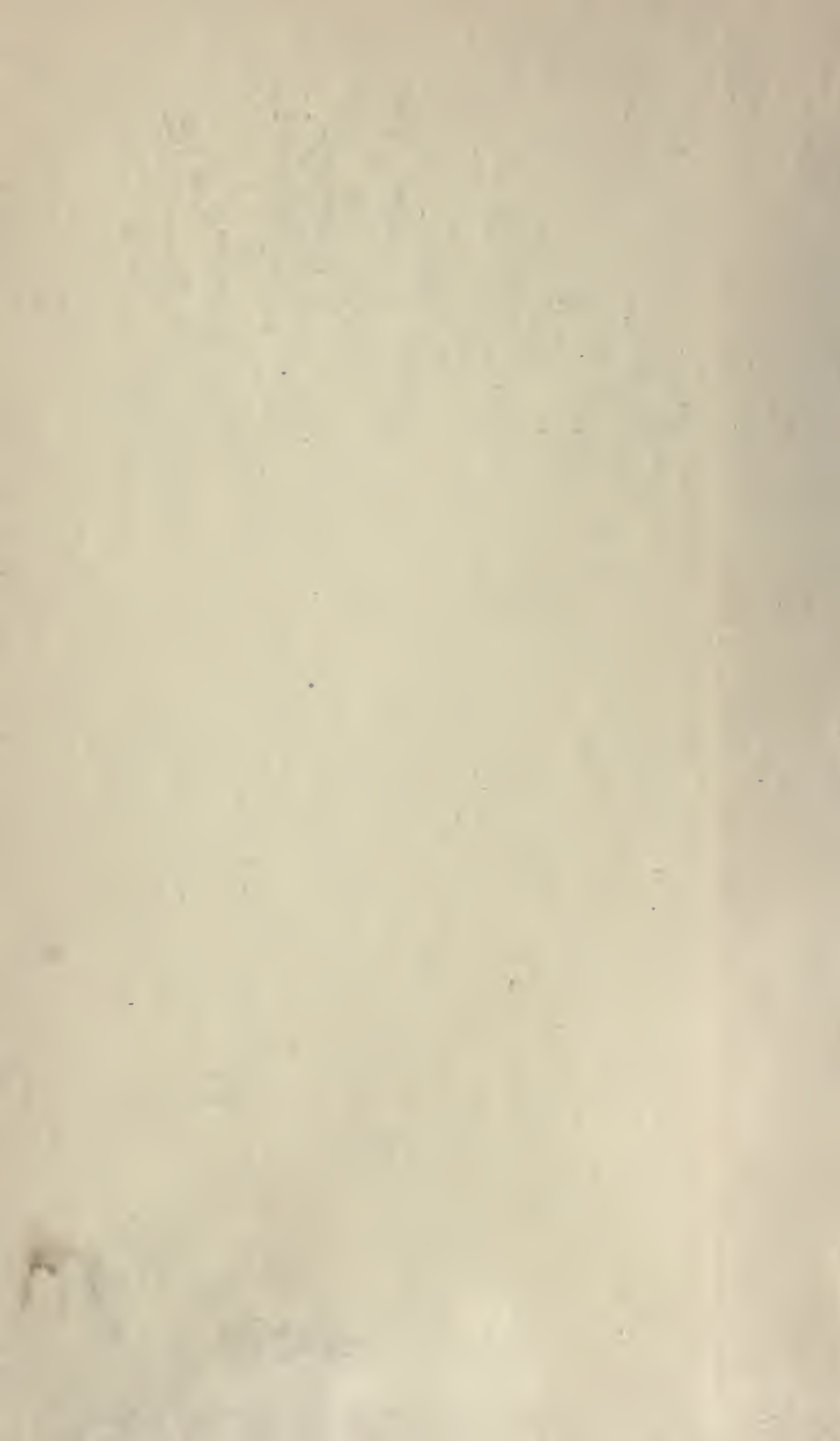
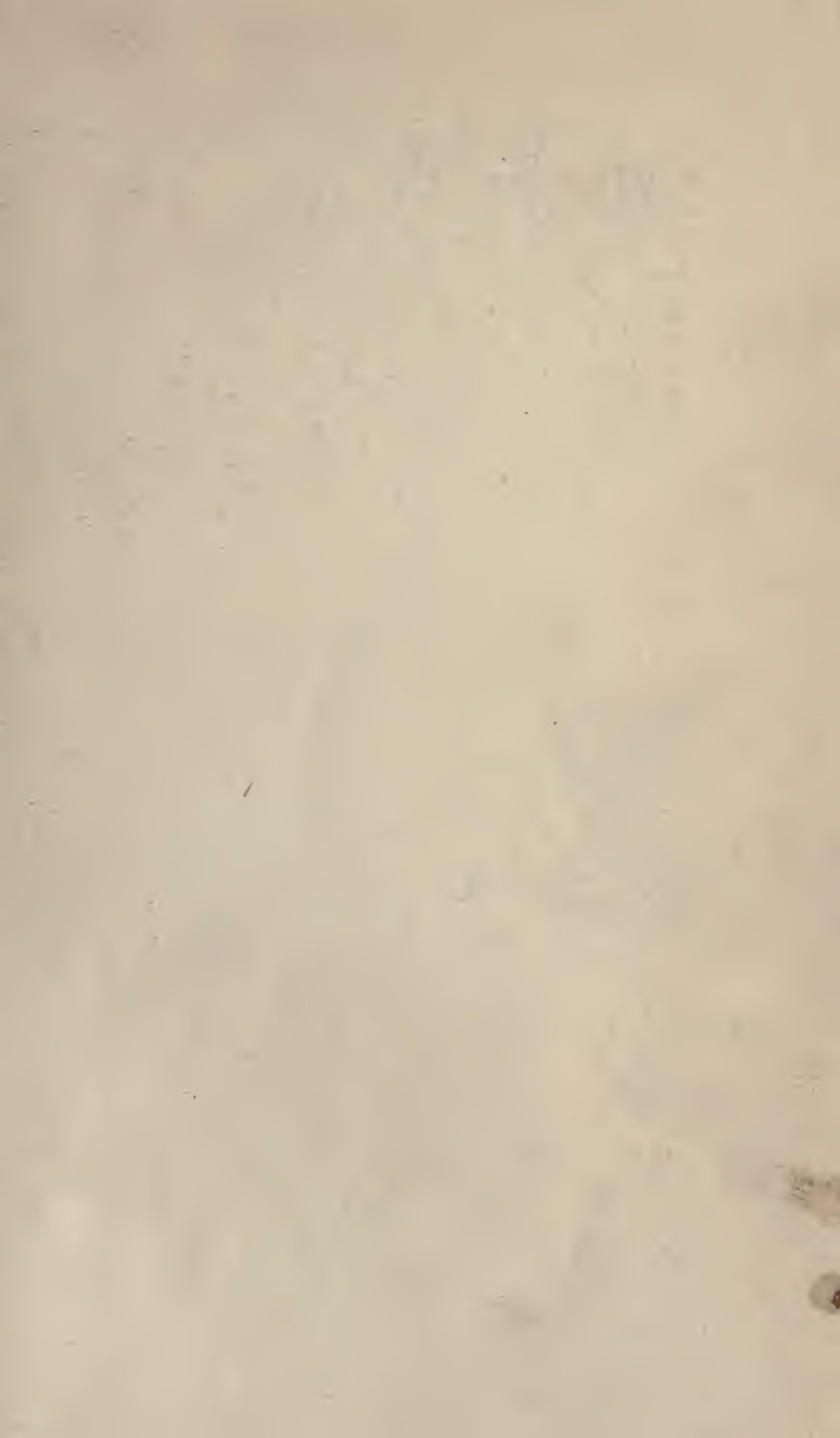


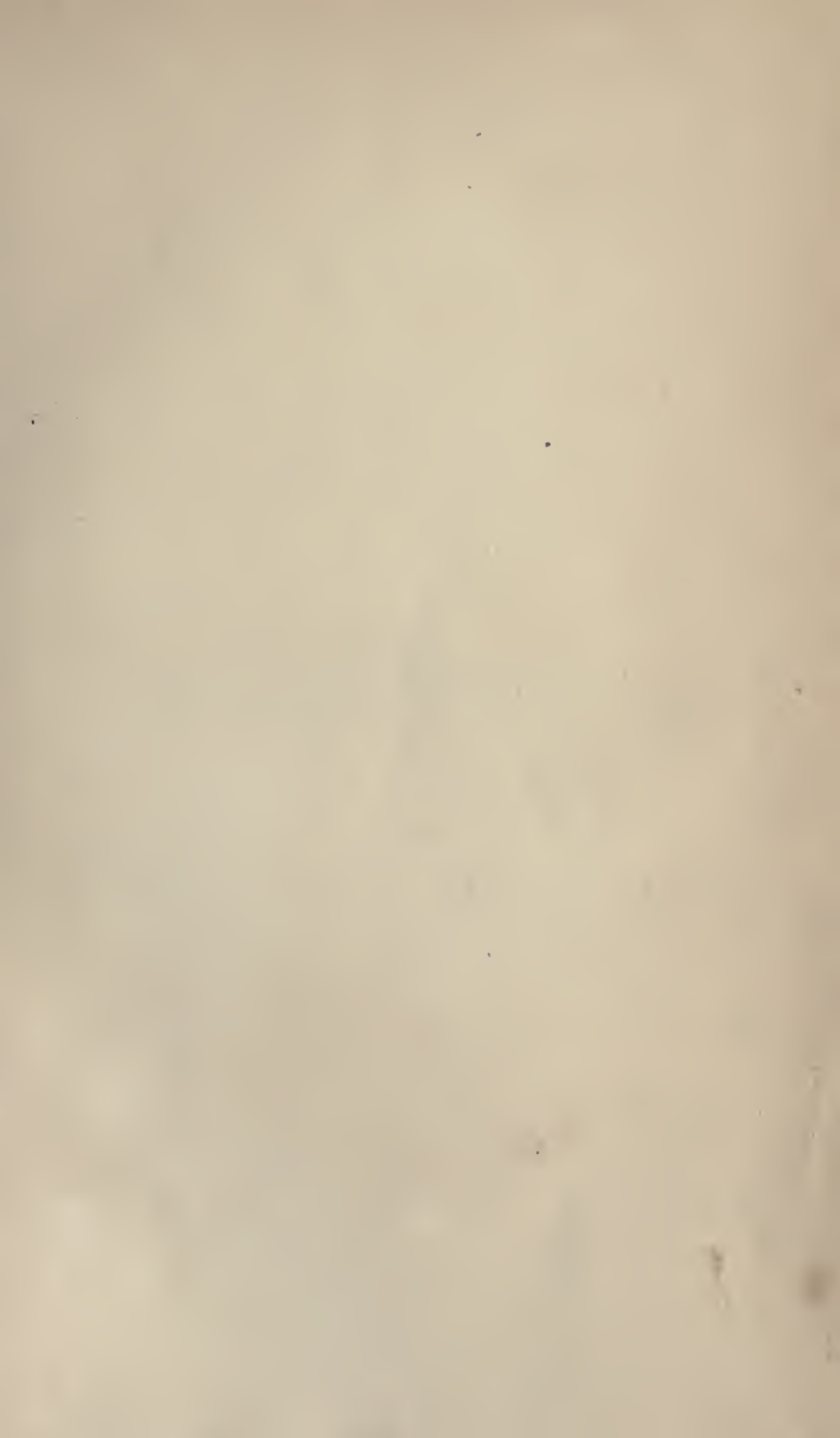


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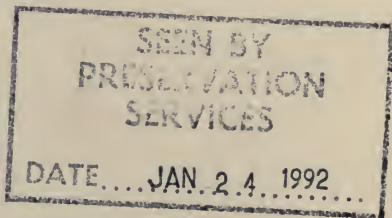
BY

PROFESSOR MAFFEO PANTALEONI

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## TRANSLATOR'S PREFACE

PROFESSOR PANTALEONI'S *Manuale di Economia Pura* has met with general acceptance at the hands of Italian students of economics. It has been translated in the hope that it may meet, on the part of English readers, with the recognition to which its comprehensive grasp and lucid exposition of the fundamental principles underlying economic questions entitle it.

The English edition embodies additions and alterations by the author, necessitated by the contributions that have been made to this subject by many writers since the original Italian edition appeared in 1889.

The translator desires to acknowledge the kindness and courtesy of Professor A. Marshall of Cambridge in giving him access to some of his unpublished writings, to which reference is made in the text.

T. B. B.



## PREFACE

THIS manual is intended as a succinct statement of the fundamental definitions, theorems and classifications that constitute *economic science*, properly so called, or Pure Economics. Thus all questions pertaining to *economic art*, or Political Economy, are beyond its scope. This is a departure from the lines on which text-books of economic science are usually prepared, their authors' object being to equip the reader forthwith for the discussion of the most important economic problems presented by everyday life. The reasons of this departure are twofold. In the first place, it appears to me that the discussion of problems of economic art is altogether superficial and inconclusive, if not based ultimately on theorems of Pure Economics. In the second place, I do not share the view that Pure Economics is not susceptible of plain exposition, requiring no greater intellectual effort for its comprehension than many other branches of study that form part of a university curriculum. ¶ My experience in the class-room has convinced me that all that is necessary on the part of the lecturer is that he should enunciate his propositions in a rigorously logical order of sequence, explain and illustrate their contents and bearing with copious detail, and enhance the mnemonic effect of his prelection by occasionally repeating the same things in a different form. ¶

In yet another point I have departed from the general practice of text-writers. To each theorem and each classification I have given the name of the economist to whom we are

chiefly indebted for it. The selection of these names was a matter of some difficulty, in view of the conflicting claims that may be advanced on behalf of the economist who first discovered a theorem, or the one who first analysed it minutely, or who co-ordinated it with other theorems, or who popularised it, or rediscovered it after it had been forgotten. The principle on which I have proceeded is to mention the author whom the student may consult with most profit to himself. This method facilitates the recollection of theorems, conduces to the study of the sources, and presents a small repertory of the latter methodically classified.

MAFFEO PANTALEONI.

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PART I  
THE THEORY OF UTILITY



## CHAPTER I

### OF THE SUBJECT-MATTER OF ECONOMIC SCIENCE

ECONOMIC science consists of the laws of wealth systematically deduced from the hypothesis that men are actuated exclusively by the desire to realise the fullest possible satisfaction of their wants, with the least possible individual sacrifice. This hypothesis is appropriately termed the hedonic premiss of economics, inasmuch as every economic theorem may be expressed in the form of the conclusion of a syllogism, having for its major or minor premiss the hedonic hypothesis, and for its other premiss some matter of fact, which may be a truth borrowed from some other science, or ascertained inductively by the economist himself. Naturally, this reduction of any one economic theorem to its simplest form cannot, for the most part, be effected immediately; the theorem in question must be successively resolved into others more proximate to itself and less remote from the fountain-head of all economic science. The category of premisses of fact comprises chiefly the more or less complex technological data utilised by economic science, consisting of the mechanical and chemical laws of those bodies which in economics are regarded as commodities, and of the biological, psychological and sociological laws that govern man and other organic beings.<sup>1</sup> The demonstration of the truth of these premisses pertains to the science to which they respectively belong: economic science can only accept

<sup>1</sup> P. Geddes, *An Analysis of the Principles of Economics*, part i. Williams and Norgate, 1885, London.

them, until they are modified, or their accuracy is impugned, by the science which originated them. Thus, for instance, the theory of the factors determining the magnitude of markets, rests, if we utilise it for a classification of all products, upon data derived from commercial technology; whilst the Ricardian theory of rent presupposes data derived from agrarian technology. Sometimes economics requires a groundwork of facts which other sciences, owing to their special nature or trend, omit to investigate; in which case it proceeds itself to ascertain these facts by the induction and generalisation of typical data. These researches after premisses for economic theorems are however, though often necessary, and always useful, nevertheless mere prolegomena, or even digressions, from the economist's point of view; thus for instance, considered under this aspect, the greater part of Malthus's celebrated work on the *Principles of Population* is a digression.

