then the increments of output resulting from the slight expansion of each remaining firm will not, when

added up, equal the output of the old firm, i.e. the total output of the industry will shrink. This difference represents the marginal product of the entrepreneur.

5. *Diminishing Returns to the Firm.*—The entrepreneur is thus a factor of production, the analysis of whose function imposes the transfer of the focus of interest from the firm to the industry. How will this effect the previous analysis of the marginal productivity of the individual factors?

! The marginal productivity of each factor is measured by fluctuations of output of the firm; but the magnitude of these marginal products is now seen to be affected not only by the proportionality of the factors within that firm but also by the number of firms in existence within the industry.

In the analysis of the marginal productivity of the factors consideration of the industry was indeed introduced, but merely for the limited purpose of considering the influence of total output and hence of commodity prices on value-productivity; it was convenient to disregard the importance of the more complex aspect of the organisational structure of the industry. In other words, it was assumed that the number of firms was not relevant because the firm, *as such*, was producing under conditions of constant returns and could expand or contract over an appreciable scale of output without upsetting that situation. (Compare Chapter V, Section B 3.) This was justified because strict equilibrium implies constant returns to the firm and zero profits.

The marginal product of a factor is now seen to depend not only on the proportionality of the factors themselves but also on the ability of the entrepreneur to make the necessary adaptations of process (within the given methods of production) which different scales of production require. For a given total intake of factors into the industry, the greater the number of entrepreneurs (and hence the smaller the firms) the more competently will entrepreneurs of given ability perform their functions, and hence the greater will be the marginal productivity of the factors, singly and as a whole, and so the less will be the marginal productivity of the entrepreneurs. The less the number of entrepreneurs in a given industry, and hence the bigger the firms, the less

will be the marginal productivity of the other factors, the more steep the incidence of diminishing returns to the firms and so the greater the profits.

C. THE FLUCTUATIONS OF PROFITS

1. *The Incidence of Change.*—When the transition is made from the imaginary world of equilibrium to the conditions of the real world, profits assume a somewhat different aspect from the reward for the purely co-ordinating services hitherto envisaged.

The real world is characterised by incessant change of economic data. Every change will upset any balance which has been established between quantities, prices and costs, and will set in motion impulses and incentives to adjustment. The process of adjustment is necessarily subject to a time-lag. The change betrays itself first as a change in prices; the causes of that change have to be diagnosed, decisions have to be made concerning the best means of dealing with the new situation and these decisions have to be carried out. In the meantime a lack of harmony between relative prices will inevitably imply that somewhere firms exist whose costs and prices have moved unevenly or divergently, and until the equilibrating adjustments have been completed the direct incidence of those changes will fall on the residual earnings, to raise profits or to lower them.

Profits must thus inevitably fluctuate: they are the economic buffers upon which the direct shock of change impinges and whose consequent oscillations are the cause and consequence of the greater relative stability of other prices (including the earnings of the other factors which are thus in some degree sheltered from the hazards of change). It may be possible to lessen these changes; it may be possible to devise alternative methods of dealing with them; it will never be possible to eliminate them.

2. *The Average Level of Changing Profits.*—The effect of this fluctuation of residual earnings on the level of profits necessary to ensure the continuance of the performance of entrepreneurial service is disputed: whether in such cir-

cumstances actual profits must average more or less than theoretical Normal Profits.

On the one hand, it is argued that a fluctuating income affords less real satisfaction than a steady income equalling the average of the fluctuations. Owing to the diminishing utility of income to any individual, the contraction of income by any definite amount in any period must occasion more loss of satisfaction from consumption in that period than an equal addition to the standard income would bring him gain in satisfaction. Hence, in order to equalise Net Advantages, the fluctuating income must average higher than a steady income.

On the other hand, it is argued that human temperament is more attracted by the prospect of gain than deterred by the prospect of an equal loss: people look forward optimistically to the gains and discount the possibility of loss. The popularity of sweepstakes and the glamour of professions such as those of barristers and actors, where large gains are possible but where average gains are negative or relatively small, are cited to support this contention. Hence it is argued that the supply of entrepreneurs will continue even if average profits are negative (as has been alleged) so long as many entrepreneurs do succeed in making positive profits while some make spectacular gains.

3. *Risk and Uncertainty*.—A further complication must be considered. Man is gifted with foresight and is motivated as much by expectations of the future course of events as by awareness of the actuality of the present. If foresight were perfect, as in the equilibrium world where the accidental is ruled out, then change in itself would cause no disequilibrium. Today's conduct would be shaped in the light of the known future and the economic system would move smoothly through time, adjusting itself harmoniously by steady transition to the onset of change; the arrangements which are actually made in any efficient community to deal with the certainty of the seasonal rhythm of agricultural crops are an illustration of this. Even in a world where change was unavoidable, if foresight were sufficiently accurate then again profits would be always normal.

Actually, however, foresight is often lamentably inaccurate. The restless upheavals of circumstance baffle the anticipations of the most gifted, and the economic system is characterised by a ceaseless surge of adjustment as men strive to counter the disharmonies of unending variations of data, pursuing vainly an ever-receding wraith of ever-changing equilibrium.

Nevertheless, man does possess foresight and many expectations prove actually correct. The chances of the future vary from the certain to the uncertain in steady gradation and so the possibility of anticipatory adjustment also varies. On the one hand, we have chances whose incidence is so predictable that they become calculable risks; on the other hand are chances so uncertain as to be outside the competence of forethought. In so far as a risk is calculable, then provision can be made by the entrepreneur to counteract its onset, as by insurance; and the cost of this forestalling will be reckoned as a normal cost of production charged up to total costs before profits are struck. In suitable cases the entrepreneur can thus divest himself completely of these calculable risks by transferring them, at a price, to specialists, and by other devices.

The incalculable uncertainties, however, he cannot so transfer, and it is the inescapable function of someone to bear them. Again human ingenuity has devised means of lessening their burden (see Section *F* 4).

4. *The Nature of Net Profits.*—Profits in the real world are thus seen to be a complex of elements:

(a) The normal profits of organisation and management—the earnings of the economic factor which controls and co-ordinates the others.

(b) The reward of Uncertainty Bearing—the earnings which are required to induce men to engage in entrepreneurial activity in the face of a future, many known chances of which are so incalculable as to be beyond the scope of adequate anticipatory adjustments and whose onset, owing to the time-lag of economic adaptation, may cause actual residual earnings to fluctuate from high positive profits to negative losses.

(c) Chance earnings—resulting from changes whose onset was not merely incalculable but was not even foreseen and which similarly arise out of the inevitable time-lag of adjustment to these changes.

D. THE FUNCTIONS OF THE ENTREPRENEUR

1. To initiate the productive enterprise.
2. To decide upon the kind and quality of the product.
3. To secure the services of co-operating factors of production, and in particular:
 - (a) To secure control of capital.
 - (b) To select, at least, the upper grades of personnel and to delegate authority and control.
4. To assume the risks of production and in particular the risk involved in paying the co-operating factors a contractual income in advance of the sale of output.
5. To secure maximum efficiency (i.e. output at least cost per unit of output):
 - (a) By choice of the technical methods.
 - (b) By co-ordinating the factors in efficient proportions.
 - (c) By control of the scale of production and the volume of output.
6. To arrange for the sale of the output.
7. To assume the legal responsibility of conforming with the law.

E. THE ENTREPRENEUR AND THE CAPITALIST

The Capitalist is the individual who supplies capital, i.e. who has legal command of a supply of material resources and allows them to be used as factors in production.

The Entrepreneur is quite a distinct factor analytically: he performs a function distinct from that of the other factors. The supply of entrepreneurs would seem to depend on the supply of a particular kind of ability and temperament and to be determined in the same way as is the supply of any other specialised form of labour.

Where conditions are not such as to favour sufficient

division of labour there is, of course, no reason theoretically why the entrepreneurial function should not be performed by an individual who is also supplying any other factor, such as labour. These dual rôles are very common, particularly in non-industrialised countries and everywhere where the productive unit is on a small scale.

In capitalist industry, however, even where the division of labour is extreme, the entrepreneur is typically also a capitalist and the supply of entrepreneurs is restricted to those individuals who possess not only the required ability but also a fund of capital. There are various reasons for this:

1. It is the outcome of historical development—the spread of the institution of private property and the association between political power and economic privilege.

2. The major obstacles to the production of wealth by mankind have been not lack of raw materials or labour but lack of knowledge and lack of material equipment or capital. Now knowledge quickly becomes a free good, inventors and innovators cannot long retain any privileged position. Thus the most serious limitation has always been lack of capital to make use of the methods of production which have been devised. Hence the owner of capital has occupied a key position and has been able to lay down conditions to the other factors and to assume that control of production which is associated with the entrepreneurial function.

3. To initiate production by establishing a firm requires immediate control of capital and immediate use of it. The assembling of the factors of production and their organisation into a going concern producing output requires a period of time often very extended; also the marketing of output may not immediately follow production, and payment for sales may be even further delayed. In the meantime the factors have to be paid their contractual prices and commodities continuously made available for them to consume. Furthermore, there is no assurance that the product, even when the proceeds of sale do come in, will sell at a price which will cover the disbursements made.

Thus a vital feature of the initiation of production (and the same applies to an extension of the scale of production) is the need for control of a supply of liquid capital and the risk of loss of that capital. Consequently, entrepreneurs are recruited most usually from the ranks of capitalists: that entrepreneur who can demonstrate his self-confidence by investing his own capital in the business he initiates is most likely to secure the co-operation and support of other suppliers of capital.

4. It thus follows that the risks of productive enterprise are twofold: on the one hand, the risk of loss of the capital engaged; and on the other hand, the risk of fluctuating residual incomes.

The risk of loss of capital is not a risk which attaches, strictly speaking, to the entrepreneur, since there is no analytical reason why the entrepreneurial service should be connected with that of supplying the capital. Differences of opinion are found as to whether in practice the two functions can be successfully separated, and various forms of economic organisation exist or are suggested which solve the dilemma in different ways.

The risk of fluctuating profits is inescapably the risk of the entrepreneur so long as his income is a residual income arising from the difference between total receipts and total other costs. It is a point of controversy as to whether this is essential for efficiency. Those who deny the necessity maintain that it is possible to secure efficient entrepreneurial service by payment of contractual incomes and by shifting the risk of fluctuating income either on to the capitalist (in the form of fluctuating dividends) or on to the community as a whole.

There is thus some ambiguity of meaning possible in discussions concerning the essential functions of the entrepreneur; and in cases where the whole complex of entrepreneurial function previously analysed is performed, not by one man but by a group of men, by an organisation of management, there is room for much dispute as to which individual, or group of individuals, is the essential entrepreneur.

F. THE DIVISION OF ENTREPRENEURIAL LABOUR

It has been assumed hitherto that the unit of organisation, the firm, is controlled by one man and that in equilibrium the firm as such will be subject to diminishing returns which will set narrow limits to its expansion. The fact that entrepreneurs differ in ability has also been disregarded, but to remove that assumption will not seriously modify the results of the analysis and can be done on the same lines as were followed in a similar argument with regard to wages (see Chapter IX, Section F).

A much more perplexing consideration now confronts us. In modern industry the control of a firm and the functions of organisation are performed often by a complex group of individuals who jointly compose the Management. The process of division of labour has been applied to the entrepreneurial function itself with two relevant consequences:

(a) It has become difficult to say who is the fundamental entrepreneur.

(b) It has become possible to expand vastly the scale of output of the firm and to postpone that sharp incidence of diminishing returns previously postulated.

As regards the first point, the uncertainty of the identity of the entrepreneur, it has been found possible in many cases, where the scale of production is sufficiently large, to separate certain functions and to hand them over to specialists, within or outside the firm, in return for contractual payments. Such services then become assimilated to those of the other employed factors and the sphere of the entrepreneur shrinks. This leads to the natural query: Can all the functions of the entrepreneur be so performed for contractual earnings? This is partly a political problem, comprising one aspect (but only one) of the controversy between socialism and individual capitalism.

We shall first examine the devices adopted for specialising the entrepreneurial function and for distributing it among different individuals (following the analysis of the functions of the entrepreneurs set out in Section D).

1. *The Initiation of Production.*—Although the entrepreneur must himself initiate a project, he often secures the services of specialist Company Promoters to assist him. These Company Promoters adopt projects laid before them by inventors and innovators, supply capital themselves and interest other capitalists in the proposal, and carry out all the financial and legal preparations necessary. Once the project is launched they sell out their own holdings, wholly or in part, to other entrepreneurs (often by the issue of shares to the public) who will control the going concern.

2. *The Selection of the Product.*—To assist entrepreneurs in deciding upon the kind and quality of the product, a vast organisation of investigation and research has been set up, by private concerns, by societies and journals, by government departments, which makes known the wants of consumers in all parts of the world. More than this: commodities are produced even where no conscious want exists, and a remarkable development of advertisement has been devoted in part to the creation of wants which the proposed products will satisfy.

3A. *The Command of Capital.*—The entrepreneurial problem of securing control of supplies of capital is facilitated by the maintenance of an efficient monetary system, and more particularly, by the organisation of banking and of the investment market.