Lastly, it may be convenient to assume, as a hypothesis, the existence or non-existence (as the case may be) of one or more facts, without any inductive examination as to their truth. Well-known instances of hypotheses that frequently occur in economics are: the existence of perfect industrial or commercial competition, the existence of a close market, of non-competing groups, and other such conditions. More especially it may be necessary, owing to the impossibility of having recourse to experiments, to make use of hypotheses whenever we want to determine the isolated effect of a moral or physical force, that is manifested only in conjunction with concomitant forces, in cases falling within the scope of historic observation. This is done by supposing a market to be in equilibrium, by supposing a new force to come into existence, by calculating or determining then the new state of equilibrium, and comparing it with the preceding one. Of course the properties of a market supposed to be in equilibrium must be, and are, known to students of economics.

It is a mistake to give the name of economic laws, as is occasionally done, to some of the premisses of which we have been speaking; for though they are indeed laws, inasmuch as they are constant uniformities of nature expressed in the form of propositions of co-existence, succession, and equality or inequality, yet they are not economic in their nature. This



mistake is most commonly made with reference to those data which economists have sought out for themselves, owing to their not having been supplied by any other science. Thus, for instance, it is a misnomer to speak of the *economic law of decreasing productivity*, or of the *economic law of definite proportions*; not that they are untrue, nor that they are not of capital importance to the economist; but because they pertain to other branches of science, or will certainly do so some day; as has indeed happened with the law of natural selection, which was perceived and utilised by the economists long before its bearing and importance were realised by the naturalists.

It follows from what has been stated that the advancement of economic science can be furthered only in two ways, viz.: by the discovery of new premisses pregnant with inferences, or by the discovery of new conclusions drawn from known premisses.

It is easy to understand how the fullest satisfaction of his wants, at the least possible cost, has come to be regarded as the specific characteristic of the *homo economicus*; inasmuch as an economic problem, in a broad sense, presents itself whenever it is desired to obtain *a given result with the smallest comparative means*; or, conversely, to obtain *any maximum result with any given means*. Economic problems, in a broad sense, are, *e.g.* those which constitute the mathematical doctrine known by the generic name: *de maximis et minimis*. Thus the problem of inscribing in a given triangle a rectangle of maximum dimensions, or that of circumscribing a given sphere with a minimum cone, or yet again that of determining the case in which the sum of two variable quantities having a constant product is least, are problems of mathematical economics; the object being always to obtain a given result with the minimum quantity of means of a determinate kind. In the same way, there are problems of mechanical economics in which the aim is to obtain maxima of energy, velocity, or resistance, with minima of cost, friction, weight, volume, etc. In the same way, too, we speak of an economy of nature, or of a "law of the minimum of action," wherever she reveals to us organic or inorganic phenomena produced with the minimum amount of energy required for the purpose.<sup>1</sup>

<sup>1</sup> The so-called "law of the minimum of action," due originally to Maupertuis

Economic science, strictly so called, or political economy, is not therefore defined in the most appropriate manner, when it is termed simply the *science of the laws of wealth*, or of the production, consumption, circulation and distribution of the same; for many other sciences and arts also treat of these phenomena or subjects. Economics, for instance, lays down no precepts for the cultivation of land, or the manufacture of industrial products, nor yet does it concern itself with the physiological phenomena of nutrition. Attempts have been made to get over the difficulty presented by the distinction between economic and technological phenomena and the other analogous, but more general, difficulty presented by the distinction between economics and those sciences which apparently deal with the same subject-matter, by observing that if certain sciences are distinguished from each other by the *difference of their subjects*,—as is for instance the case with mineralogy and botany—others instead are distinguished from each other by the *different aspects under which they consider the same subject*; and that this is precisely the case as regards economics and the numerous other branches of knowledge which, like it,

(1746), must be stripped of the teleological conceptions that coloured it down to the time of Lagrange. There is no proof that nature ever acts with any *intent*, or in conformity with any *purpose*, or to realise any *aims*; her processes are all *causal*. The principle of the minimum of action signifies simply that the motion of a system of forces, howsoever composed, is disturbed only in proportion to the magnitude of the disturbing forces; so that any disturbance in excess of that proportion would be without a cause. In other words, the motion follows, as nearly as circumstances admit, the course it would pursue if it were unimpeded. For a brief history of this principle, see H. v. Helmholtz, *Wissenschaftliche Abhandlungen*, vol. iii. No. cxxi. pp. 240-268, Leipzig, Barth, 1895. Perfectly analogous is the view taken by economists of the hedonic principle, and accordingly a series of writers, and among them—to quote one of the earliest and one of the latest—Briganti and Jevons, have called economics the *mechanics of pleasure, or of hedonism*. See Filippo Briganti, *Esame economico del sistema civile*, cap. i. § 5, p. 19, Collezione Custodi; W. S. Jevons, *The Theory of Political Economy*, 2nd ed. 1879, Macmillan, London, Pref. p. vii., Introduction, p. 23. Indeed, even Maupertuis compared the desire for maximum pleasures to the law of the minimum of action; and Verri and Ortes appear to me to have been influenced by him in adopting, as the basis of theoretical economics, the “calculus of pleasures and pains.” On teleology and the *rationale* of pain, see Regalia E., *Rivista di Filosofia Scientifica*, Anno III. No. 2, Sept. Oct. 1883, p. 187, in which the view is combated that in the economy of nature pain has a purpose, and is, in this respect, a punishment.

treat of labour, capital, natural agents, cost, rent, exchanges, industries, consumption, commodities, personal services, etc. Now this explanation must be regarded as a popular, and not very accurate, form of expressing a very simple truth, viz. that, strictly speaking, *differences in the aspect, or point of view, constitute different subjects*; for any two sciences which apparently treat of the same subject or phenomenon, but from different points of view, contemplate *different properties* of such subject or phenomenon; and these different properties, which engage the several attention of the two sciences, constitute in fact different subject-matters.<sup>1</sup> Whilst therefore it does not appear that economics treats of phenomena peculiar to itself, and distinct from those contemplated, at least incidentally, by moral philosophy, jurisprudence, physiology, and a hundred other sciences and technical arts, which, like it, treat of man, his actions and their causes, the objects he pursues, shuns, transforms, etc.; on the other hand no room for confusion is left, if we note that economic science considers, in all the processes connected with wealth, only the workings of the law of the minimum of action; that is: it either *recognises in these processes the realisation of the hedonic hypothesis*, or *supposes that they take place under the operation of the hedonic postulate*.<sup>2</sup>

<sup>1</sup> "La science étudie, non les corps, mais les faits dont les corps sont le théâtre. Les corps passent, les faits demeurent. Des faits, leurs rapports et leurs lois, tel est l'objet de toute étude scientifique. D'ailleurs, les sciences ne peuvent différer qu'en raison de la différence de leurs objets ou des faits qu'elles étudient. Ainsi, pour différencier les sciences, il faut différencier les faits." L. Walras, *Éléments d'écon. pol. pure*, 2<sup>e</sup> éd. 1889; 2<sup>e</sup> leçon, § 16, p. 38.

<sup>2</sup> F. Y. Edgeworth, *Mathematical Psychics*, Kegan, London, 1881. "Now, it is remarkable that the principal inquiries in Social Science may be viewed as maximum problems. For economics investigates the arrangements between agents, each tending to his own maximum utility; and politics and utilitarian ethics investigate the arrangements which conduce to the maximum sum total of utility" (p. 6). "The economical calculus investigates the equilibrium of a system of hedonic forces each tending to maximum individual utility; the utilitarian calculus, the equilibrium of a system in which each and all tend to maximum universal utility" (p. 16). Economics has no method of investigation peculiar to itself, *i.e. no logical methods of its own*. There is not a single species of logical argumentation which may not, in some instance, be turned to account. Consequently the best training in logic for students of economics is supplied by such works as those of A. de Morgan, E. Schröder, J. Venn, W. S. Jevons, A. Bain, W. Wundt, M. W. Drobisch, J. N. Keynes, etc. But

By analysing the hedonic principle, we shall find that for this definition of economic science we may substitute another, equivalent to it, but briefer and clearer, viz. *the Science of Value*.

numerous methodological books have been written by economists with special reference to economics, and of these some may be read with great profit, not so much for their logical, as for their economic, contents. Such are: J. E. Cairnes, *Character and Logical Method of Political Economy*; W. Bagehot, *Economic Studies*; C. Menger, *Untersuchungen über die Methode der Socialwissenschaften*; and J. N. Keynes, *The Scope and Method of Political Economy*.

## CHAPTER II

### OF THE HEDONIC PRINCIPLE

#### § 1. *Meaning of the Hedonic Principle and its Correspondence with the Psychological Reality*

THE economic hypothesis according to which men are actuated in the production, consumption, distribution and circulation of wealth, exclusively by the desire to obtain the maximum satisfaction of their wants that circumstances admit of, with the least possible individual sacrifice, may be accepted as the postulate of a condition of fact, concerning which it would be irrelevant to inquire whether it accords more or less closely with real life. In other words, whether and to what extent the hypothesis of psychological hedonism,—from which every economic truth is deduced,—is in harmony or at variance with the motives that really determine human actions,—either generally, or more particularly as regards the acquisition and disposal of wealth,—is not a question that need be solved before we can decide as to the truth or accuracy of the economic theorems that flow from it. Suppose, indeed, that we refrain from examining the correspondence between the hypothesis of psychologic hedonism and actual fact, and that we regard that hypothesis as non-subsistent, or as subsistent in an unknown degree; then provided the economic theorems are rigorously deduced from the premisses, they will none the less be incontestable truths, within the limits of the hypothesis; that is, they will be hypothetical truths, and will reveal to us what the action of egoism, or of individual interest, would be, in the most varied environments, were that motive to be exclusively

and universally operative. If, however, the non-existence were demonstrated of the force whose effects it is the business of economics to study, the latter would in that case be an idle science, though a true one, inasmuch as it could never form the basis of any art or preceptive discipline; though indeed even this conclusion might be inaccurate; for if in this case it were further demonstrated that the opposite of the postulated force, *i.e.* altruism, existed, then, inasmuch as the latter would, if universal and isolated, *produce the same effects as egoism*, it would probably be convenient to work out the problems relating to it in terms of egoism, just as it is sometimes convenient to invert the signs of an equation in order to solve it.<sup>1</sup> If, on the other hand, the non-existence of egoism as the mainspring of human action is not proved, but the extent to which the hedonic hypothesis corresponds with psychological fact is only doubtful, as not having been sufficiently investigated, it is obvious that the economic theorems must, *a priori*, be deemed valid, as regards the world of fact, to the extent of the said correspondence; and that they will form the groundwork of a preceptive discipline, which need only be on its guard against omitting to examine the correspondence between the circumstances of actual cases and the conditions postulated by the theory. This is precisely the present situation as regards this question; so that pending the positive demonstration of the existence of that force which the economist postulates, three different opinions are advanced as to the accordance of the hedonic hypothesis with what appears to be the psychological reality. By some it is held that the hedonic hypothesis exhibits a *typical trait in the human character*, which admits of the concurrent action of other moral forces. In this case, economics, instead of studying all the causes of human activity,—supposed or ascertained to be of diverse natures,—would fix its attention on one alone, making entire abstraction of every other, and having resolved

<sup>1</sup> In fact, altruism, if supposed to be universal, neutralises itself. Titius, *e.g.*, from altruistic motives, asks much less than the current rate of interest for the capital he lends. In that case, Caius will, from similar motives, feel bound to offer much more than the current rate. Titius is willing to work *gratis* as a labourer, and Caius is constrained by altruism to pay him handsomely. Moreover, in order to realise the maximum altruistic effect, one would have to act in accordance with the most downright egoism.

a complex phenomenon into its elements, would make that the isolated subject of its study, revealing only one aspect of the empiric world, but that with perfect accuracy.<sup>1</sup> Other writers hold that the hedonic hypothesis contains the *entire truth* concerning the human character, and excludes the concurrent action of other moral forces, in certain departments of social life; that is, in certain places, at certain times, and in certain social groups; and that, within these limits, the hedonic hypothesis is in complete accord with empiric reality.<sup>2</sup> Finally, others hold that the only existent psychic force is egoism; and that every other apparently different force may be ultimately reduced to this one; so that the hedonic hypothesis is in absolute correspondence with universal empiric reality.<sup>3</sup>

The proof of the existence of the force postulated by economics is supplied both by self-observation and by observation of the motives from which other men act. In fact, the observation that egoism or self-interest is one of the most frequent and general causes of human actions, has been constantly made on so vast a scale, and may be so easily repeated by every one, that it may be doubted whether any one questions its accuracy; in any case it cannot be denied that in it economics possesses a more solid basis of fact than most other sciences can lay claim to. Above all, it is evident that commercial or industrial activity, or the activity (whatever its nature may be) displayed by men in the pursuit of what is commonly termed wealth, has no other motive than egoism.

<sup>1</sup> J. S. Mill, *Essays on some Unsettled Questions of Political Economy*; J. E. Cairnes, *The Character and Logical Method of Political Economy*, Lecture II. §§ 2 and 3. On the function of statistics with regard to economic theorems, see W. Lexis, *Zur Theorie der Massenerscheinungen*, 1877, ed. Wagner, Freiburg, book i. pp. 2, 3.

<sup>2</sup> W. Bagehot, *The Postulates of English Political Economy*, p. 5; *The Preliminaries of Political Economy*, p. 79; *Economic Studies*, London, 1888.

<sup>3</sup> Ch. Adr. Helvétius, *Traité de l'esprit*, Tome I. Disc. II. chap. ii. p. 50, ed. Bibliothèque Nationale, Paris: "Si l'univers physique est soumis aux lois du mouvement, l'univers moral ne l'est pas moins à celles de l'intérêt." Ant. Genovesi, *Lezioni di economia civile*, part i. chap. ii. § 5, p. 33, Collez. Custodi: "Now, nothing should be clearer to us than that, as was said above, pain and pain only, in the sense already explained, is the motor principle of all human actions and non-actions." § 6, p. 34: "If the allaying of pain and solicitude are termed interest—as indeed they are,—then it is clear that man acts naturally only from motives of interest."

This does not imply that, because they are actuated by egoism, men must necessarily achieve their purpose of realising the satisfaction of their wants in the best manner, that is: at the least cost or in the fullest measure, subject to the condition that the utility of the last addition to their stock should be equal to the utility of the last increment of labour with which it is purchased; for they may be misled by ignorance of the means available for that purpose, and of the properties of such means; or else their efforts may be thwarted by external compulsion of various kinds. Nor does it exclude the possibility of their acting in conformity with customs, or with the dictates of morality, or with any other rules of conduct, even the most absurd or vicious, if they consider these to be in accordance with the dictates of egoism. The very terms of the hedonic postulate exclude any such construction.<sup>1</sup>

If from the proposition that "men, in addition possibly to other motives that are held to be non-egoistic, are actuated chiefly by personal interest"; or from the alternative that, "in certain spheres of human activity, the sole motive consists in the desire to obtain the maximum satisfaction of one's wants," we pass to the proposition that the *sole motive of every action* is the hedonic impulse, the demonstration becomes more arduous, or at least more subtle, if not absolutely impossible. In the first place, it may seem necessary to eliminate all unconscious actions, and next all such as, though forming part of our consciousness, are reflex. These are neither few, nor of secondary importance, even in the case of an adult in the full enjoyment of his faculties; whilst, during the first months of an infant's life, they probably absorb the whole of his activity.<sup>2</sup> This exception must be borne in mind at all events so long as the hedonic postulate is formulated in Bentham's terms, viz. that, with reference to each act, every human being inclines to that course of conduct which, in his estimate of the conditions of the moment, will contribute in the comparatively highest degree to promote his happiness. In the second place, we must be on our guard

<sup>1</sup> Religions, customs, morals and laws are explained by some writers as rules of egoism, or utilitarianism, become partially obsolete. See A. de Johannis, *Sull' universalità e preminenza dei fenomeni economici*, 1882, Dumolard, Milan. A. Loria, *Les bases économiques de la constitution sociale*. Alcan, Paris, 1893, 2nd ed.

<sup>2</sup> See *infra*, part i. chap. iii. § 1.



against accepting the demonstration most commonly offered of the foregoing thesis. This demonstration, which appears to date back to Socrates, is, according as its form varies, now tautological, now a *petitio principii*, now a *ὑστερον πρότερον*, always a paralogism. The following is a sample of it:—Any person who resolves to do something that is apparently not egoistic, and is, in the common acceptation of the term, virtuous, as, for instance, giving away half his substance to the poor, or ministering gratuitously to the sick, is actuated by motives of vanity, piety, or zeal for the welfare of his fellow-men that outweigh all considerations of any advantage to be derived from a different course of conduct; or else he cherishes the hope of a future reward, or experiences some inward satisfaction; in brief, he acts in accordance with some interest of his own, but for which he would not act as we have assumed. In other words, no one does what is right unless he finds his happiness in so doing, or unless he thereby experiences less pain than he would by pursuing the opposite course of conduct; and though human actions will not always be determined by the immediate interest of the agent, but sometimes by the tribal interest, it will still be true,—even apart from the fact that the tribal interest is only a derivative of individual interest,—that man acts in the sense that pleases him best.<sup>1</sup> The paralogism involved in this argument becomes apparent, if we reflect, that it is not disputed that the actions of which we are conscious, and which are not reflex, but willed, are *determined by motives*; but that the controverted proposition is: that *the motive in every case is to procure a pleasure or to shun a pain*; in other words, to promote one's self-interest to the utmost. Now, by way of proving this proposition, on the one hand stress is laid on the fact that, for an action to have taken place, the agent must have been determined by a preponderating motive,—which was granted;—and on the other hand it is assumed that the motive which so influenced him to act in one sense rather than in another was, *for that very reason*, an individual interest, *i.e.* a present or prospective pleasure or pain. This is simply to beg the question.<sup>2</sup>

<sup>1</sup> Gabelli, *L'uomo e le scienze morali*, 2nd ed. Florence, Le Monnier, 1871, chap. v. pp. 142-149. .

<sup>2</sup> In the same way we say: "The desire for one's own welfare, or the instinct

To avoid doing so, we should be obliged to admit the possibility of certain desires, volitions and actions being prompted, not by pleasures and pains, but by one or more categories of different sensations. In other words, either the correspondence between the hedonic hypothesis and psychological fact is not established otherwise than by a *petitio principii*, or else we must admit the *possible existence* of other motives than pleasures and pains,<sup>1</sup> and undertake at the same time to prove that such other motives are never, or at least not generally, operative;<sup>2</sup> which proposition, equally with its opposite, appears to be incapable of proof.<sup>3</sup> There is however a series of considerations, which, if it does not prove that the sole motive of every human action is the desire to procure some pleasure or to shun some pain, proves at all events that this motive is, not only universal and most powerful, but likewise so multi-form, that motives apparently most diverse from, are really reducible to, it. In fact, if (in accordance with the tautological definition given by Maupertuis, for no other can be given of a simple state of mind) we take "pleasures" to mean those sensations which incite to acts calculated to perpetuate

of self-preservation, makes one act along the line of the least resistance, or of the greatest traction. What is the line of the least resistance or of the greatest traction, only appears, however, from the direction actually taken; and to explain the direction taken by the line of the least resistance, and the line of the least resistance by the direction taken, is to argue in a circle."

<sup>1</sup> *Ex. gr.* Von Kirchmann maintains that the ultimate motives of all wilful actions do not consist exclusively of sensations, actual or foreseen, of pleasure or pain; but that for an entire series of actions the determining motive is a feeling of respect or reverence for some authority (*Achtungsgefühl*); and that these two mainsprings of action are irreducible *inter se*. As this demonstration rests ultimately on its author's self-observation, it is at once inconclusive and irrefutable. See Von Kirchmann, *Die Grundbegriffe des Rechts und der Moral*, and by the same author, *Katechismus der Philosophie*, Leipzig, Weber, 1877, Theil ii. chap. i. p. 141 *et seq.* In the same connection see Cogliolo's *Filosofia del diritto privato*, Manuali Barbera, p. 36. For a masterly discussion of this subject, see H. Sidgwick, *The Methods of Ethics*, 3rd ed. 1884, Macmillan, book i. chap. vi. and book ii. A good epitome for students is A. Baker, *Outlines of Logic, Psychology, and Ethics*, London, 1891, p. 123 *et seq.* For a history of ethical doctrines, see W. Wundt, *Ethik*, Enke, Stuttgart, 1886, p. 332 *et seq.*

<sup>2</sup> J. S. Mill, *System of Logic*, book vi. ch. viii. § 3, p. 580, people's ed. 1884, Longmans, London. H. Sidgwick, *l.c.* book i. chap. iv. § 2, pp. 42-44; Austin, *The Province of Jurisprudence Determined*, 2nd ed. 1861, Murray, London, vol. i. pp. 103-107.

<sup>3</sup> A. Bain, *Logic*, 2nd ed. 1873, Longmans, London, part ii. book v. p. 315.

any pleasurable sensations that are present to our consciousness, or to procure such sensations if they are only represented in our consciousness; and if we take "pains" to mean those sensations which incite to acts intended to remove or prevent them, we see at once that the former must be concomitants of acts tending to the preservation of the organism, whilst the latter must be concomitants of acts that are prejudicial to it. For if the reverse were the case: if on the one hand pleasurable sensations were the concomitants of acts detrimental to the organism, and on the other hand, painful sensations were the concomitants of acts beneficial to the organism, so that the former would be sought after and the latter shunned, then the speedy result would be the disappearance of the organism so constituted, owing to its persistence in selecting conditions unfavourable to its development and preservation, and to its repugnance to subsist under favourable conditions.<sup>1</sup> As therefore only those species can survive in which pleasurable sensations accompany acts conducive to the preservation of the organism, and in which painful sensations accompany acts directly or indirectly injurious to it, it follows that to say that man seeks to maximise his happiness and to minimise his pain, is tantamount to saying that he desires to promote his preservation to the utmost. The observation that there are pleasures that are noxious, and pains that are salutary, does not refute this proposition; for it must be borne in mind that, frequently, specific and immediate pleasures are to be renounced, in favour of greater pleasures that are generic and comparatively remote; and further, that if pleasures are not always reliable criteria of conduct, the reason is that the conditions of existence, in the case of nearly all species, have undergone and are undergoing a gradual change; whence have arisen, and

<sup>1</sup> H. Spencer, *The Data of Ethics*, 2nd ed. London, 1879, chap. vi. § 33, pp. 79 and following: "Sentient existence can evolve only on condition that pleasure-giving acts are life-sustaining acts," p. 83. This theory coincides with that of Verri, according to whom, pain is the laceration or violent irritation of our physical frame, or the anticipation or apprehension of such laceration. Pleasure is always a rapid diminution or cessation of pain. To set forth his theory in detail would be tedious and unnecessary; suffice it to point out that here too we have the concomitancy of painful sensations with the impairing of vitality, § 6, p. 37, and § 7, p. 42, *Discorso sull' indole del piacere e del dolore*, Collezione Custodi. See Melchiorre Gioja, *Teleologia*, part vi. § 2, p. 5, ed. 1837.

are continually arising, partial discrepancies between pleasurable sensations and life-sustaining acts, discrepancies occasioning a process of readjustment that necessarily and certainly takes place, but is often not completed within the period required to effect a change in the environment of the organisms. Having thus ascertained the equivalence of the instinct of self-preservation and the hedonic postulate, it may be doubted whether the former is not the more fundamental principle of the two; for whilst it may be argued that we care for our life, only inasmuch as it affords us more pleasures than pains, and that we should put an end to it—as indeed some men do—as soon as that ceased to be the case, nevertheless it seems more probable, having regard to what has been set forth above, that things and actions appear pleasing or painful to us, according as they are, or are not, conducive to our self-preservation; and that the latter in turn requires that we should retain the environment amid which we have come into existence.<sup>1</sup> In other words, the order of genetic sequence of the principles in question would seem to be the following: the chemical composition and physical structure of organic beings are determined by the environment in which they are bred and exist; the substances essential to their preservation are those constituting the environment in which they originated and to which they owe their existence, whilst the acts that conduce to their preservation are those that tend to maintain their original environment; their wants are the results of variations in their composition, and are directed to the substances constituting the environment; in beings susceptible of pleasurable and painful sensations, natural selection causes sensations of pleasure to accompany acts that conduce to the preservation of the species, through the elimination of individuals for whom life-sustaining acts are not productive of pleasure, and in whom acts prejudicial to life occasion no pain.

<sup>1</sup> P. Mougelle, *Statique des civilisations*, p. 417, Paris, Leroux, 1883. Genetic priority is assigned by economists, sometimes to the instinct of self-preservation, sometimes to the hedonic postulate; but without any discussion of their comparative claims to priority, and indeed suppressing all considerations respecting the principle to which the preference is not accorded. See *cx. gr.* Hermann, *Staatsw. Untersuchungen*, 2nd ed. Munich, 1874; Ackermann, § 4, p. 9; and Hearn's *Plutology*, London, 1864, p. 12, chap. i. § 1.

§ 2. *Of the Principle of the Relativity of Sensations of Pleasure and Pain*

From the above theory we might deduce that of the relativity of sensations of pleasure and pain, were we unable to found it on an independent basis of observations. It is in fact obvious that nothing is intrinsically pleasurable or disagreeable; on the one hand, we do not in the least know whether things really are such as we perceive them to be, and on the other, their perception by means of our senses procures us sensations that are pleasing or painful, according to our frame, and to the condition it happens to be in. Now, if tastes are relative to the structure of the organism, and if that structure is due to the environment in which the organism has been evolved, it follows that tastes,—that is the pleasurable or painfulness of all things—come to be what the environment has made them under the influence of natural selection. Whilst the correspondence between the painfulness of certain forces and the tendency of the latter to impair the vitality of the organism, is common to all creatures, the painful effect of a force of a given quantity and intensity varies considerably with the size, the structure and the condition of the organism subjected to the shock; and the same observation applies to the pleasantness of determinate forces. Tastes differ, not only as between one race and another, or as between one individual and another, but even the same individual is differently affected by the same objects, according to his age and state of health, and also as the quantity of such objects and his environment vary.<sup>1</sup>

The relativity of sensations of pleasure and pain is an economic fact of the greatest importance. We shall see further on that a long series of economic theorems is based upon it; but already it possesses an interest for us, owing to the relation in which it stands to the hedonic postulate. Suppose a multitude of people all bent exclusively on maximising their pleasures and minimising their pains: if no other actual or hypothetical condition supervenes to qualify the hedonic postulate, the supposed multitude may even consist of

<sup>1</sup> Spencer, *The Data of Ethics*, chap. x. pp. 174-186.

ascetics, or it may comprise groups of ascetics and groups of individuals who are insensible to the attractions of remote and (in their view) uncertain pleasures; at the same time there is room in it for perfect altruists and for every conceivable gradation between them and absolute egoists. In fact each of these groups *would conform precisely to the hedonic postulate, seeking after its greatest happiness, in accordance with its own conception of what happiness is, which conception is supposed to be different from the conceptions of happiness of the several other groups.* Now, it is obvious that if we thus divest the hedonic postulate of all material contents, it becomes absolutely sterile, and does not yield us even the simplest deduction. If, for instance, a contractor offers a workman a certain amount of remuneration per hour for a certain kind of work, whilst another contractor offers him twice as much for the same kind of work, it is not certain, or even probable, that the workman will prefer to work for the one who offers him the better terms, unless the hedonic hypothesis is qualified by the fact, or ulterior hypothesis, that every workman regards work as a pain, and remuneration as a pleasure. In the same way, we cannot have laws of the value of exchange, if one of the parties is egoistic and the other altruistic in an unknown or variable degree; and still less if the tastes of both parties differ so much from the normal standard of mankind as to compel us to regard them as insane. On the supposition of an indefinite heterogeneity of structure, and therefore of tastes, among the members of a society, there is an end to all economic laws. Any one, for instance, who wished to enunciate the economic law, that *the rate of discount and the purchasing power of money tend to vary in opposite directions,*<sup>1</sup> and to state in addition the law of two exceptions to the more general law, referable, the first to the purchasing power of money measured exclusively in so-called securities, and the second to a particular cause of the rise or fall of the discount, viz. a sudden influx or efflux of coin, could not deduce these laws from the hedonic postulate otherwise than by supposing a society of individuals who regard as pleasures and pains those things which are so considered by the persons who frequent the Stock Exchange and the Markets. And if

<sup>1</sup> Sidgwick's *Principles*, p. 260.

he were to demonstrate his theory by a series of observations, he would be forced to deduce from these the inapplicability of the hypothesis of an indefinite diversity of structure to the environment that yielded him this inductive result; and to admit instead, within certain limits, however wide, the existence of a certain analogy of structure.

Now what is the reason of this apparent *ἀπορία*? Simply this: that the hedonic postulate is by no means void of material contents, these being supplied to it both by its assimilation to the desire of self-preservation, and by matters of fact which are sometimes implied in the argument, and sometimes stated explicitly. The identification of the hedonic principle with the desire of self-preservation involves our not considering as pleasures and pains, *quâ* the hedonic principle, any sensations of either kind experienced by the deformed organs or vitiated functions of individuals who are destined to be eliminated by natural selection; and, on the contrary, our considering as pleasures those sensations that sustain, and as pains those that impair, the organism. Judgments at variance with this standard, concerning things that are causes of pleasant or painful sensations, are classed as *anti-economic*, and are not subjects of our study, save in so far as they are causes of deviation in the working of economic laws. Thus, for instance, the judgments and acts of the anchorite are anti-economic, as also the preference of a lower remuneration to a higher; and many forms of altruism are also anti-economic. A vast and sometimes variable content is supplied to the hedonic postulate by matters of fact, or by what observation ascertains concerning the pleasantness or painfulness of determinate things, under determinate conditions. Thus it is a fact that labour is painful, and that aversion to it increases with its duration and intensity. Thus too it is a fact that successive increments of any commodity, beyond a certain point, produce a decreasing gratification. It is also a fact that people care for money and for the things which are to be had for money. In an environment in which these propositions were not facts,—and there are environments in which certain kinds of labour are pleasurable, or in which money is of no concern—a large portion of the laws of economics would not be true, and probably in lieu of them we should have a series of propositions

expressing constant uniformities of chronological or causal sequence, of coexistence in space, or of attributes of equality and inequality, which at present are wholly erroneous.

### § 3. *Of Individual and Tribal Egoism*

In most instances the qualifications of the hedonic postulate are tacit and implied, being either self-evident or shown by the context; sometimes however they require to be specifically stated. This is more particularly the case whenever it might otherwise be doubtful whether individual or tribal egoism is intended, and what differences may result from the reciprocal substitution of these two hypotheses, each of which corresponds, though in an unequal degree, with the hedonic postulate. This will be made clear if we examine successively these two forms of egoism, or of economic interest.