The organisation of the joint stock company and of the co-operative society represent in part methods of collecting capital in small amounts which can then be aggregated under the control of entrepreneurs.

Municipalities and the state obtain capital, for collective investment, by taxation.

3B. *The Delegation of Authority.*—In the selection of personnel the entrepreneur is assisted by State Employment Exchanges and by the development of advertisement in newspapers and trade journals. An allied problem concerning personnel is the subdivision of the functions of control and their delegation to subordinate officials responsible to the head of the concern. Modern large-scale enterprise is

founded on a diffusion of entrepreneurial authority. The method of the joint stock company illustrates this.

The ultimate entrepreneurs of the company (the recipients of residual incomes) are the Ordinary Shareholders. In practice their activity is restricted to the Annual Meeting, where they (ostensibly) elect Directors and endorse or criticise the actions of the directors. Their latent powers, however, may become active if the company is not successful, and are usually displayed to the extent of changing the directors.

Between annual meetings the authority of the shareholders is wielded by directors, whose functions are primarily the direction of general policy and the selection of the upper personnel of the staff. In some cases individual directors specialise on particular aspects of the work of control.

The execution of policy is entrusted to the Managing Director, the General Manager and the Heads of Departments. General operations are again subdivided and separate departments specialise on:

- (a) Technical methods.
- (b) Purchase of materials.
- (c) Secretarial and financial routine connected with the raising of loans and capital, payment of wages and salaries, distribution of dividends and interest.
- (d) Sale of products.
- (e) Control of staff—appointments, promotions, dismissals, welfare work.
- (f) Legal relations.

A joint stock company is thus, in one aspect, a very flexible device for the specialisation of some functions of the entrepreneur.

4. *The Specialisation of Risk Bearing.*

(a) Certain risks are so uniform and predictable that they have been taken over by specialised outside concerns—Insurance Companies and Brokers, Produce Brokers, etc. The entrepreneur divests himself of these risks by making contractual payments.

(b) Certain risks arising from fluctuations of prices and of the demand for the product are destroyed or mitigated

by adaptation of the scale and methods of production (see Chapter XI, Section C 6).

(c) The major risks involved in paying out costs in advance of receipts from sales of product may be grouped as the risk of variable profits and the risk of loss of capital. These risks are inescapable, but the joint stock company is one device which has been perfected to mitigate these risks. The bearing of these risks is almost the sole entrepreneurial function of the passive investor and the technique of investment is highly developed:

(i) Capitalists "spread" their investments among a diversity of companies and concerns, and by splitting risks they lessen them. The modern development of Investment Companies has enabled even small investors to partake of the benefits of spreading.

(ii) The ready transfer of the ownership of shares, made possible by the Stock Exchange, serves to lessen the risk of loss of capital.

(iii) Capital holdings in companies are graded to make possible the division of risks of fluctuating incomes among different holders on the basis of more risk of loss, more chance of gain:

Debenture holders merely lend capital and are guaranteed a fixed income (interest) in return. If they do not secure this income, or if their capital is not repaid when due (if the debenture is dated), they can distrain on the company's assets to recover their capital.

Shareholders are the owners of the business. They cannot recover their capital except (perhaps) by winding up the company. Their income (dividend) comes out of profits after debenture holders have been paid and is not legally guaranteed: if there is no profit there is no dividend.

Preference Shareholders receive the first share of net profits, usually at a fixed rate per cent. on their holdings and, because it is of different riskiness, it is higher than debenture rates and lower than average ordinary dividends.

Ordinary Shareholders share out the balance of profits

after debenture and preference holders have been paid. Their dividends may thus fluctuate widely: their risks are greatest.

5. *Specialisation of Production.*—Productive efficiency is promoted by methods of specialisation and division of labour, which are examined later (see Chapter XI).

6. *Specialisation of Marketing.*—Marketing efficiency is promoted by methods of specialisation and division of labour, which are examined later (see Chapter XI).

7. *The Legal Aspects of Production.*—Legal advice is secured by the employment of specialists inside or outside the firm, in return for contractual payments. It is not possible, however, for the entrepreneur to divest himself of legal responsibility for conforming with the vast network of law and statute relating to the conduct of productive enterprise. This responsibility most usually assumes the form of liability to the payment of fines for non-conformity with those legal requirements. In the eyes of the law, however, the firm is a legal entity and the responsibility is that of the firm itself and only in limited degree the responsibility of any individuals within the firm. Company Law has thus mitigated the individual responsibility, and payments made by the firm would be classed as costs of production.

G. RISK AND CONTROL

An examination of the functions of the entrepreneur and of the possibility of securing their performance by contractual payments seems to reveal that the fundamental problem is as follows:

1. The task of co-ordinating the complex organisation of a firm must be performed by one brain; no other meaning can be given to the process of co-ordination. Managerial functions may be divided among specialists and the organisation of large-scale production thus be made possible, but someone must still co-ordinate the management and direct policy. Some one mind must weigh up the problems posed by changing circumstance, must assess the relevant evidence and resolve the difficulties. In so far as ultimate control is

exercised by a group of individuals, then in practice this, at its best, will merely ensure that as few relevant considerations as possible are omitted and that the decisions may thereby be sounder. It must remain true that the decision will be formulated in the mind of one individual who imposes that decision upon the others by virtue of its soundness or by force of his personality.

2. The ultimate risk of productive enterprise is the risk of misdirection of effort and resources as tested by the responses of the final consumers of the product. Misdirection implies loss since, on the one hand, the labour and materials have been engaged upon a relatively useless product when they might have been engaged on a more useful product; while, on the other hand, the factors engaged (or their owners) have continued all the time to consume commodities made available by someone in the mistaken expectation of adequate return.

The direct loss is that of the capitalists, measured by the volume of consumption of the factors engaged in the abortive enterprise, a consumption of commodities made available ultimately from the saving of capitalists (the capitalists, be it noted, may be the whole community in so far as the enterprise was financed out of taxation).

The indirect loss is that of the community and is measured by the volume of other products which could have been made available had those factor resources been wisely applied.

What apportionment of control, as between these two types of risk-bearers (where they are distinct), will ensure maximum efficiency of productive effort? To what extent does the type of product and method of production affect the answer?

Although these risks can be, and are, reduced by various devices, nevertheless in a dynamic world enterprises must be launched whose outcome is uncertain. The alternative is stagnation and decay. If then these enterprises fail, productive effort has been misapplied and the community as a whole and some of its members in particular are worse off. Is it necessary for efficiency that the direct control of a productive enterprise should be retained by those who will

suffer the *direct* loss of failure? Or is any alternative system possible?