Let us first suppose an egoist whose every act tends exclusively to maximise his happiness, regardless of that of others. All acts conducing to his individual preservation will probably be performed by him, since we may assume that, as a rule, they will coincide with acts tending to maximise his pleasures and minimise his pains; but even this is not certain, as it is also possible that they may not so coincide. As for acts conducing to the preservation of his species, it is evident that none of them will be performed by him, unless they coincide with acts he would in any event have performed, as being conformable to his own restricted hedonism. Now, inasmuch as acts conducive to the preservation of the species may be, at least as probably, and hence at least as often, acts entailing sacrifices that are not compensated during the lifetime of the agent, as acts conformable to individual hedonism, it is clear that many acts that conduce to the preservation of the species will be left undone; and it is further certain that the vitality of the species will eventually—perhaps after a series of generations of such egoists—become gravely impaired.

Let us now suppose an egoist so constituted as to identify his own maximum happiness with that of his species: an egoist whose every act tends to procure for his species the maximum amount of happiness and minimum amount of pain.



Self-preservation will be the paramount rule of his conduct until he has ensured the existence of the species; thenceforward it may well happen that the welfare of the species will impose on him acts of self-sacrifice, or what others would deem such, though to him they must still appear to be fraught with happiness to himself. Each act tending to the preservation of the species will be performed by him, regardless of the views of others as to its pleasurable or painfulness.

Given these two types of egoists, it is clear that, in the long run, they will be unable to subsist simultaneously in the same environment, and that the former will be eliminated by natural selection. Hence, after a certain lapse of time, only the second species of egoists will remain, whilst together with the former type will have disappeared the ideas they entertained concerning the hedonic maxima and minima, as also the sensations produced in them by the accidents of the environment; whilst on the other hand habits of thought and sensation of the opposite character will have become confirmed and strengthened. Hence this must be regarded as a more complete, intense and perfect form of egoism, as the more egoistical of the two, since it yields a sum of pleasures infinitely greater than the other, because of indefinite duration. Notwithstanding the substantial differences between individual and tribal egoism,—which latter may indeed be regarded as a qualified form of altruism,—it frequently happens that the conduct of the *homo economicus*, when actuated by individual egoism, does not differ from his conduct when actuated by tribal egoism.<sup>1</sup> It happens, namely, that many problems regarding the latter may be worked out as if they referred exclusively to the former; and this owing to a circumstance already mentioned, but which it may be well to emphasise by repetition. Tribal egoism presupposes a conditioned individual

<sup>1</sup> As an instance of the difference between the conduct of the individual and that of the tribal egoist, it may be mentioned that the former will in all probability limit his offspring as much as possible, and even refrain from having any, in order not to compromise his self-preservation, or diminish his pleasures, through the sacrifices incidental to the rearing of offspring. If large masses of persons are actuated by individual egoism, this phenomenon may assume the alarming proportions it has attained in France. The tribal egoist on the contrary will indulge his desire for offspring within such limits as are necessary to keep it from deteriorating in quality.

egoism, inasmuch as it is impossible to realise the ends of tribal egoism unless a large part of the ends of individual egoism have first been realised; in other words, it is necessary that the *homo æconomicus* actuated by tribal egoism should first make sure of his own preservation and more perfect development, before he can benefit the species, or contribute to its happiness in the highest degree that circumstances admit of.<sup>1</sup> Hence economic problems may be worked out just as easily and correctly by taking as our rule the hypothesis of a *homo æconomicus* actuated by individual egoism, who, with regard to each act, weighs the increase of vitality it is calculated to procure him against the diminution of vitality it will cost him,—provided always that this hypothesis be qualified or conditioned in particular cases,—as by having recourse exclusively to the wider hypothesis,—wider inasmuch as it comprises the former,—of a *homo æconomicus* actuated by tribal egoism, who with regard to each act will compare the expected increase of tribal happiness or vitality with the apprehended diminution of his individual happiness.

It must be observed, however, that the second hypothesis is the simpler and truer one, and that by its means the scope of ordinary economic problems is extended to comprise those also which are usually classified separately as forming part of a special class of problems of State economics. It is commonly held that, for the State, all knowledge relating to future events possesses an incomparably greater importance than for individuals, provided always that such knowledge falls within the sphere of interests common to both; in other words, it is considered that, in the sphere of State interests, those relating to the future are much more numerous and weighty than is the case in the sphere of private interests. Hence the old adage, that the interests of the State are of a prospective character; from which it would follow that the principles of sciences treating of the State likewise partake of such character in a predominant degree. Now the fact is simply this:—Both the State and the individual have in the first place present interests; that is, they are benefited or prejudiced by certain present situations of fact, and they act in conformity with this first series of interests. In the second place, both are interested

<sup>1</sup> H. Spencer, *op. cit.* chap. xi. § 68, pp. 187 and following.

in the future, and consequently act in accordance with a second series of interests, bringing it into harmony with the first, according to certain very complex psychological laws. But those who hold that the State is in its nature more essentially and characteristically prospective than individuals, argue that the life of the State, being more protracted than that of the individual, is more richly endowed with elements of prospective interest, even on the hypothesis of an original equality; and it is, above all, this distinctive feature that has given rise to a series of singular doctrines as to the ethical nature of the State itself. Now, from what has been set forth respecting individual and tribal egoism, it is clear that if the State, as it is contended, safeguards all its prospective interests, giving them the weight that is necessary to ensure its own preservation for an indefinite period, in so doing it is only actuated by tribal egoism; and slight reflection will suffice to show that the State can only exist so long as the members animated by the same tribal egoism predominate over those who are animated by individual egoism.

#### § 4. *Of the Commensurability of Pleasures and Pains*

The practice of the hedonic principle presupposes that sensations of pleasure and pain are susceptible of commensuration,<sup>1</sup> whichever formula of the principle may be preferred. Whether an individual seeks by his every act the maximum satisfaction of his needs with the least possible self-sacrifice, or at the least possible cost; or whether he desires the largest possible measure of wellbeing, which implies that he desires to attain it, if circumstances do not admit of his doing so without effort, at all events with the least possible degree of personal inconvenience; or yet again whether he acts in conformity with his own interest, or in the sense most conducive to his own preservation, or maximising his pleasures and minimising his pains;—in each of these cases it is supposed that a hedonic or egoistic calculus is effected, consisting of the commensuration of the good and evil, the pleasures and pains, the increments and diminutions of vitality, the greater and lesser interests, the satisfactions and the sacrifices that are

<sup>1</sup> Verri, *loc. cit.* § 14, pp. 83-85.

compared with each other, or among which a choice is made. This calculus may apply to four different combinations of pleasures and pains; for we have to consider whether it is worth while either: 1st, incurring a pain " $a$ " in order to obtain a pleasure " $A + \Delta A$ "; or 2nd, incurring a pain " $a$ " in order to avoid another " $a + \Delta a$ "; or 3rd, forgoing a pleasure " $A$ " in order to obtain another " $A + \Delta A$ "; or 4th, forgoing a pleasure " $A$ " in order to avoid a pain " $a + \Delta a$ ."<sup>1</sup> In each of these cases there figures as COST, either the pain that is endured to obtain a pleasure, or the lesser pain incurred in order to avoid a greater pain, or the lesser pleasure that is renounced in order to obtain a greater, or the pleasure that is renounced in order to shun a pain; and as GAIN or REMUNERATION what is obtained by such means.<sup>2</sup> We may also imagine the case of the possession of a good being conditioned disjunctively, either by a pain to be borne, or by a pleasure (inferior to the one inherent in the attainment of the good in question) to be renounced. In that case, the cost must be expressed by that of the two pains, or of the two discomforts, which is least; because that will be the only one suffered by the hedonist. If, on the contrary, the possession of a good is conditioned cumulatively by a pain that must be incurred and by a pleasure that must be renounced, the cost of the good is the sum of the two pains. If, finally, the possession of a good is conditioned by submission to a pain, which would otherwise have availed to procure us some other good, or to avert some other pain, and if the attainment of such other good, or the avoidance of such other pain, outweighs the first-mentioned pain, then the cost of the first-mentioned good is expressed by the other good we have had to forgo, or the other pain we have had to endure, since that is the full extent of the sacrifice made.<sup>3</sup> Now, we call VALUE the

<sup>1</sup> By  $\Delta$  we denote an *increment*; by  $a$  a quantity of pain; by  $A$  a quantity of pleasure equivalent to  $a$  of pain.

<sup>2</sup> Verri, *loc. cit.*: "If therefore in practice men constantly compare pains and pleasures, we must conclude that they are two proximately comparable quantities. Our every action resembles a sale: we give money to obtain a thing; parting with the money is in itself an evil; but when we buy we consider that the thing we want is a greater good than that evil. In whatever condition he is placed, even on the throne, man is forced to perform a number of arduous, inconvenient and toilsome acts, in order to procure himself pleasures."

<sup>3</sup> The following are instances of the various cases: (1) To procure a pleasure

ratio of *cost to remuneration*, whether in the case of the direct trucking of one commodity against another by two persons, or in that of a single person who undergoes some labour in order to obtain some good, the fruit of such labour, or who submits to some pain in order to obtain a pleasure. To put it in the words of Francesco Ferrara, *we have the phenomenon of value in individual economics, no less than in the economics of exchange*; and the hedonic calculus consists of JUDGMENTS ON VALUE.<sup>1</sup> The question now arises whether the comparisons referred to between costs and rewards do not sometimes occur with reference to incommensurable quantities, and are not therefore paralogistic.

As we have already seen, no definition properly so called can be given of what constitutes a pleasure or a pain, because these are elementary conditions of our perceptive faculty or consciousness.<sup>2</sup> On the other hand, genetic and teleological definitions are barren, constituting, as they do, a *mutatio elenchî* as regards the problem. The hedonic calculus supposes that they are opposite, but homogeneous, sensations, and therefore susceptible of treatment as negative and positive quantities.

worth 11 involves working 9 or spending 10 : here the cost is 9 ; (2) to procure a pleasure worth 20 involves working 9 and spending 10 : here the cost is 19 ; (3) to procure a pleasure worth 12 involves working 10, but this labour would procure a pleasure worth 11 if not employed in procuring the one that is worth 12 : here the cost will be 11.

<sup>1</sup> *Biblioteca dell' economista*, vol. v. p. 51. Introduction to Senior, and vol. xiii. Carey, chap. ii. p. 335. The hedonic postulate, both in isolated and in social economics, may be briefly formulated as the precept to maximise always the value of one's stock ; but this formula, which has been repeatedly proposed, requires the term "value" to be taken in the sense of *residual utility* or consumer's rent (see part i. chap. iv. § 3), which is not done by us in this work. Value signifies here only the *ratio of two hedonic quantities*.

<sup>2</sup> This is the opinion of Verri, *loc. cit.* § 11, pp. 68, 69 : "In fact a sensation supposes a change of state in the organ that experiences it, *i.e.* either an increased or a diminished tension : if the organ was in a perfect state, the first sensation removes it therefrom, and is consequently a disorder and a pain ; if, on the contrary, the organ was vitiated, either by excessive tension or by excessive relaxation, the first action of external bodies may prove remedial, but it will be preceded by the pain produced by organic derangement ; and thus it follows that the first sensation must necessarily be painful. . . . The essence of sensibility therefore involves the priority of pain, for either the action affecting our organs is painful, or it applies a remedy to the pained organism, or it is ineffectual, neutral and null. Pain is an action ; pleasure is a rapid cessation of such action. Man is thus set to live in the midst of suffering." Ortes took a similar view. See *Calcolo de' piaceri e de' dolori della vita umana*, § 4, p. 307, vol. iv. ed. Custodi, tome xxiv.

It is however a moot point whether pleasures are only diminutions or negations of painful sensations, or whether they are qualitatively distinct and opposite sensations. The former opinion appears to be most in keeping with the results of self-observation, since we experience painful or pleasurable sensations only with respect to a certain antecedent emotional condition. If this doctrine were more certain, the greatest obstacle to the commensuration of pleasures and pains would be removed. Since pleasures are differentiated from pains, *cæteris paribus*, by their duration, and, their duration being equal, by their intensity, it follows that the more lasting pleasure appears to be the greater when the degree of intensity is the same, and that the intenser pleasure appears to be the greater when the duration is equal; and no quantitative difference is any obstacle to commensuration, as we can always set off the greater intensity of one pleasure against the longer duration of another. This holds good however only in theory, for, in practice, the shortness of human life would frequently prevent our setting off against very intense pleasures others less intense of adequate duration.<sup>1</sup> Moreover, pleasures like pains may be either presently felt, or only anticipated; and pleasures as well as pains, that are only anticipated, may be certain or uncertain, and more or less proximate or remote. Now, some doubt may exist as to the method of estimating or weighing pleasures or pains which, their duration and intensity being equal, differ in this, that some are present and thus certain and infinitely proximate, whilst the others are only anticipated, and either certain or uncertain, and in either case are subdivided into proximate and remote. These five modes of being of our sensations of pleasure or pain give rise to ten binary combinations, as to each of which the hedonic theory requires that commensuration should be possible. It has indeed been doubted whether the nearness or remoteness of an expected pleasure or pain can affect the hedonic calculus, independently of the uncertainty of the event which remoteness for the most part implies; and it has been contended that a remote pleasure or pain, if supposed to be absolutely certain,

<sup>1</sup> Verri, *loc. cit.* § 10, p. 61. A singular error in valuation that is sometimes committed is also pointed out there: preference is given to "the lesser intensity over the lesser duration of a pain."

must, other conditions being equal, be of equal weight with a proximate pleasure or pain. This is perfectly correct, and acts determined by a different view, if we had any instance of them, must be considered anti-hedonic or anti-economic. But remoteness must be construed as a form of uncertainty affecting both the probability of the occurrence of the pleasurable or painful event, and the probability that the individual concerned will be agreeably or painfully affected by it when it actually happens.<sup>1</sup> Given this explanation of the conception of remoteness or propinquity of anticipated pleasures and pains, the further criticism to which we may subject it becomes a simple question of words. But, even if that were not the case, the complexity and nicety of hedonic valuations of these elements would warrant the suspicion that, in the majority of instances, these valuations are carried out with only approximate correctness. This is tantamount to saying that error is a principal source of anti-economic acts, and operates in this sense on a vast scale (*confer post*, chap. iv. § 6). The commensuration of pleasures and pains is however rendered still more difficult in a special instance. The tribal hedonist, as we have briefly designated him, has frequently to estimate his own pleasures as compared with those of others, *i.e.* with those of his species, and it is difficult to understand how this can be done without error, compatibly with the law of the relativity of sensations of pleasure and pain.<sup>2</sup> The fact remains that these hedonic valuations are constantly made by all; but with what admixture of error, we do not know.

<sup>1</sup> An individual interested in a future, but certain, pleasurable or painful event, may, for instance, doubt whether he will still be alive when it actually comes to pass. It would be erroneous to cite, as an instance impugning the doctrine according to which a remote, but certain, event should, *cæteris paribus*, be taken to be equal to a proximate event, the fact that death, the most certain of events for every individual, preoccupies the mind much less when it is believed to be distant than when it is thought to be near. For it is clear that the prospect of death, as a motive of our actions, must have greater weight if it is believed to be near, than if it is thought to be distant; because when it does happen, all the pleasures of life come to an end, and hence its nearness, or remoteness, curtails, or prolongs, the series of these pleasures. Thus, it is not the near or distant prospect of death that supplies the motive of our actions, but the varying quantity of pleasures or pains we look forward to during our lifetime; which is quite a different matter.

<sup>2</sup> Respecting the commensuration of pleasures and pains, see *contra*: H. Sidgwick, *op. cit.* p. 115; *pro*: Spencer, *op. cit.* chap. ix. pp. 150 and following.