3. If the mind which co-ordinates must be that of the individual who bears the ultimate direct risk—if the entrepreneur must also be the capitalist—then small-scale individual enterprise is imposed upon the economic system. Since, however, the gains of large-scale enterprise are so spectacular in some industries, and since large-scale enterprise involves a capitalisation vastly beyond the resources of any individual or small group of capitalists, the problem in these cases becomes that of devising forms of organisation and control which will ensure, on the one hand, that one individual (or at most a small group) retains effective control of the productive organisation; and, on the other hand, that the risk-bearers retain effective control of that organiser. It seems less ambiguous and more in keeping with the general terminology hitherto adopted to sum this up by saying that the fundamental problem is that of the control of the entrepreneur (the organiser) by the capitalist (the risk-bearer). The problem is institutional: the Joint Stock Company embodies one attempted solution; the Public Utility Corporation embodies another.

CHAPTER XI

THE SCALE OF PRODUCTIVE OPERATIONS

A. THE VOLUME OF OUTPUT AND COSTS

I. *The Possibility of Increasing Returns.*

(a) It has been argued that Diminishing Returns is the characteristic of equilibrium, and this in both its aspects, to the factors and to the firms.

On the one hand: if, from an initial combination of factors in any firm, it is possible to secure successively rising increments of output by making unit increases of the intake of one factor (more accurately, if with any given intake the marginal return to a factor exceeds the average return to that factor), it must follow that from that initial combination an increase of output could be secured by a slight contraction of the intake of the other factors. Thus, that initial combination cannot be stable and does not conform to the equilibrium criterion of maximising output from a given total intake of factors. An equilibrium combination of factors must be one from which an expansion of intake of any one factor would increase total output but would cause diminishing returns to the expanding factor.

On the other hand: if, with an initial organisation of firms within one industry, it is possible to secure successively rising increments of the output of any one of the firms by uniformly increasing the total intake of factors into that firm, it must follow that the number of firms in that industry is excessive: in other words, that the total output of the industry, with a given initial total supply of factors, would expand if the number of firms were reduced and the scale of production of each expanded. Hence, in equilibrium, strictly conceived, production will be carried on under conditions of constant returns to each firm

(constant returns constituting the turning point between increasing and diminishing returns). 'This will imply zero profits to the entrepreneur.' If, however, conditions 'are variable in any degree which renders the functioning of the entrepreneur essential to efficiency, then, in order to induce the performance of the services of entrepreneurs, the number of firms will be reduced and the scale of each expanded so that diminishing returns to the firm are characteristic, and positive normal profits to the entrepreneur emerge.

(b) This theoretical analysis seems in flat contradiction to those facts of experience known as the "economies of large-scale production" which represent increasing returns to the firm as it expands. When the indisputable evidence of the real world belies the conclusions of accurate theory, it is usually advisable to seek for an explanation of the discrepancy by considering whether the assumptions on which the theory is based are in conformity with the elements of the real situation analysed. This difficulty of large-scale economies is an illustration.

The explanation is found along two lines: one resting on the practical indivisibility of factors; and the other resting on the rôle of the division of labour (which involves an examination of the definition of a factor and of the meaning of an increase in total factor-intake).

2. *The Indivisibility of Factors.*—The equilibrium combination of factors, characterised by diminishing returns to each factor, can be secured only if the factors are divisible into small units permitting flexibility of adjustment. In reality, however, factors are obtainable in units which vary in magnitude; the intake of raw materials, fuels and so on, is usually flexible, but the labour unit is typically one worker engaged for a definite number of hours weekly and working at a standard efficiency and intensity of effort; the equipment unit may be a large machine, and so on.

Hence variation in the intake of some factors can proceed only by big steps, and the practical problem of organisation, as regards proportionality of factors, is to secure an intake of the various factors which most nearly approximates to

an equilibrium combination, and will be achieved by securing a reasonably harmonious assortment of the large-unit factors and adjusting the intake of the small-unit factors as suitably as possible. In so far as an equilibrium adjustment cannot be obtained, the excessive intake of some of the large units will be revealed by their working below capacity—machines and labour standing idle occasionally or working below efficiency speeds. These maladjustments will be paralleled by discrepancies between factor costs and marginal products. Thus an increase in the scale of production will mean, in practice, an increased intake of only some of the factors and will permit the emergence of increasing returns, as an increase of the scale of output enables the large-unit factors to be worked at an intensity nearer capacity.

3. *The Rôle of Division of Labour.*—The system of production by division of labour is based upon the fact of experience that a complex process can often be more efficiently performed if it is divided into parts and stages, each performed by a separate group of factors whose efforts are then harmoniously co-ordinated. In other words, the volume of output from a given intake of factors will be greater if, instead of each unit group of factors performing the whole of a process, each becomes a specialist unit doing a part of the process and combining their functions into one complete process.

Two limitations are decisive:

(a) The process may not be of a nature to permit subdivision. The possibility of the division of labour is dependent on the ingenuity and inventiveness of men to devise methods of achieving it.

(b) The possibility of the division of labour is also dependent upon the scale of output of the product. If the intake of factors necessary to produce the total market output is small, the possibility of specialisation, even when technically conceivable, will depend upon the divisibility of the factors: if the intake of some factors is small and their units are large, no great division of labour will be applicable; and each factor group will perform a

broad general task and not a specialist subdivision. Thus, the possibility of division of labour is fundamentally allied with the problem of the divisibility of factors.

It can thus be seen how the economies of large-scale production arise. Where the volume of output is small, the large factor items engaged must be employed on general tasks. As the scale increases, factor items can specialise, being divided into groups each concentrating on one task only and all co-ordinated by the entrepreneur. The possibility of doing so will, of course, vary from industry to industry—using the term in the broadest sense, e.g. to include the industry of medical service, tailoring, transport, etc. It will also depend upon the stage of economic development and technical knowledge of the community.

Since the output of two specialists, each doing part of the process, will often exceed the output of two general workers, each doing the whole of some process, it follows that where an increase of scale permits the intensification of specialisation and division of labour, then increasing returns will emerge.

It remains to be seen what forms these economies typically assume and what limitations are imposed upon their application.

4. *The Definition of a Factor.*—A further inference is inevitable. If an increase of the scale of production is accompanied by an intensification of specialisation, it is implied that particular factor services are narrowing in scope and changing in character. In what sense, therefore, can continuity of factor-intake be understood? Although for purposes of exposition it was assumed that each factor item was a separate distinct entity, and that an increase of intake implied a multiplication of similar items, it can now be seen that the only satisfactory definition of a factor which will suit economic analysis is one conceived on broad lines—labour, equipment, raw materials, fuel and so on. Such broad groups cannot be considered as composed of homogeneous units (as the marginal approach demands) except in value terms. The intake of factors can thus be measured, not in physical quantities, but in terms of expenditure

upon them at market rates by each entrepreneur, e.g. the magnitude of the intake of labour will be represented by the total expenditure on wages (including salaries), and one of the functions of the entrepreneur will be to engage, for that specific expenditure, the most suitable combination of the particular kinds of specialised workers which the alternative methods of production of that scale of output permit to be employed.

5. *The Scale of Production.*

(a) Very great differences exist in the scale of production of different commodities, and it is necessary to examine the main influences which determine the size of an industry and of the firms which compose it; and how the division of labour is applied in different forms; and the possibility of its application in different lines of production.

(b) *Technical Units, Firms and Industries.*

The Technical Unit is the unit of production in the narrow sense, the unit combination of factors co-operating as a separate going concern to perform a distinctive service or manufacture a distinctive commodity. The product may be a consumption good or a production good. Furthermore, one technical unit may produce, by joint or overlapping process, more than one good.

The Firm is a unit of organisation or control, usually a legal entity. It may control one or more technical units.

The Industry is a group of firms in any one country or locality which is linked by some common interest—producing the same commodity or group of commodities, consuming the same raw material, or using the same, or similar, technical processes. It has no legal or organisational unity and its frontiers are indefinite and often subject to rapid change as technique changes.

(c) *The Size of the Market.*

The possibility of applying methods of specialisation by division of labour will depend upon the size of the market for the product concerned.

(d) *The Nature of the Product.*

Standardised commodities of widespread appeal are those whose production can be most readily organised on

a large scale with intense division of labour. In some cases the product itself may not be standardised, but the parts out of which it is assembled may be standardised.

B. LARGE-SCALE TECHNIQUE ¹

1. The scale of output affects costs of production per unit. That scale at which the technical costs are at a minimum is known as the Optimum Technical Unit.

2. The maximum advantage of the division of labour can be derived only if the industry or firm is on a sufficiently large scale, but it may take the form of subdivision into relatively small technical units each running an independent process for the production of a component part of some complex commodity.

3. *The Integration of Processes.*—Integration is the reverse of division of labour. Invention may devise means for the mechanical co-ordination of a series of operations previously subdivided and distinct. The integrated process generally requires complex equipment. Integration is thus usually available only to large concerns which can afford the equipment and keep it occupied.

Where, however, the integrated processes can be separated into a distinct unit, it is often established as an independent disintegrated firm working in conjunction perhaps with a number of small firms serving it as market or as sources of supply.

4. A large technical item of equipment is relatively cheaper to build and cheaper to operate. This is one important cause of the economies of large scale.

The gain from the large item depends upon its working to capacity, i.e. continuously at its most efficient speed. This arises because many of its costs are fixed per unit of time irrespective of output; e.g. interest on capital cost, rate of depreciation through obsolescence.

5. Thus the technical optimum must reach a certain minimum size which will permit of the fullest division of

¹ Sections B to E which follow are (inevitably) based on *The Structure of Competitive Industry*, by E. A. G. Robinson, to which the student is referred for a more detailed and complete analysis.

labour. | Since the different items of equipment associated in the particular process may each require for efficient functioning a different optimum output per week, the joint technical optimum may be at some higher point permitting such a balance of equipment that each item can be worked at or near capacity. It also follows that as the scale of output increases costs per unit may change unevenly.

C. THE OPTIMUM FIRM

1. The size of the Optimum Firm will depend upon five main influences; those of technique, management, finance, marketing and fluctuations. Considering each of these influences separately, there will be a certain scale of output which will secure most efficient functioning, i.e. least cost per unit of output. The actual size of the optimum firm in any industry will be a reconciliation of these often conflicting optima.

2. *Technical Influences.*—These will usually impose a certain minimum size to secure the advantages of division of labour (see Section B).

3. *Managerial Influences.*—There will be a certain minimum size of firm to secure the most efficient division of labour of management (see Chapter X, Section F). In many cases this minimum size will be larger than the technical optimum, and one management will control several technical units.

As the firm grows, however, the problem of organisation increases in complexity. Every decision has to be transmitted through a vaster hierarchy and "red tape" becomes progressively more hampering. There is also a narrow limit to the number of subordinates that any one man can effectively supervise. Hence efficiency will decline rapidly after a certain point. Problems of management and control are, in practice, the main obstacles to expansion.

4. *Financial Influences.*—The major financial problem is that of securing control of capital.

Two types of firm must be distinguished:

(a) Firms in which the technical unit is relatively small

and which can therefore grow by duplication and integration of technical units, e.g. retail shops, taxi service.

In these cases the difficulties of securing capital are less, but they remain, in countless cases, formidable. Many potentially able entrepreneurs can never get a start because they lack the capital to equip the smallest technical unit. Moreover, even where a start can be made, their rate of growth is restricted usually by the necessity to finance expansion out of profits.

If at any time a stage is reached where drastic reorganisation of technique or of management is imposed which requires a rapid expansion of capital, it will be obtainable only by conversion into a company or by a public issue of shares. The larger the firm, at this critical point, the less will be the financial obstacles: a given amount of capital can more readily be borrowed and at better rates of interest by a large firm than by a small firm!

(b) The second type of firm is that in which the technical unit is large, e.g. a steel rolling mill, a railway. In these cases joint stock organisation is imposed from the outset. Two consequences usually follow.

Firstly: it is better to be large than otherwise. Successful flotation of a company is expensive, specialised promoters have to be paid, heavy advertisement costs, etc. These costs can best be afforded when the total capital raised is large.

Secondly: it is easier for an established concern to expand its capital than for a new company to raise capital. The standing of the old company is known, its record can be examined. This influence encourages the integration of firms and the formation of combines. Alternatively, it encourages interlocking directorates, "guinea-pig" directors and the holding of multiple directorships. The real promoters of a share-issue may be relatively unknown to the investing public and, to instil confidence, they are forced to secure the co-operation and the use of the names of well-known people.

Thus, financial influences tend to favour the large concern and tend also to concentrate economic power and

control in the hands of a relatively small class of financial magnates.

5. *Marketing Influences*.—Production includes not only the manufacturing process but also the buying of raw materials and the selling of the product. Marketing costs, buying and selling, are often a high proportion of total costs, and marketing economies are an important element in efficiency.

The scale of marketing exerts an important influence on costs of marketing and the optimum marketing scale is usually large:

(a) Large-scale buyers obtain cheaper rates because the expenses of the seller do not vary in proportion to the size of the order and because sellers will cut rates more readily to obtain or retain a large order, i.e. an element of monopoly may enter.

Large-scale buyers can also employ specialists to test systematically the quality of the materials bought.