### § 5. *Of the Fundamental Law of our Sensibility*

Our aptitude to receive pleasurable impressions is subject to two factual laws possessing fundamental importance as economic premisses. These laws are revealed by our daily experience, and in psychology they have been known since the time of Aristotle. They are thus formulated by Gossen :—<sup>1</sup>

1st. *Every enjoyment, as it is prolonged, decreases, and at length ceases altogether.*

2nd. *An enjoyment has, when repeated, a lesser initial intensity and a shorter duration than it had before ; and its intensity and duration decrease the more, the shorter the intervals at which it is repeated.*

It is obvious, for instance, that to a hungry man the first portion of food he partakes of affords an intenser pleasure than the second, and the second than the third, and so on till the point of satiety, or even of nausea, is reached. It is likewise obvious that, given the same kind of food, its repeated use for the purpose of appeasing the cravings of hunger, affords a decreasing pleasure. This explains, for instance, the reason why a meat diet is relished much more by those who only partake of it on exceptional occasions than by those who are accustomed to its daily use ; and why those who are accustomed to eat bread every day derive a keener enjoyment from this food when they have been obliged to abstain from it for some days. The law of the decrease of protracted enjoyments applies to every kind of enjoyment or consumption of commodities. Daily observation will confirm to every one the rigorous exactness of Jennings's contention, that by dint of gazing at an

<sup>1</sup> Hermann Heinrich Gossen, *Entwicklung der Gesetze des menschlichen Verkehrs und der daraus fließenden Regeln für menschliches Handeln*, Brunswick, Vieweg, 1854 ; now Berlin, Prager, pp. 4-9, although not a new edition. See also Richard Jennings, *Natural Elements of Political Economy*, Longmans, London, 1855, book i. chap. i. pp. 96-99, § 7, Law of the Variation of Sensations. This author has analysed even more minutely and subtly than Gossen the law of the decrease of protracted enjoyments, as we shall see in ch. iii. § 3. Before both these authors, in 1844 and again in 1849, J. Dupuit expounded the same laws, but with numerical indices, instead of curves, *Annales des ponts et chaussées*, tom. xxv. 2nd series, pp. 170-248, Mémoire, No. 207, 1849, Paris, Carillan-Gœury.



object, we end by ceasing to perceive it; by dint of listening to a sound, we cease to hear it; that, in the same way, our sense of smell becomes exhausted, and that the pleasures of the palate end in nausea, or are transformed into painful sensations. In view of their importance, it is worth while examining the graphic expression of these laws devised by Gossen.

Let a straight horizontal line OX (diagrams I-III.), which we shall briefly term the abscissa, express the time a sensation lasts: each point of the line corresponding with an instant of

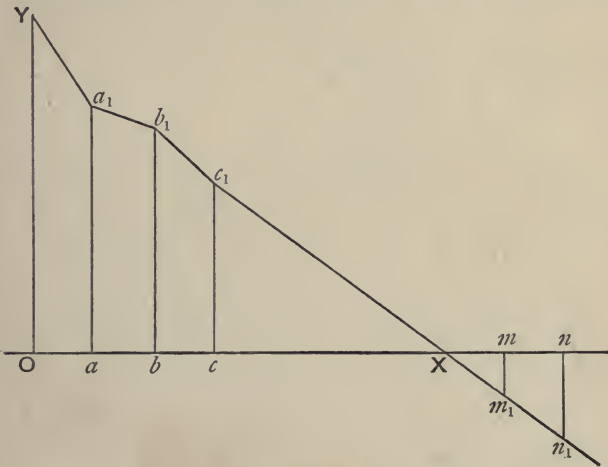


DIAGRAM I.

time, and each part of the line,  $Oa$ ,  $ab$ ,  $bc$ , etc., corresponding with intervals of time that are in the same proportion to each other, and to the entire duration, as the said parts of the line are to each other and to the whole line.

Let a series of straight lines  $OY$ ,  $aa_1$ ,  $bb_1$ ,  $cc_1$ , etc., which we shall briefly term the ordinates (and which form known angles with  $OX$ ,—let us say for the sake of simplicity, right angles, so that they are vertical with respect to  $OX$ ), be in the same proportion to each other as the intensities of enjoyment corresponding with the moments indicated on  $OX$  are to each other. Thus  $OYa_1a$  comes to signify, for instance, the intensity of the gratification experienced by a thirsty man during the first interval  $Oa$  in which he is drinking;  $aa_1b_1b$  the intensity

during the second interval  $ab$ ;  $bb_1c_1$  the intensity during the third interval  $bc$ , and so forth. By connecting the extremities of the ordinates, *i.e.* by drawing the line  $Ya_1b_1c_1$ , etc., we shall have the curve of the intensities of enjoyment. This curve may follow the most varied course, according to the nature of the enjoyment we have to deal with and the individual to whom it relates. It may, for instance, as in diagram I., begin high up (*i.e.* the initial ordinates may be long), and descend gradually till it reaches, or sinks below,  $OX$  (*i.e.* the successive ordinates may go on shortening down to zero), and then become negative; or it may begin, as in diagram II., at a

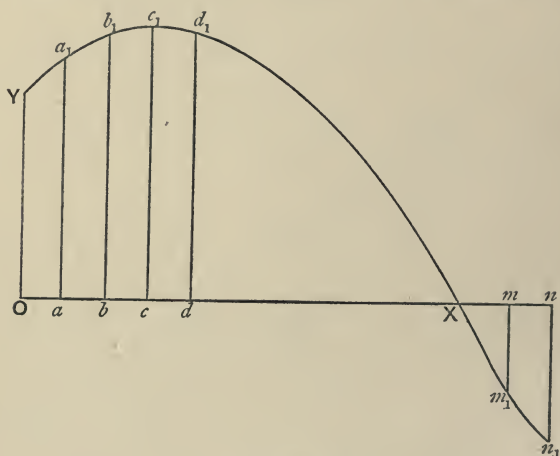


DIAGRAM II.

moderate height from  $OX$ , and gradually ascend till it attains a maximum height, after which it declines like the curve in diagram I.; in which case we say it is constituted by increasing ordinates till a maximum is reached, and then by decreasing ones. But what is characteristic of it, and limits its possible variations, is the more or less rapid and saltatory, but always certain, ultimate decrease of the ordinates, until they are reduced at some point on  $OX$  to zero. If we suppose the enjoyment protracted beyond this point, the ordinates become negative and increasing, that is, they must be expressed by straight lines perpendicular to  $OX$  as before, but drawn in an opposite direction and increasing successively, since they express painful intensities. Let such be, for instance, the ordinates  $mm_1$ ,  $nn_1$ ,

etc. As in most cases we know next to nothing of the rapidity with which real hedonic curves decline, or of their particular shapes whilst declining, Gossen is perfectly right in operating exclusively with the simplest of curves, *i.e.* with straight lines, as in diagram III. The reader must imagine  $Oa$ ,  $ab$ ,  $bc$ ,  $cd$  to be the diameters of contiguous points on  $OX$ , looked at under a microscope, which should so expand them. The area  $OYa_1a$  is to be imagined as a *thick perpendicular line* seen through a strong magnifying glass, the area  $ae\bar{b}_1b$  is the next perpendicular line similarly magnified, and so on as regards the areas  $bf\bar{c}_1c$  and  $cg\bar{d}_1d$ . If these thick perpendicular lines are only *close enough to each other*, their upper extremities will form a continuous line  $MXN$ ,

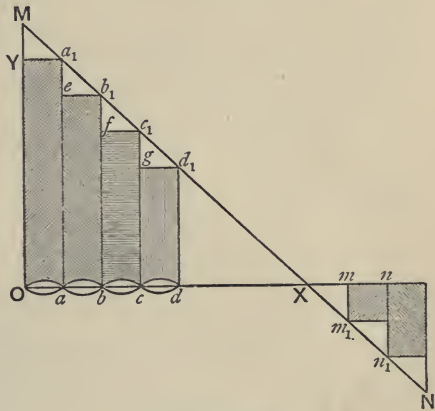


DIAGRAM III.

which Gossen supposes to be a *straight line* as in diagram III. The operation with straight lines can easily be translated into numerical examples. This method has been adopted successfully by Menger and his followers, and it dispenses with the use of higher mathematics; but the use of curves is necessary for some of the nicer problems, and is extremely suggestive. Before leaving this subject, it must still be noticed that, although economics presupposes nearly always declining hedonic curves, there are cases in which the fact must be taken into consideration that we are concerned with their ascending segments; a circumstance conducing to so-called positions of unstable equilibrium, as we shall see later on.

§ 6. *Gossen's Two Theorems of the Hedonic Maxima*<sup>1</sup>

From the factual law respecting the decrease of protracted or repeated enjoyments, and from the hedonic postulate,

<sup>1</sup> Gossen, *op. cit.* pp. 11, 12.

certain theorems are derived concerning hedonic maxima which go by the names of Gossen, of Walras, or of Jevons, *i.e.* of those who first, and independently of each other, enunciated and demonstrated them, and made them the groundwork of all further economic exposition.

Gossen's first theorem runs as follows:—

*Every enjoyment may be indulged in with such frequency that a greater or a lesser frequency will yield inferior hedonic results.* In fact, an enjoyment protracted throughout a duration OX (see any one of the preceding diagrams) ceases at X to give pleasure; protracting it still further, the hedonic ordinates become negative, that is, the enjoyment is transformed into pain. In other words, the uninterrupted continuance in the use of what causes us pleasure ceases, after a certain time, *to increase the amount of pleasure afforded to us.* On the other hand, after an interval in the use of the thing which afforded us gratification, our sensibility generally revives, and its renewed use may again give us pleasure. Now, if the interval between the first and second occasions of our using a thing were of infinite duration, evidently the sum of pleasure afforded to us would be merely that *derived from its use on the first occasion.* Therefore between the extreme of our obtaining only the amount of pleasure that a thing is capable of affording us, if used without interruption to the point of satiety, and the other extreme of our obtaining this same amount by not repeating for an indefinite time, notwithstanding our revived sensibility, the use of the thing capable of affording us pleasure, there exists a *hedonic maximum dependent on the frequency of the repetition of the enjoyment in question.*

Gossen's second theorem is also an immediate consequence of the law of decreasing enjoyments. It is formulated as follows:—

*Given the option of several pleasures, and a time so limited as not to suffice for enjoying them all to the point of extinction, we obtain a hedonic maximum by enjoying each pleasure in such measure, that its intensity at the moment when the period of fruition expires is equal to that of every other pleasure.* In other words: *The final degrees of intensity of pleasures must be equal at the instant when the given time expires, what-*

ever may have been the initial intensity of each kind of pleasure.

In fact, given two pleasures of equal initial intensity and which during equal periods of time decrease equally, it is obvious that if we wish to utilise to the best advantage a limited time, it is expedient to divide it equally between the two pleasures.

If the whole of it is spent in the enjoyment of the first pleasure, then at the moment when the time expires, much lower degrees of intensity of sensation of the first pleasure will have been reached than the degrees of intensity of sensation of the second pleasure that remains untasted; and *vice versa*, if the time available is wholly allotted to the enjoyment of the second pleasure.

Now, the initial degrees of intensity of the two pleasures being equal, as also the respective scales of their decreasing intensity, it is evident that the hedonic *maximum* is obtained by apportioning equal periods of time between the two enjoyments, and thus obtaining equal degrees of intensity in the last sensations experienced before the expiry of the time allotted. Graphically the problem is presented thus:—Let the total enjoyments and the decreasing scale of enjoyments that may be derived from the fruition of the first pleasure to the point of satiety, be expressed by diagram IV., and those of the second pleasure by the identical diagram V.

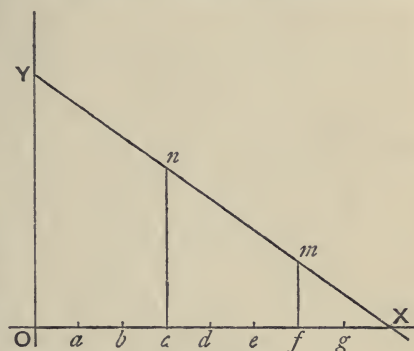


DIAGRAM IV.

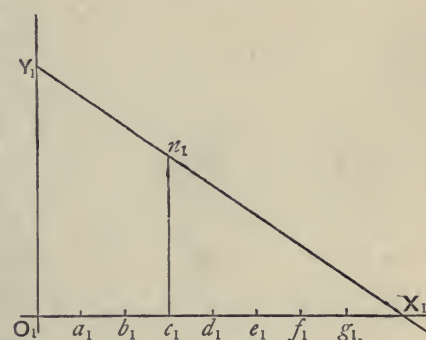


DIAGRAM V.

Let  $O_1X_1$  in the first diagram express the time it would take to produce satiety with respect to the first pleasure, and  $O_1X_1$  in

the second diagram, the time requisite to exhaust the second pleasure. Let the time allowed for the enjoyment of one or other, or both pleasures, be equal to  $O_f$  in the case of the first pleasure, and to  $O_1f_1$  in the case of the second pleasure; that is, it consists of six equal units. Now, if the time limited is spent wholly in the enjoyment of the first pleasure, the sum total of enjoyment will be expressed by the area  $O_fmY$ , and the ultimate degree of enjoyment will have the dimensions of the ordinate  $fm$ . But the area  $O_fmY$  is much smaller than the sum of the two other areas which we obtain, as the expression of the amount of pleasure enjoyed, if the time limited is apportioned equally between the enjoyment of the first and second pleasures. In this case the line  $cn$  in diagram IV. and the line  $c_1n_1$  in diagram V. denote the last degrees of enjoyment obtained, and the totality of such enjoyment is expressed by the areas  $OcnY + O_1c_1n_1Y_1$ ; and comparing the area  $O_fmY$  with the sum of the areas  $OcnY + O_1c_1n_1Y_1$ , we perceive at once that the area  $OcnY$  is common to both, and that the comparison is therefore limited to the areas  $cfmn$  and  $O_1c_1n_1Y_1$ . Now, whilst the abscissa is equal in both areas,  $cf = O_1c_1$ , the smaller ordinate of the second area, viz.  $c_1n_1$ , is equal to the larger ordinate of the first area, viz.  $cn$ ; and consequently against the decreasing ordinates of the latter we can set off an equal number of increasing ordinates of the former.

Let us now suppose the more complex, but more natural,

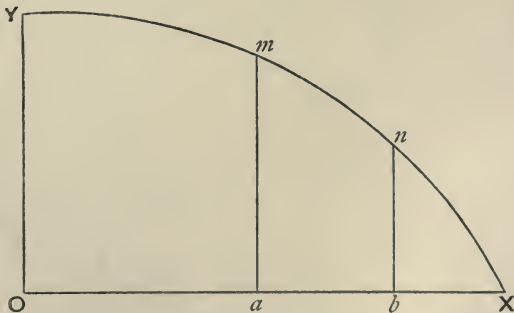


DIAGRAM VI.

case of two pleasures presenting different initial degrees of enjoyment, and different scales of the decrease of enjoyment during equal periods of time. Let  $OXY$  (diagram VI.) denote

the magnitude of a first pleasure, and  $O_1X_1Y_1$  the magnitude of the second pleasure (diagram VII.). The pleasure the hedonist will taste first will be the one possessing the greater initial intensity, viz.  $OY$ ; and he will continue to indulge in it until its intensity is so far reduced as to be equal to the initial intensity of the second pleasure. Let us suppose this to happen when the first pleasure has been enjoyed for a period equal to  $Oa$ , so that the ordinate  $am$ , which denotes the intensity of the enjoyment afforded by the first pleasure at the moment  $a$ , must be deemed equal to the ordinate  $O_1Y_1$ , which denotes the initial enjoyment afforded by the

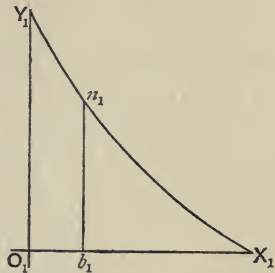


DIAGRAM VII.

If the time available is equal to  $Oa$ , or less, it will be entirely spent in the first enjoyment; if it is greater, its ulterior allotment must always be such that, at the moment it expires, there remains no unexhausted degree of intensity of either pleasure superior to the last degree of intensity that has been enjoyed; for if that be the case, the apportionment of the time will not have been so effected as to obtain, in the given time, the maximum possible sum of pleasure. Let us suppose, for instance, that the time suffices to extinguish the first want; evidently the hedonic maximum does not consist in so using it; for if the time,  $Ob$ , is allotted to the first pleasure, the intensity of enjoyment is so reduced as to be equal to the fruition of the second pleasure from  $O_1$  to  $b_1$ , the ordinate,  $bn$ , being equal to the ordinate  $b_1n_1$ . Therefore we obtain the hedonic maximum by dividing the time available in such proportions that the final degrees of enjoyment in both pleasures always remain equal.<sup>1</sup>

We shall find this theorem of Gossen again shortly, only modified in form, in the theory of wants, and repeatedly further on under analogous forms. We obtain, indeed, the same problem if, instead of supposing the time for enjoyment to be limited, we suppose the limit to apply to the stock of commodities, or to the labour that serves to satisfy various

<sup>1</sup> It is very easy to solve this problem graphically. Let the smaller triangle





is reached.<sup>1</sup> This corollary is of paramount importance for the right comprehension of the law that regulates values in international exchanges.<sup>2</sup> Graphically expressed, the demonstration is self-evident. Let A be a great pleasure and B a

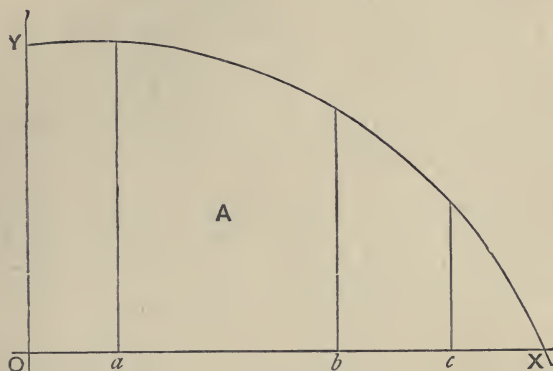


DIAGRAM IX.

small one (diagrams IX. and X.). The ordinates of A, *e.g.* those erected in *a*, *b*, *c*, etc., become smaller and smaller in the direction of X; therefore before X is reached, there must be a point at which one of them is equal to the initial ordinate of B, viz.  $O_1Y_1$ , whilst the successive ones are less than  $O_1Y_1$ , however small the pleasure B may be. When this point of satiety is reached for A, the time disposable must be apportioned between A and B,

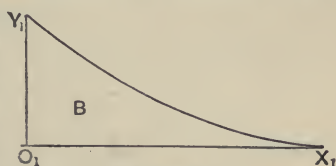


DIAGRAM X.

<sup>1</sup> Indeed it is impossible that, of several present pleasures, one should be entirely exhausted, unless all are so; for the last portion of time or means destined to the enjoyment of a pleasure might be expended more profitably on some other pleasure further removed from the point of satiety.

<sup>2</sup> Ricardo's theorem: Each nation pays its foreign debt solely by the exportation of the commodity in the production of which it is most efficient, until the decrease in the value of such commodity in the foreign country renders it equally profitable to send another commodity, in the production of which it is efficient in a secondary degree; and of this commodity together with the former one it continues to send as much as is necessary until the reduction in value of the same renders equally profitable the exportation of a third commodity, in the production of which its efficiency is only third in degree; and so on until the equation of the mutual demands is attained.  $\frac{2}{3}$  (See *infra*, part ii. chap. iii. §§ 3, 7, 8.)

instead of exhausting the enjoyments afforded by the pleasure A.<sup>1</sup>

A second corollary of Gossen's second theorem is that: *the possibility of increasing the sum of enjoyments is conditioned by the possibility of discovering a new pleasure, however small it may be, or by that of perfecting one already in existence*; and this whether its intensity increases each moment, or only at certain moments, and whether or not the period of enjoyment may be prolonged as the rate of decreasing intensity is slackened.

<sup>1</sup> This proposition should, strictly speaking, instead of appearing as a corollary of Gossen's second theorem, precede it, as an autonomous proposition, since it constitutes an implicit premiss of such theorem. I have not ventured to alter the order preferred by the master.

## CHAPTER III

### OF WANTS

#### § 1. *That Economic Actions are such as are caused by the Existence of a Want*

IN the course of the foregoing discussion of the hedonic principle, we have implicitly assumed a fact which must now be verified, viz. that economic science is by no means concerned with every kind of human actions. In the first place, in economics, those actions are disregarded which are due directly, and without any intervention of the human will, to the mechanic influence of the environment. A man who falls from a fifth story does not, *quâ* his fall, act economically. Indeed, in vulgar parlance, the fall would not be considered as *his act*. Still the transition from motions effected under the influence of physical laws to movements that are *acts adjusted to a preconceived end*, is so gradual, that no well-defined line of demarcation can be drawn between them. Besides actions of this kind, we must exclude those that are unconscious, such as most of the organic processes and reflex acts. The human body performs a great number of acts that tend to adapt it to new conditions in the environment: inspiration is followed spontaneously by expiration; the pulsations of the heart and the digestive processes are accomplished unconsciously, and are independent of our will, even when they cause us pain.

The reason why these two kinds of actions are outside the range of economic subjects, is that the psychological law of the minimum of action, or hedonic postulate, cannot be manifested in them. Only those actions accordingly are economic which are

due to the desire to rid oneself of pain, or to lessen or avoid pain, and which are the fruit of our consciousness and will. This sphere of human activity, which is certainly very limited, and possibly altogether non-existent, in the earliest stage of infancy,<sup>1</sup> and scantily developed in savage populations, widens out enormously with every progressive step in civilisation, and with every intellectual and emotional advance in the individual; so that the duration and intensity of individual and collective life are increased by the perfected and multiplied adjustment of acts to ends.

The sphere of economic actions is however still too broadly defined when we so designate all actions that are due to the actual or prospective existence of a pleasure or pain; for in reality that sphere comprises only one species of this kind of actions, viz. *such as are caused by the existence of some want*. Now a want<sup>2</sup> is *the desire to dispose of means deemed to be adapted to remove a painful sensation, or to guard against it, or to excite or prolong a pleasurable sensation*. If we say that Titius wants to eat, we mean: that he feels a certain pain called hunger; that he believes in the existence of means fitted to remove that pain, viz. food; and that he desires to avail himself of such means.

It is a mistake to identify, as is often done, the want which is the desire for an instrument or means, with the painful sensation *which is only one of its causes*. In order to constitute a want, the prior existence actual or prospective of a pain is certainly necessary; but that alone does not suffice: another condition must concur, viz. belief in the existence of means of alleviation. A painful sensation which we were convinced that no means could alleviate, would give rise to no want; nor would the conception of some pleasure which we believed to be reserved to some other species of beings than ourselves. A want implies therefore the con-

<sup>1</sup> Many physiologists doubt, for instance, whether a newly-born infant is susceptible of feeling pleasure or pain, owing to the imperfection of its nervous system; those of its acts which seem to us indications of pain are reflex.

<sup>2</sup> "Want" is the nearest English equivalent of the term used by the author: *bisogno*. But, owing to the ambiguousness of "want," which, besides the *desire* for something needed, expresses also the mere conception of its *absence* or *deficiency*, I have been sometimes obliged to render *bisogno*, in this chapter and elsewhere throughout this treatise, by "need" or "desire."—TR.

currence of at least two conditions: 1st, some pain must exist in our consciousness,<sup>1</sup> no matter whether such pain be reasonable or unreasonable in the opinion of others, or whether it may seem real or imaginary to them; 2nd, there must be the knowledge of some means or instrument, the use of which would diminish or suppress the pain in question; or at all events there must be the belief, even though erroneous in the opinion of others, that such means or instrument does exist. Given these conditions, there is begotten the want of such means or instrument, *i.e.* the desire to dispose, or avail oneself, of it. This is an elementary mode of being of the mind, which cannot therefore be defined. It is in its turn the cause of a series of acts intended to satisfy it, and it is these acts alone that form the subject-matter of economic science; inasmuch as by egoistic individuals (or by the *homo æconomicus*) they are performed in accordance with the hedonic principle, that is, at the minimum possible cost that circumstances admit of.<sup>2</sup> Just as the *want* must not be confounded with the *pain*, which is one of its *causes*, so too we must avoid confusing the *satisfaction of a want* with the *pleasure* (or cessation of pain) which is its *effect*. This is mentioned, not as a warning against speaking elliptically, but in order that the ellipsis, being noted, may not induce any misapprehension.

§ 2. *Of Hedonic Mensuration applied to the various Degrees of Intensity of a single Want, and to the Comparison of the Degrees of Intensity of several Simultaneous Wants.*

Although our wants are neither pleasures nor pains, but have pleasures as their effects, if satisfied, and are begotten by

<sup>1</sup> It is a contradiction in terms to talk of "unconscious wants," or "unconscious pains," for the sensation of pain is of the very essence of consciousness (A. Bain, *The Emotions and the Will*, 3rd ed. 1880, Longmans, p. 540).

<sup>2</sup> Instead of "egoistic individuals," we may also say: "individuals who act in conformity with their self-preservation"; since this end is gained by not applying to the satisfaction of a want more labour than it requires; by not satisfying it at all if it is not hedonically worth while doing so; and by preferring, in the case of several wants, to satisfy the one that is hedonically paramount. The labour required for the satisfaction of a want is a *consumption of vitality*, and therefore, *cæteris paribus*, a lesser development awaits him who spends more effort or labour for the sake of equal satisfactions, and natural selection eliminates him in the long run, as a being that realises fewer conditions of vitality.

pains, nevertheless we can apply the hedonimetry we have already investigated, in its completeness, to wants. Nothing has hitherto been effected by any other means. The attempt has been made to find a quantitative standard of wants in the metric quantities<sup>1</sup> of the several commodities, of every sort or kind, which are consumed by an individual or by a nation, within a given time. Let us call this quantity the *requirement* of an individual, or exceptionally, his *demand*,<sup>2</sup> as an equivalent of the German *Bedarf*, or of the Italian *fabbisogno*. We shall therefore understand by *requirement* the metric quantity of the objects consumed, in a given time, by an individual, or their money value. His annual expenditure is divided into so many pounds for bread, so many for meat, and so many for clothing, house rent, etc.

Now what these data are supposed to render possible, is the measurement of the intensity of our wants. If a man spends £175 on food, £50 on clothing, £45 on his lodgings, £37:10s. on firing, and £20 on drinks, it is supposed that the intensities of these several wants are to each other in the proportion of 175:50:45:37½:20. This, however, is not the case, because the amount spent, say, on food depends, not only on the price of food, but also on the price of every other commodity the man buys; nay even on the prices of those objects he abstains from buying because, for the time being, they are too expensive. A case in which the knowledge of our requirements might be of use to us in other respects, would exist if all the commodities we consume were obtainable gratuitously. In this case our requirement would coincide with our *demand*, at a price equal to zero. We should then be acquainted with a most important point of the demand curve of every individual, *i.e.* of the quantity of commodities he would appropriate, if he had nothing to do but to take them; but we should still be unable to gauge the comparative intensity of his desire, say, for meat and for beer; we should only know that he consumes so many pounds of meat and so many gallons of beer, in a certain time.

<sup>1</sup> *e.g.* by Hermann, *op. cit.* ii. pp. 80, 81; iii. pp. 107, 108.

<sup>2</sup> The term *demand* possesses in economics the special meaning of the *quantity* of a given commodity that is required at a given price, and consists therefore of the *quantity of the commodity offered by way of price*. We shall return to this subject in the sequel (part ii. chap. ii. § 1, note, and chap. iii. § 1).

Hedonimetry, however imperfect, carries us a step further. We must distinguish between the quantitative variations of one and the same want, and the quantitative differences that exist between several distinct wants. In fact, on the one hand, in respect of one and the same want, we may distinguish various degrees of strength, as a greater or lesser desire for any given satisfaction, such as a greater or less desire for water, or warm clothes, etc. On the other hand we may compare the various degrees of strength with which different wants make themselves felt at a given moment, or in a series of moments, in the same individual; as for instance the craving for food with the need of sleep, the need of recreation, etc. Now, the quantitative differences between the degrees of one and the same want are measured in accordance with the quantitative differences in the sensation of pain which is the cause thereof, until they are satisfied; or in the sensation of pleasure which is the effect thereof, when they are extinguished. Thus, for instance, we conceive the magnitude of the several degrees of the desire for food to be *proportionable to the magnitude of the several degrees of the feelings of hunger which are the cause thereof*, or of the several degrees of the pleasure afforded by their appeasement. Consequently we may now apply to wants the reasoning set forth with reference to pleasures and pains (chap. ii. §§ 5, 6). Supposing any given want, having at a given moment and for a determinate individual, any determinate initial strength, it is a fact supplied by daily observation that, before being extinguished by possession of the commodity which was its object, it passes more or less rapidly through a series of indefinite gradations of decreasing strength, corresponding with the decreasing variations of its cause. If the original strength or magnitude of a want is expressed, as in diagram XI., by an arbitrary numerical index, say 10, or graphically by an ordinate of arbitrary length ( $A_1O_1$ ), the successive partial assuagements of this same want will cause it to assume successively the dimensions designated by 9, 8, 7 . . . to zero, and denoted graphically by ordinates decreasing until they coincide with the abscissa ( $A_2O_2, A_3O_3, . . . A_{11}O_{11}$ ). The various strength of several wants is expressed in exactly the same manner. A number of such wants may be ordered

in accordance with the strength they possess, at a given moment, for any determinate individual. This scale of the urgency of wants will be founded ultimately on the scale

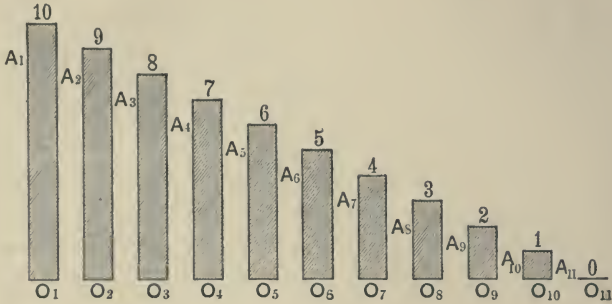


DIAGRAM XI.

constituted by the pains that beget the wants, or that would have to be suffered if the wants remained unsatisfied. Let us express, as in diagram XII., by any index, say 10, or by any ordinate, say A<sub>1</sub>O<sub>1</sub>, the urgency of the first want in this

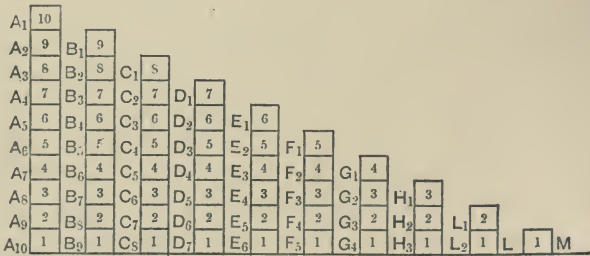


DIAGRAM XII.

scale, viz. the amount of pain that must be suffered if it be not satisfied.<sup>1</sup> The aliquot parts of this ordinate, viz. the  $\frac{9}{10}$ ,  $\frac{8}{10}$ ,  $\frac{7}{10}$ , etc., thereof (A<sub>2</sub>O<sub>1</sub>, A<sub>3</sub>O<sub>1</sub>, A<sub>4</sub>O<sub>1</sub>, . . . A<sub>10</sub>O<sub>1</sub>) will be equivalent to the successive intensities of the want in question, consequent on its progressive satisfaction. Let the initial urgency of the second want be expressed by a second