(b) The greatest economies are derived from large-scale selling. It promotes division of labour among the selling staff: storage, packing, dispatch, transport, advertisement, travellers, secretariat, etc. It also enables specialists to be employed in each aspect and worked to capacity.

(c) The economies of working the sales organisation to full capacity often encourage the expansion of the firm to a size beyond the technical or managerial optimum. In some cases they encourage lateral integration of production: the firm develops the manufacture of other lines which can be handled by the same sales organisation. This is most probable when goods are branded and producers are trying to create a separate market for their own brand.

(d) Where an industry is large there is often vertical disintegration of selling. Firms of merchants spring up with specialised sales functions dealing either in a variety of allied products, e.g. wholesale groceries, or in one particular commodity, e.g. cotton merchants. This may permit the continuance of manufacturing firms on a small scale yet enjoying all the economies of large-scale selling.

This system is usually only possible where goods are standardised and where the identity of the manufacturer is not particularly important.

Thus, marketing influences are in general in favour of large-scale firms except in those cases where marketing can be disintegrated from manufacturing.

6. *The Influence of Uncertainty and Fluctuations.*—The primary influence which has to be considered is that arising from the existence of non-insurable uncertainties: the risk of fluctuations in the demand for the product.

These fluctuations will affect all the factors concerned, but more vitally those which are less mobile. Hence it can be expected that immobile factors will be less commonly employed in an industry subject to fluctuations. Only those forms of specialisation will be adopted which are mobile: standardised types easily adaptable or available for service in other lines.

As regards the effect of fluctuations upon the size of the firm a further point must be noted. The firm does not own all the factors, it merely buys their services. The firm, as such, can meet fluctuations by varying its purchases of factors (prime costs). The firm, however, does own one important set of factors: the fixed capital, with continuous costs represented by the rate of interest on capital value and by rate of depreciation. Furthermore, there is a certain minimum nucleus of personnel whose services are essential to the maintenance of the organisation as a going concern. Hence the firm must incur certain costs (overhead costs) which are independent of the scale of output. It is the relationship between overhead costs and total costs which will determine the effect of fluctuations on the scale of operations of the firm.

(a) Where the most efficient technical processes do not require much fixed capital, the possibility of fluctuations will scarcely affect the size of the firm—unless the supply of the factors themselves is adversely affected by the fluctuations.

(b) Firms subject to fluctuations will tend to be smaller than the other optima require.

- (c) Attempts will be made to iron out the fluctuations:
- (i) By production for stock in slack periods.
 - (ii) By combining one seasonal or erratic product with another of complementary rhythm or with a standard line which is storable, or within the capacity of the same factors.
 - (iii) By combining within one firm a wide range of fluctuating products whose processes of production overlap, e.g. different qualities of the same commodity or different fashionings of the same material.

D. EXTERNAL ECONOMIES

I. *The Optimum Industry*.—External Economies are those which arise outside the firm, economies which the firm enjoys through no direct action of its own, e.g. reduced telephone charges, reduced railway rates.

Costs of production within the firm are affected by the size of the industry of which it is a member. External economies become possible as the industry grows:

(a) Specialist firms or organisations are established by vertical disintegration, are equally available to all member firms and grow to optimum as the industry grows, e.g.

- (i) Firms supplying specialised machinery.
- (ii) By-product firms utilising waste products.
- (iii) Organised markets for raw materials and for products.
- (iv) Specialised transport, commercial and banking facilities.
- (v) Trade journals, university departments, government departments, etc., all interesting themselves in the problems of the industry.

(b) Specialised personnel is trained by an apprenticeship system or by technical colleges and is available to each firm within the industry.

(c) Research on a large scale can be promoted by joint action of all the firms. Large-scale research is more

fruitful and its discoveries are quickly diffused through all the member firms of the industry.

2. *Generalised Economies*.—Still further economies are available on a scope wider even than the industry.

(a) Certain costs of production are shared by allied industries and, as the whole group of industries expands, economies become available to the individual firms.

(b) Certain costs of production are common to the whole industrial system of the area and certain services increase in efficiency as the whole area develops, e.g. banking and transport, government services, the supply of fundamental factors such as power, and so on.

(c) Certain economies are mobile internationally. If in any one country certain specialised services are made available for any one industry by reason of its large scale, it is possible that the same industry in other countries will reach optimum on a smaller scale, but enjoying large-scale advantages based upon the major centre. Examples of these specialised services available internationally are the Liverpool Cotton Market, the Chicago Wheat Market, the London Discount Market.

3. *The Limits of External Economies*.

(a) External economies arise as an industry grows because subsidiary industries or firms are growing to optimum. As they successively reach optimum, external economies gradually slacken. When they cease, the industry is at its optimum.

(b) If factors of inelastic supply are important, diminishing returns will set in more rapidly and the optimum will be smaller.

(c) The limit to expansion will in any case be set by the increasing costs of transport as more distant sources of materials and more remote markets for products have to be tapped.

E. THE LOCALISATION OF INDUSTRY

In competitive conditions it might be expected that each producer would establish himself as far away as possible

from his rivals so as to enjoy an element of local monopoly. Actually, we find that in many cases the member firms of an industry are grouped together in one restricted area. This Localisation of Industry requires explanation.

The attendant phenomenon of Concentration consists of the grouping together of different industries within one relatively small geographical area.

There are various influences at work which affect localisation and concentration.

1. *The Nature of the Product.*

(a) Personal services to consumers must be located at centres of population.

(b) Extractive industries are situated near natural resources.

(c) Commercial occupations concentrate near markets.

(d) Shipping and its ancillaries are based on ports.

(e) Transport services link sources of materials, places of production and markets.

2. *The Geography of Comparative Costs.*—In competitive conditions the aim of the entrepreneur is to deliver his product to consumers at lowest cost. The location of production will affect costs. In this context, total costs may be analysed as:

(i) Cost of factors at works, made up of:

Cost of factors at source or origin.

Cost of transport from source to works.

(ii) Cost of transport of product to market or consumer.

The location of production will be chosen so that these costs are minimum.

3. *Location of Production and Cost of Factors.*—There will be a tendency to locate production at a centre where factors are cheap, i.e. at a centre most accessible to abundant supplies of a predominant factor, e.g. raw materials, labour.

Where the important factors are mobile, alternative locations become possible and costs of transport are then of decisive influence. Note that immobility does not always coincide with heavy costs of transport, e.g. the mobility of labour across national frontiers.

4. *Cost of Transport of Factors.*—Where factors are

ubiquitous (e.g. clay for bricks) or involve negligible costs of transport (e.g. capital, at least within a country), they will exert no influence over location of production.