<sup>1</sup> The axis of the abscissæ is to be considered as designated once for all by OX, even if in some diagrams these letters are omitted, and the axis of the ordinates by OY. In diagram XII. at foot of the columns of A, B, C, etc., O<sub>1</sub>, O<sub>2</sub>, O<sub>3</sub>, etc., are omitted.



ordinate having 9 as its index ( $B_1O_2$ ), and divided into aliquot parts likewise equivalent to the successive intensities of this want. In the same way, let a third want be expressed by a third ordinate ( $C_1O_3$ ) having 8 as its index, and divided into aliquot parts with decreasing indices ( $C_2O_3, C_3O_3, \dots C_8O_3$ ). And let this process be carried on to the representation of a tenth want ( $L_1O_{10}$ ) having as its index 1, and consequently supposed to be of such magnitude as to be satisfied with what will diminish any one of the preceding wants by one degree of intensity. The ordinate ( $M_0O_{11}$ ), having zero as its index, is non-existent, and expresses a want already satisfied, or not yet felt. Given this scheme of the various degrees of intensity that every want passes through before it is extinguished, and of the scale of intensity of several wants at a given moment, it follows that if an individual has at his disposal a determinate quantity of means of satisfaction which can be applied to several uses (for instance a certain amount of money),<sup>1</sup> he will take care to extinguish first the most urgent want (the want A of diagram XII.) and will direct to this end the employment of the means at his disposal. However, he will not care to extinguish this most urgent want completely, before providing for the satisfaction of the second and ulterior wants; for the first want is not more urgent than the second, except within determinate limits, and more precisely until the first degree, denoted by A in diagram XII., and having 10 as its index, is satisfied. In fact, as soon as the first want is satisfied to this extent, the second becomes equally urgent; so that if the means still available were employed exclusively in satisfying it, so as to reduce it to an intensity of, say, 8 degrees (at  $A_3$ ), there would remain unsatisfied a want now surpassing it in urgency, viz. the second, having 9 as its index (at  $B_1$ ); so that the hedonic postulate would have been transgressed. Therefore when the first want A is reduced by the employment of a portion of the available means to an intensity equal to that of the second ( $A_2 = B_1$ ), so that both come to have the index 9, the hedonist, or *homo æconomicus*, must apply his means in equal measure to the satisfaction of the first two wants.

<sup>1</sup> Here, for a first approximation, abstraction is made from the final degree of utility of money, *i.e.* the unitary prices are considered as being all the same.

However even then he will not persevere in this to the complete extinction of such wants; for when the first two are reduced to the intensity indicated by the index 8, *i.e.* the first by two degrees ( $A_1$  and  $A_2$ ) and the second by one degree ( $B_1$ ), the third want will equal them in intensity ( $C_1$ ), and must thenceforward be satisfied *pari passu* with them, for the same reason that previously called for the simultaneous satisfaction of the second want. If the means that are still disposable suffice, the first three wants will be satisfied until they are reduced to the intensity denoted by the index 7 ( $A_4 = B_3 = C_2$ ), when the fourth want ( $D_1$ ) will claim attention; and so on.<sup>1</sup>

It follows, that *at whatever moment the disposable means are exhausted, the wants that have been satisfied therewith have all Equal Degrees of Intensity, and that these are the Greatest experienced by the individual at that moment.* In this proposition we have an economic theorem which is nothing more than a formal variation of Gossen's second theorem of hedonic maxima. In this shape however—which is the more common one—it goes by the name of Gossen's or Jevons's theorem of *final degrees of utility*.<sup>2</sup> In order to avoid misapprehension, it may be expedient to paraphrase, and to add a few comments on, it. It is clear that it could also be formulated by the proposition: that the wants that remain unsatisfied after any given quantity of means has been employed in appeasing them, possess either equal or inferior degrees of intensity. If the unsatisfied wants are among those which have been partially appeased, their degrees of intensity are now equal; if, on the other hand, they are such as had not yet been taken into consideration, their degrees of intensity are inferior to the minimum degree of intensity that the disposable quantity of means sufficed to satisfy in the case of the other wants. The scale formed by the intensities of the

<sup>1</sup> The method of using numerical indices instead of curves is due to Menger, and is extremely useful to all who are puzzled by geometrical diagrams or analytical expressions. It can be adapted to nearly any purpose that is subserved by curves.

<sup>2</sup> Gossen, *op. cit.* p. 33: "Wenn (des Menschen) Kräfte nicht ausreichen alle möglichen Genussmittel sich vollaus zu verschaffen, muss der Mensch sich ein jedes soweit verschaffen dass die letzten Atome bei einem jeden noch für ihn gleichen Werth haben." Jevons, *op. cit.* p. 65: "The final degrees of utility in two (or more) uses of the same commodity must be equal."

various wants, arranged in order of decreasing initial magnitude, will never present in reality the symmetry shown in diagram XII. We may suppose that a first want has 10 as its index, a second 6, and that successive wants have still lower indices, say between three and one. By marking only the upper extremities of the ordinates corresponding to these indices, and joining them by a line, we shall have the curve AL of diagram XIII. It may be that the means disposable will only suffice to satisfy the first and second wants as far as the fifth degree (line MN). Both these wants will then have equal degrees of intensity; whilst the others, which have not been even partially satisfied, continue to have degrees of intensity (between 5 and 1) inferior to the lowest degree

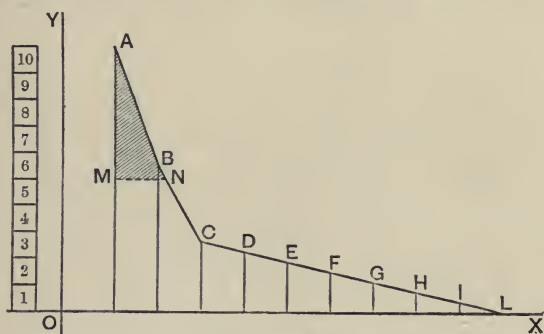


DIAGRAM XIII.

(6) that the mass of disposable means sufficed to satisfy. We might also have supposed this mass to be so small as to suffice only for the extinction of a couple of degrees of the first want. The theorem might still be expressed in the same way; only then the equal degrees of intensity would be the eighth degree of the first want, which is equal to itself. As the satisfaction of several wants is always effected in such a manner as to equalise the degrees of intensity of those wants which, though not extinguished, are partially satisfied, it may be said to proceed in accordance with equal indices, or with lines parallel to the abscissa.

If the mass of disposable means sufficed to extinguish completely all the wants existing at a given moment, then also the degrees of intensity of all remaining wants would be equal, for those degrees would be zero in all cases alike.

### § 3. *Of an Absolute Scale of Intensity and of the Law of the Elasticity of Wants*

The scale of wants we have hitherto considered is relative to any given moment and any given individual; in other words, according to the moment and to the individual, the first place, *i.e.* the greatest intensity, may be attributed to any one want, and the last place to any other.

We have now to inquire whether there exists any scale of the absolute urgency<sup>1</sup> of wants. All that can be stated with certainty on this point is, that for a few groups of wants there is a scale of precedence, in the sense that, until certain wants have been satisfied, no others make themselves felt. Whilst the scale we have considered above applies to *the intensity of wants existing simultaneously*, the one we now refer to applies to the *genetic succession* of wants. Sociological history reveals to us a few degrees of that scale, and so does the study of statistics. As usual, psychological analysis and the data of physiology carry us further. On this basis Jennings has succeeded in formulating a law almost as important as that of the decrease of protracted enjoyments. Let us distinguish two series of sensations: let us place on one side those received by us through the medium of the so-called five senses, and on the other those we receive through the medium of the nerves pertaining to other parts of the body, and let us call the former *special sensations*, and the latter *common sensations*. To the category of common sensations will belong in particular those of weight, resistance, temperature, hunger, thirst, stimulation, etc. Now, in conformity with this division of human

<sup>1</sup> The term "absolute scale" signifies, that the scale we are now considering exists, making abstraction of a greater or lesser part of the conditions to which the former is subject. The *absoluteness* is therefore *relative*. The former scale was relative to a given individual, *i.e.* to a subject the logical *content* of which is *maximum*, while the *sphere* is *minimum*. The scale we are at present dealing with makes abstraction of the conditions either of time, or of social position and civilisation, or of individual idiosyncrasies, or perhaps even, according to the opinion of some, of those of sex and age of the individual; *i.e.* it relates to a subject having a *lesser logical content* than the former, but a *larger sphere*. A number of errors arise owing to its not being always perceived: (1) That the term "absolute" is only the negation of a *determinate relativity*, so that it must be stated *with reference to what condition* the absoluteness is predicated or postulated; (2) that there may be *infinite degrees of absoluteness*.

sensations, we shall have a division of *wants and of things* that are the objects of such wants, and we shall designate as *primary wants* those corresponding to common sensations, and as secondary wants those corresponding to special sensations. This classification will coincide in the majority of cases with the one usually adopted,—but which lacks any rational basis,—of necessary wants and luxurious wants ; whilst, according to our classification, no doubt can ever arise as to the category to which any satisfaction, and the object that is instrumental in producing it, belong. The following principles are deduced from the said classification :—

1st. *Primary wants* (corresponding with common sensations) *may be satisfied without any hedonic loss, even when the secondary wants are not satisfied ; on the contrary, no enjoyment is derived from the satisfaction of secondary wants, or the latter are not even realised, or the enjoyment is much less than it otherwise would be, if the primary wants are not satisfied in large measure, or completely.* For instance, every one is disposed to satisfy his hunger, or thirst, or to rest, or to move, etc., even without the concomitant satisfaction of the senses of hearing, smelling, or seeing ; on the other hand, the desire to gaze on statuary or flowers soon vanishes under the influence of hunger, thirst, cold, excessive heat, or sickness. In other words, the satisfaction of the common senses must precede the satisfaction of the special senses.<sup>1</sup>

2nd. *The law of the decrease of protracted enjoyments differs somewhat, according as we have to do with primary or secondary enjoyments ;* for the satisfaction of secondary wants is less affected by quantitative variations in the objects causing satisfaction than is the satisfaction of primary wants. With regard to primary wants, one might apportion the quantities of primary commodities according to the respective purposes they subserve, with the same exactness in the case of man, as in the case of animals that are reared for determinate purposes ; but this does not hold good with regard to any secondary satisfactions.

<sup>1</sup> This explains, *e.g.*, why the liberal professions are poorly paid in countries where the number of persons is limited who possess a competency for the satisfaction of their primary wants, and *vice versá*. Owing to Jennings's law, this fact becomes an excellent semeiologic criterion of the national wealth.

3rd. *The satisfaction of one primary want cannot, as a rule, compensate for the non-satisfaction of another primary want.* An increased ration of food will not quench thirst, nor make up for the want of rest, or coolness, or warmth, and *vice versa*. On the other hand, the satisfaction of one special sense often compensates for the non-satisfaction of another, to the extent of making us forget it: for instance, the enjoyment of music may make up for the want of some other artistic enjoyment.<sup>1</sup>

Probably, however, what so far is known with most certainty in this connection is that the absolute scale of wants obtained by induction is very different from what, *a priori*, we should expect it to be. Thus for instance, *a priori*, most people would probably assign a comparatively remote place in the scale of wants to the desire for ornaments, which appears to us a form of luxury, and that of a moral or intellectual order. Instead of this however, facts seem to demonstrate that this want precedes by a long way certain others, the satisfaction of which is much more conducive to the preservation of the individual and of the race. That an absolute scale of wants does exist, albeit its nature is very imperfectly known to us, appears from a very simple consideration: suppose, in fact, an individual at any given moment, whose wants accordingly constitute a determinate curve; and let his first want in the scale of intensity be *a*, the next *b*, and so on. If we now suppose that this individual lacks the means of satisfying some one of these wants, after a longer or shorter series of moments, the curve of intensity of his wants will have been sensibly modified. The first want will no longer be *a*, nor the second *b*. The longer the series of these moments is supposed to be, the more will the curve, through its successive modifications, tend to assume a shape *approximately uniform for every individual*, being constituted by few elements similarly graduated. Probably the first places will be occupied by the want of food, drink, heat: in a word, by the series of wants relating to the preservation of the human organism; probably, too, a large

<sup>1</sup> Jennings, *op. cit.* pp. 100-104. Within certain limits, however, primary commodities may also be substituted for one another: more food may to some extent make up for less warmth and less sleep. In the Franco-German War of 1870 the German soldiers were always commanded by their officers, when halting, to eat first, and to sleep afterwards if any spare time remained.

series of wants that existed before will have entirely disappeared, as the painfulness of the non-satisfaction of some other wants is so great as to render us insensible to the painfulness of these.

The hypothesis we have suggested actually occurs in the case of besieged cities and wrecked vessels. It seems however that the absolute or fundamental curve of wants contains only a few items, and that as soon as the means suffice to satisfy them, the original or *natural* curve, as we might justly call it, is differentiated into as many diverse curves as there are individuals. Possibly, between the original curve common to all, and the multiform individual curves, there exist intermediate curves that are common as regards a particular race, or sex, or age, or with respect to some other particular principle.<sup>1</sup> There is only one way of conceiving absolute differences of magnitude in our wants; and though it cannot be expounded without reference to matters which will be discussed in the sequel, it may be advisable to indicate it at this stage.

Suppose an individual expends an equal quantity of labour in the production of each commodity he requires. Such unit of labour will yield determinate quantitative results as regards the several commodities, for instance:  $m$  of food,  $n$  of clothing,  $o$  of shelter, and so on. Supposing the unit of labour to be very small, we shall call the corresponding quantity of commodity obtained thereby, the *marginal efficiency* of a unit of pain or toil; or speaking elliptically, we call these diverse quantities of commodity *units of commodity*. Now, each of these various units of commodity has a final degree of utility; and the magnitude of these degrees of utility is the exact measure of the magnitude of each want. Graphically, we may imagine equal segments of an abscissa, denoting equal portions of labour, as regards their painfulness for the same individual, and applied to the production of different commodities. On each segment of the abscissa is drawn perpendicularly a rectangle proportionable to the utility yielded

<sup>1</sup> With few exceptions, the wants of a child cannot be the same as those of an adult; hence, too, the scales relating to classes of youthful and adult individuals, *i.e.* the comparatively absolute scales, must vary considerably. The same applies to every other class scale.

by the quantity of commodity resulting from a unit of labour. If the segments of the abscissa are shortened, the rectangles are reduced until they become ordinates. Of these some will be infinitely long, others again will be short. The scale they form will be the one we are seeking.

The fact is that we have hardly any definite knowledge on the subject, with the exception of the above-mentioned law of Jennings; and that Block's so-called *law of abstention*, according to which, "given a reduction of the available means of satisfaction, we dispense first with the satisfaction of the less urgent wants, and then with that of the more urgent ones," constitutes a vicious circle; inasmuch as we cannot construct an absolute scale of the urgency of wants, since the criterion for determining whether a want is more or less urgent is furnished by the fact that we dispense with its satisfaction sooner or later.<sup>1</sup>

The practical importance of studies that should reveal to us what wants are satisfied in a lesser measure than before, and what other wants are no longer satisfied at all, when the means of satisfaction are reduced; and on the other hand what wants are satisfied in a fuller measure than before, and what new wants are superadded, in the converse case of an increase in the means of satisfaction, would be incalculable; for we should then possess the key to all the fundamental questions connected with the theory of imposts on articles of consumption; in other words, we should have a *law of the elasticity of wants*.