Where any important factor is of localised origin and transport is costly because it is bulky (iron-ore), fragile (grapes for wine), or perishable (flowers for scent), it will attract production towards its source. This will particularly apply where the disabilities of the factor are not embodied also in the product (e.g. scent, wine, coal consumed as fuel).

If two or more factors are of this latter type, production will be located at a compromise centre where these combined costs are minimised (e.g. blast furnaces needing coal and iron-ore).

5. *Cost of Transport of Product.*—Where consumers are widely scattered and the market is not localised, marketing will not affect location.

Where markets are localised, as is usual owing to the agglomeration of consumers and production in towns, and the transport of the product is relatively costly, production will be located at the market.

6. *Scale of Operations and Location.*—Small-scale operations will be usual if transport costs are high and if markets or sources of factors are small and scattered.

Large-scale operations dealing with several scattered markets or sources of factors will be possible only if the economies of large-scale production outweigh the increased costs of transport, making it possible to undersell local small-scale producers.

7. *Localisation and Concentration.*—If economic forces result in the establishment of a localised centre of production of one commodity, the concentration of other industries will be encouraged in the same locality since not only will the established industry set up a demand for materials and subsidiary services but also the workers agglomerated will constitute a market for other commodities; and those industries whose location is determined by the location of the market will be attracted.

8. *The Persistence of Localisation.*—Once an industry has been established for some time in a particular area it may

long persist even after the original economic advantages have vanished; partly because of inertia and partly because of the developed advantages of:

(a) A ready supply of specialised factors and in particular of labour trained in local institutes.

(b) The existence of subsidiary industries and services such as machine-makers and repairers, by-product firms, research departments and information bureaus of local trade journals and educational institutes.

(c) The service of specialised transport and communications.

(d) Political pressure to secure authoritative protection by legal privileges, e.g. tariffs.

9. *Decentralisation*.—Influences which counter the attractions of localisation and concentration:

(a) An increase in the mobility of factors, e.g. a rise in the standard of living or in the level of education of labour promoting migration towards areas where the demand price for labour is higher.

(b) The rising costs of factors of inelastic supply, e.g. rent of building sites.

(c) Increasing transport difficulties through congestion.

(d) The dangers of dependence on a narrow range of products in times of instability and fluctuations arising from new developments, i.e. from economic variations.

(e) The social evils of concentration: crowded and unhealthy industrial areas.

(f) Strategic considerations of national defence.

F. THE PERSISTENCE OF SMALL-SCALE PRODUCTION

Despite the spectacular advance of large-scale concerns, the majority of productive units are on a small scale and will probably continue to be so, although in many industries where this is true, the total volume of output of the small firms is less than that of the few large concerns. The reasons for this persistence have been implied in previous discussions, but may be summarised:

(a) The preference of individuals to be independent

entrepreneurs rather than cogs in the large-scale machines. This will be effective mainly in those lines of production where a large amount of capital is not required, e.g. retail selling.

(b) The establishment of a host of small-scale satellite firms performing specialised services disintegrated from the main large-scale processes and whose existence is due to large-scale production itself and is bound up with its persistence.

(c) Where transport costs are high and thus promote small-scale production and marketing.

(d) Where the product is:

- (i) A direct personal or professional service, or
- (ii) Not capable of being standardised.

(e) Where the location of the technical process is fixed by:

- (i) The location of the consumer, e.g. house-building.
- (ii) The local distribution of small sources of immobile factors, e.g. brick-making.

(f) Where the market is restricted because of transport difficulties or because the demand is small in volume, e.g. luxury goods, highly specialised products.

(g) Where there is a high element of uncertainty and fluctuation making adaptability imperative.

(h) Where close supervision of productive processes is required under changing conditions requiring promptness of decision, e.g. agriculture, coal-mining.

There is usually in small-scale production a direct association between the making of a decision and the shouldering of the consequences. This promotes efficiency. Nevertheless, as the technique of organisation improves, large-scale production tends constantly to invade the domain of the small.

G. LEGAL FORMS AND THEIR ECONOMIC SIGNIFICANCE

I. *The Individual Business.*—Owned and controlled by a capitalist-entrepreneur. Usually small scale, but modern

specialisation has made possible a growth in scale where the function is narrow. The product is often of the type of professional service which requires small capital and no great diversity of staff such as would complicate organisation. They multiply where "rugged individualism" flourishes.

2. *The Partnership*.—Represents the first step in subdivision of the entrepreneurial function. Often a combination of active organiser with passive capitalist.

3. *The Joint Stock Company*.—Primarily a device for facilitating the massing of capital by an association of capitalists and for permitting subdivision of the entrepreneurial function.

It has the advantage of continuity of existence as a legal entity and is not broken up when one participant dies, which is important where processes are of long duration and where organisation is complex.

The device of limited liability, where adopted, serves the economic function of limiting the risk of loss of capital: the risk of financial loss is limited to the amount invested and the capitalists' other possessions cannot be seized to pay the debts of the company. This security increases the supply of capital available for investment.

4. *The Private Company*.—Usually an association of relations and friends. It is not compelled to publish the detailed information required from a Public Company, and this element of secrecy may be important for economic or personal reasons. Its disadvantage is that, being limited to fifty shareholders, it usually lacks control of large capital.

5. *The Public Joint Stock Company*.

(a) Flexibility of scale of operations.

(b) Command of capital.

(c) Spreading and differentiation of the risks of loss of capital and of fluctuating profits.

(d) Flexibility of organisation adapting itself to the changing possibilities of division of management and control in each line of production.

(e) Investment opportunity for small capitalists.

(f) Scope for the specialised organising ability of individuals who lack personal control of capital.

(g) Enforced publicity favours consideration of public welfare.

6. *The Consumers Co-operative Association.*

(a) Tries to combine the personal interest of partners with the scale, flexibility and continuity of the Joint Stock Company.

(b) The uniformity of product handled permits large-scale operations and reduces risk.

(c) It enjoys the ready-made market of its members and is saved much selling costs.

(d) The activity of its member-customers makes unnecessary much paid minor superintendence and promotes prompt criticism of laxity or inefficiency.

(e) It enjoys much voluntary service, which lowers costs but which may also impair efficiency.

(f) It prevents the exploitation of consumers, checks monopolistic predation and acts as a yardstick for judging the efficiency of rival private concerns.

7. *The Public Utility Corporation.*—A form of economic organisation adopted in the case of basic economic services either because the welfare of the whole community is directly affected by their efficient performance or because they are most efficient when run as monopolies and then too powerful to be entrusted to private enterprise.

Entrepreneurial control is organised as in the Joint Stock Company, but the directors or governors are appointed by Public Authorities on behalf of the community as a whole.

The ultimate risks are borne by the community concerned: gains being devoted either to reduction of prices of product or to relief of taxation; losses being mitigated by raising of prices or financed out of taxation.

There are many varieties of detail in their organisation.

H. A MONOPOLISTIC FIRM

If a firm had a monopoly of some productive process it would seek to secure Maximum Net Revenue. The scale of production would be determined by two considerations: the price of output, depending on the elasticity

of demand for the product; and the costs per unit as the scale of production changed.

If demand were inelastic it would advantage the firm to restrict production to secure maximum total receipts, unless this reduction of output increased costs per unit at a rate which more than offset those gains.

If the economies of large-scale operation reduced costs at a rate which more than compensated for the falling price which would result from increased marketing, then it would pay the firm to expand.

Thus, if the demand for the product is of unit or more than unit elasticity, the size of the firm will be determined by considerations of costs and the firm will tend to expand to secure the gains of large-scale operations.

If the demand for the product is inelastic, and there are no substantial economies of large-scale operations, then the firm will resort to a small turnover and high returns.

In the case of inelastic demand combined with the possibility of economies of large scale, the decision concerning policy will be difficult: various alternative scales of production may be equally remunerative.

SUGGESTIONS FOR FURTHER READING

The student is strongly urged not to rely upon any one text-book, no matter how good. Wide reading is imperative in order to gain a sound grasp of the complexities of Economic Theory. The following books are recommended. They elaborate, in different degrees, the theoretical propositions presented in this book or provide alternative points of view.

- G. D. H. COLE: *Economic Tracts for the Times* (Macmillan).
 H. D. HENDERSON: *Supply and Demand* (Cambridge).
 J. R. HICKS: *The Theory of Wages* (Macmillan).
 F. H. KNIGHT: *Risk, Uncertainty and Profit* (London School of Economics Reprint).
 L. ROBBINS: *The Nature and Significance of Economic Science* (Macmillan).
 D. H. ROBERTSON: *The Control of Industry* (Cambridge).
 E. A. G. ROBINSON: *The Structure of Competitive Industry* (Cambridge).
 F. W. TAUSSIG: *Wages and Capital* (Macmillan).
 R. H. TAWNEY: *The Acquisitive Society* (Bell).
 P. WICKSTEED: *The Commonsense of Political Economy*. 2 vols. (Routledge.)

Detailed references to these books for reading in conjunction with the development of theory followed in this present work are added:

Chapter I:

- ROBBINS . The study of this valuable work should be deferred until some grasp of the main outlines of theory has been obtained.
- WICKSTEED . Vol. I. "Introduction."
 Vol. II. "The Scope and Method of Political Economy."
 Vol. II. "Political Economy and Psychology."
- COLE . "Towards a New Economic Theory."
 "The Use and Abuse of Economic Terms."
- KNIGHT . Preface to the Re-issue.

Chapter II:

- WICKSTEED . Vol. I. Chapters 1, 2, 3.
 Vol. II. "Final Utility."
 Vol. II. "Marxian Theory of Value."

Chapter III:

- WICKSTEED . Vol. I. Chapters 4, 5, 6.
 Vol. II. Chapter 4. "Buyer and Seller."
 KNIGHT . Chapter 3.

Chapters IV and V:

- WICKSTEED . Vol. II. "The Law of Rent and its Implications."
 KNIGHT . Chapter 4.

Chapter VI:

- WICKSTEED . Vol. I. Chapters*8, 9.
 HENDERSON . Chapters 1, 2, 3, 4, 5, 10.

Chapter VII:

- WICKSTEED . Vol. I. Chapter 7.
 HENDERSON . Chapter 8.
 TAUSSIG . Chapters 1, 2.
 KNIGHT . Chapters 5, 6.

Chapter VIII:

- HENDERSON . Chapter 6.

Chapter IX:

- HENDERSON . Chapter 9.
 HICKS . Chapters 1, 2, 3, 4, 5.
 COLE . "Wages and Unemployment."
 "The World Economic Outlook and Labour."
 "The Abolition of the Wage System."

Chapter X:

- HENDERSON . Chapters 7, 10.
 ROBERTSON . Chapters 7, 8, 9, 10, 11.
 COLE . Part III. "Socialisation."
 "The Nature of Profits."
 TAWNEY . In full.
 KNIGHT . Chapters 1, 2, 7, 8, 9, 10, 11, 12.

Chapter XI:

- ROBERTSON . Chapters 1, 2, 3, 4, 5, 6.
 ROBINSON . In full.

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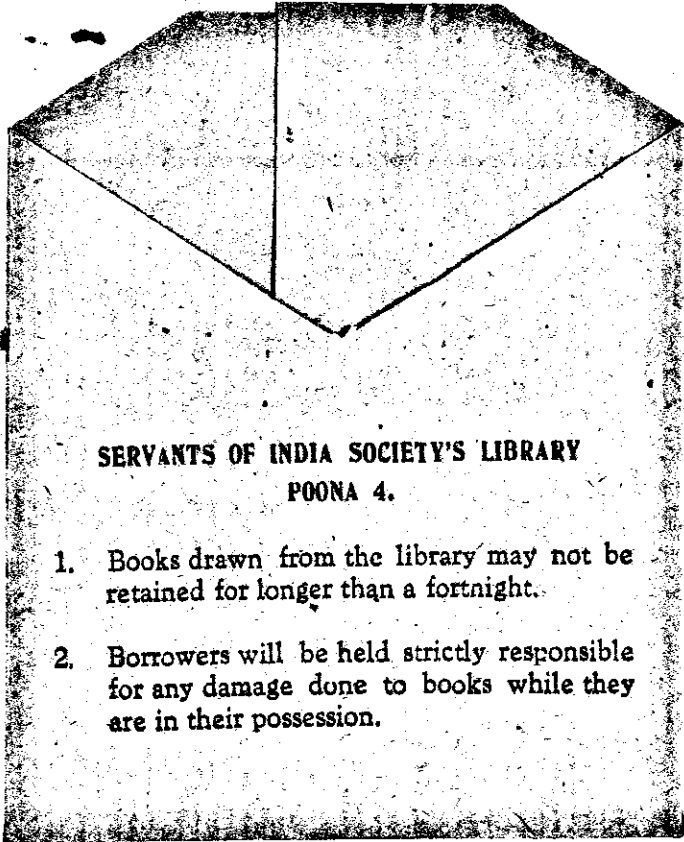
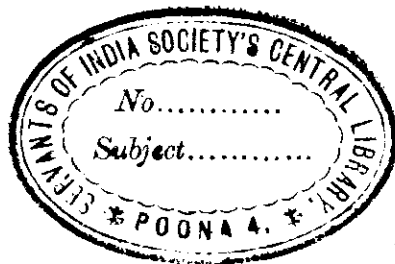
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