<sup>1</sup> Our statement that Block's law of abstention implies a *petitio principii*, is intended, not as a stricture, but as an explanation of its meaning. In fact, *if it expresses a truth derived from the observation of facts, and does not therefore relate to the future, if, i.e., a scale of wants has been framed as the result of historical study and statistical observation*, it is clear that it does not constitute a vicious circle. As regards the future, it applies only, *if and when it has been ascertained A POSTERIORI, that an individual, or a people, in view of the restriction of the means of satisfaction, has dispensed with the satisfaction of the want m or n*. In that case we are entitled to say, that in the hedonic estimation of the said individual or people, the wants *m* and *n* are less urgent than the others *a* and *b*. Moreover, within the limits of the data so ascertained, we may say that, all the other conditions remaining unchanged within a given period, if the means increase, we shall resume the gratification of the wants *m* and *n* in the inverse order to that in which it was retrenched, and that if at a future period the means should be again reduced, we may predict a diminished consumption of the commodities that satisfy the wants *m* and *n*.



What we are able to say at present, on the basis of inductive studies, is the following:<sup>1</sup>—

1st. Suppose that in a country, not being a close market (that is, possessing extensive commercial relations with other countries), the means of payment increase<sup>2</sup> in such measure as greatly to extend the limits set to the satisfaction of wants in the *solvency* of purchasers, and to render possible *an increase in the demand for commodities*, although their prices remain stationary, or even undergo a rise; in that case a determinate series of wants will be satisfied in a larger measure than before, and a new series of wants will claim and receive satisfaction; *i.e.* we shall have *an expansion of wants according to a determinate order*. Suppose, on the contrary, a diminution of the means of payment, so that the limits set to the satisfaction of wants in the solvency of purchasers are restricted, and the demand for commodities is reduced; in that case a determinate series of wants, differing from the previous series, will be satisfied in a lesser measure than before; *i.e.* there will be *a compression of wants, or a curtailment of their satisfaction, according to a determinate order differing from the previous one*. In other words: *The positive expansion of wants is, as a matter of fact, different from the negative expansion*. Whether this would be so even in the case of the *homo economicus*, cannot be deduced from the researches hitherto made, owing to the manner in which they have been carried on; but it seems probable that it would not be so.<sup>3</sup>

<sup>1</sup> *Viertelj. f. Volksw. u. Kulturg.*, 1868, vol. iii. pp. 127-165; vol. iv. p. 121, *Währung und Preise*, Julius Faucher.

<sup>2</sup> If the country is a close market, we may suppose the efficiency of labour to have been increased by new methods of organisation, by the growth of knowledge, or by technical progress; or else to have deteriorated by reason of some accident of the environment, say a deviation of the gulf-stream.

<sup>3</sup> At first sight it is incomprehensible how an expansion of wants can occur in a different order from the contraction of the same as regards a *homo economicus*, if, as we must do, we exclude the hypothesis of error in his hedonic calculations when he extends his enjoyments in a certain order, as his means increase. The explanation of the contradiction between the historical, or statistical, or otherwise inductive, fact, and the conclusions of the *a priori* calculation or reasoning, may be obtained in various ways: (1) The historical, statistical, or otherwise inductive observation may be vitiated by error. This may easily be the case, for as yet the subject has been scantily investigated. (2) It may be that the process of observation is extended to men in whom the characteristics of the

2nd. The empiric scale of positive elasticity for categories of wants seems to be, in an increasing series, the following: the desire for nourishment has a lesser capacity for expansion than the desire for clothing, and the latter has a lesser force of expansion than the desire for shelter.

3rd. In the first category the increasing series presents the following order: salt, grains and common vegetables, fruit and fine vegetables, meat, dairy produce, eggs, salt meat, fish, stimulating beverages, groceries, tobacco. Negative expansion is different, presenting minimum degrees for salt and tobacco; in the decreasing order of negative expansion follow alcoholic drinks, coffee, sugar, groceries, vegetables, meat.

4th. In the category of desires for clothing, negative expansion is much less than in that of desires for nourishment. The conception of an absolute scale of wants, which is not without a certain amount of truth, has nevertheless, in its present imperfect condition, probably given rise to more economic errors than sound principles. More especially it has resulted in a distinction between necessary wants and superfluous wants, or luxuries, which is untenable in nearly every shape in which it has been presented. It is to be observed above all, that a want which might be deemed a luxury for one individual, is not necessarily such for another, since one individual differs from another even in his physiological conformation. Thus, for instance, the skin of a peasant or labourer is not, from a

*homo economicus* are neutralised by other characteristics, so that the theory must be understood *secundum quid*, and the observation applies *secundum aliud*. (3) It may be that the theory of the *homo economicus* is incomplete or erroneous. (4) It is possible to conceive of a reconciliation between theory and observation on these lines: Suppose that the scale of wants of the *homo economicus*, at a given moment, is constituted in order of importance by the wants *a, b, c, d*, and that subsequently he is enabled to satisfy new wants, and does so in the order in which they stand, *e, f, g, h*. But now, since he has tasted the satisfactions *e, f, g, h*, and has become accustomed to them, his absolute scale of wants for the future may have been modified so as to be constituted by *b, c, f, g, a, d, e, h*. In other words, the commodities he has consumed and the interval that has elapsed between the time when his means were less and the time when they became more, operate as alterative factors on the scale of importance of his wants. Now, suppose a diminution of his means to supervene: evidently he will act in accordance with the *new hedonic scale* in the retrenchment of his enjoyments. The divergence between theory and practice would therefore arise from the fact that the observations refer to different times, whilst the theory supposes the processes to be accomplished at the same moment.

physiological point of view, the same as the skin of an individual belonging to the upper classes; and the same remark applies to various organs whose functions furnish quantitative results so different, as to constitute qualitative differences both in the functions and in the organs. Whilst, for instance, the desire for intellectual or emotional recreation may be luxuries for the labourer, the same may be wants of the first order for the brain-worker; so much so that to deprive him of them may be to unfit him for his wonted labours.

#### § 4. *Of the Variety and Progression of Wants*

Observation furnishes us with a law of the *indefinite variety and progression of wants*, for which two causes may be assigned: 1st. Our organs are impaired by inactivity, and yet wasted by use: hence a series of painful sensations and a series of wants; 2nd. The environment in which we live is constantly undergoing modifications which react on our sensibility, causing us pain and compelling us to a continual labour of adjustment. A state of satisfaction is incompatible with anything save a state of insensibility; and thus, while life lasts, such a state can only be transitory and momentary. The satisfaction of grosser wants quickens our sensibility and gives rise to wants that are more refined. After having made provision for present wants, we begin to think of remoter ones. The progression of wants is therefore indefinite; more especially as they are directed to the acquisition not only of direct means of satisfaction, but also of *instruments* for the more abundant, or speedy, or perfect production, at the same cost, of *direct means of satisfaction*; and this species of wants has no other limits than those of the inventive capacity of the human mind.<sup>1</sup> A consequence, or rather a paraphrase of the

<sup>1</sup> H. Spencer, *loc. cit.* p. 158. Originally only the realisation of an end was pleasing; as however this usually necessitated the previous realisation of means, this in turn has come to be a pleasure, though it is often far removed from the ultimate object for which the means was realised. "During evolution there has been a superposing of new and more complex sets of means upon older and simpler sets of means; and a superposing of pleasures accompanying the uses of these successive sets of means; with the result that each of these pleasures has itself eventually become an end." See the analysis of the instance given of the merchant who thinks of making money, and enjoys making it, though it is only a means for the satisfaction of other wants.

foregoing proposition, is that the means of satisfaction *in general* can never be superabundant, though a *determinate kind* may be so; that is, the available quantity thereof may be in excess of the corresponding need.

§ 5. *Of some Classifications of Wants in respect of their Qualities*

Wants may be classified, in respect of quality, in an infinite number of ways; and to each of such classifications of wants corresponds an identical classification of means of satisfaction. Whilst one of the most fruitful classifications of wants has just been indicated in the preceding section, that namely of wants having *means of direct satisfaction* as their objects, and wants having as their objects *instruments* for procuring such means of satisfaction, the great majority of the classes of wants and means of satisfaction thus obtained possess no economic importance. As, in the formation of such classes or categories, we have to do with laws of fact, which only subserve our purpose inasmuch as they supply premisses for economic theorems, we shall do well to ignore all such as do not do so. Such are above all the divisions of wants or means of satisfaction derived from jurisprudence or from ethics. Thus the division (derived from Roman Law) of things into fungible and non-fungible, and the corresponding division of wants, are altogether irrelevant; as is also the division of wants into public and private; into individual and collective, singular, particular and universal; into wants that are common in respect of place or time and wants that are common to society; into human and animal wants; and into positive and negative wants. If any one of these distinctions should at any time become relevant, it can then be drawn briefly; for all the above and a hundred other possible distinctions are comprehensible at once. At present, rather than to dwell on the commonest classifications of wants, it behoves us to be on our guard against some of them, the importation of which into economic discussions has given rise to grave errors. Thus, for instance, there is no such thing as the distinction between natural and artificial, or between real and imaginary wants, or as the correlative distinction between the corresponding means of

satisfaction. In accordance with the usual practice we defer discussion as to which divisions are fallacious, and which are prolific of inductions, until we come to treat of the means for the satisfaction of wants; for we shall then deal with those points in connection with the divisions that are proper only to such means.

## CHAPTER IV

### OF UTILITY AND THE CLASSIFICATION OF COMMODITIES

#### § 1. *How Commodities are commonly Characterised*

THE means for satisfying our wants, whatever their nature may be, are termed commodities. Having already discussed at length the characteristics of the conception *want*, and having found that it presupposes: 1st, *The existence of a pain present or prospective*; 2nd, the consciousness, whether warranted or erroneous, that there exists a means for alleviating it; and 3rd, the desire to dispose of this means, we have now to determine the essentials of the conception *commodity* in economics. It is commonly held that the concurrence of four conditions of fact is necessary to constitute a thing a commodity, viz.: the existence of a want, the existence of a thing endowed with such properties as fit it to be the cause of the extinction of the want in question, the possession of the knowledge of these properties, and lastly the accessibility of the thing itself. In fact, it is evident that a thing can only be a means of satisfaction inasmuch as a want exists, and that the disappearance of the want involves the disappearance of the property of being a means of satisfaction previously attributed to the thing. It is also obvious, that if a thing possesses the property of extinguishing a want, that thing is a commodity for him who is aware of that property and who experiences the want. Finally, it cannot be doubted that substances contained in the stars, though they may possess the physico-chemical properties which would render them capable of satisfying human wants, are not commodities, because they are inaccessible, and that, in

the same way, all things situate beyond our control are not commodities.

But though, roughly speaking, the essentials which constitute a thing an economic commodity may be so stated, a much subtler definition of them must be given if we wish to speak with scientific accuracy. In fact,—only to point out two defects of the above definition,—we may remark with reference to the second requisite, that besides the things that are commodities because they possess such physico-chemical qualities as are capable of modifying our painful sensations, there are a large number of commodities which do not possess, but are wrongly supposed to possess, such qualities. Moreover it must be observed that, regarding those four essentials as a whole, they are insufficient to constitute a thing a commodity. Thus, for instance, judged by this criterion, is drinking water a commodity, or is it not? Given the existence of an individual who is thirsty and the accessibility of water, we must, in conformity with what has been predicated, reply affirmatively. Nevertheless it is obvious, that whilst that will be true, as regards the first, second or third pint, it is untrue of the one-millionth as regards the same individual. The same applies to heat, which is a commodity up to a certain degree, but beyond that becomes an evil, or discommodity, and to food, which is a commodity up to a given quantity, but which, partaken of in larger quantities, becomes useless, superfluous or hurtful.

It is obvious that the said four requisites are insufficient to determine the essentials which constitute a thing a commodity, if indeed we should not rather consider them as altogether erroneous, seeing that they do not solve the true difficulty of the question. The definition makes abstraction of the quantities of things as they exist, or as they are thought or spoken of, as also of the further fact that wants, in relation to which certain quantities of things are or are not commodities, likewise possess quantitative characteristics. It will therefore be well to depart somewhat from the received method of determining the essentials of a commodity, whilst seeking at the same time to adhere as nearly to it as possible.

## § 2. *Of the Essentials of the Conception "Commodity"*

Things are means for the satisfaction of wants, or in other words are commodities, when with reference to them there is realised a *complex* of conditions of fact, which may be regarded as a *modality* of the things themselves. In fact a thing has modalities of place, time, quality and quantity, that is to say, it may be situated in one place or in another, it may exist at one moment or at another, have certain structural and functional properties, or others, and it may exist, or be supposed to exist, in a variable quantity. When a thing satisfies an existing want in an individual who has a *determinate want*, at a *given moment*, and of a *given magnitude*, it is considered that the thing has determinate structural and functional properties. It follows that, as a general rule, the essentials that constitute a thing a commodity are: (a) *the existence of a concrete want*, which implies the existence of an individual who feels it in a *certain measure* and at a *given moment*; (b) *the existence of a thing*; (c) *the opinion* that this thing has *determinate structural and functional properties*; (d) *the presence or accessibility or availability of the said thing in a determinate quantity, in relation to which alone and exclusively the judgment is formulated that the thing is a commodity*. Let us examine these requisites separately, adverting to some of the controversies to which they have given rise.

(a) It is necessary, in the first place, that there should *exist a want with reference to which a thing may be a commodity*. A want exists when we are *conscious* of it; there are no such things as unconscious wants, as we have already observed, for every state of need is a state of suffering, and this is the most direct manifestation of consciousness. It matters not whether the want be reasonable or unreasonable, commendable or ignoble. It is, as a rule, a matter of indifference whatever its quality may happen to be, or whatever our judgment concerning it, under any aspect, may be. What is alone sufficient, but necessary, is its simple existence. With every variation of our wants, the *degree* varies in which things are commodities, as also the *group* of things that have the property of being commodities. In fact, in the same measure



in which a thing satisfies a want, it is a commodity; for a want the non-satisfaction of which is very painful, will make the thing that appeases it seem intensely pleasurable, and a want the non-satisfaction of which is slightly painful, or almost indifferent, will make the thing that extinguishes it seem of little or almost no significance. Hence, *the quantitative variations of our wants are in a direct ratio to the variations of the degrees in which the things are commodities.* It is obvious, *a fortiori*, that to the qualitative variations of our wants correspond variations (in the same direction) in the group of things that are commodities, and that therefore to the *law of the progressive extension of our wants* corresponds a *law of the progressive extension of the group of things that are deemed commodities.*

(b) and (c) It is necessary, in the second place, that there should *exist a thing respecting which we entertain the OPINION that by its means we can satisfy the want in question.* It is not necessary that the thing should *actually* possess the properties attributed to it, or the qualities it is considered to possess. Doubtless, in civilised times, the rule will be that the thing that is deemed a commodity does possess the properties attributed to it, and that these properties have the virtue of appeasing the respective want. We esteem quinine *e.g.* to be a commodity in relation to the suffering produced by malarial infection, and as a matter of fact it possesses the property of preventing the recurrence of attacks of that species of fever. But this drug would still be a commodity in an economic sense, if the said property were purely imaginary, for human judgments and actions are adjusted to so much of objective reality as enters into our consciousness, and not to what remains outside it. Probably a large proportion of the medicines of to-day are commodities of a kind which a later generation, if more enlightened than ourselves, will pronounce to be imaginary. And, in the same way, many other classes of cognitions, or of objects to which they relate, as also entire groups of instruments, and various processes and institutions, would by minds more enlightened than our own as to the laws of nature and the actual properties of things, be deemed to be imaginary commodities. But, *at any given moment, there is no distinction between imaginary and real commodities,* for even

the latter are *commodities* for us, only inasmuch as they too are imaginary, i.e. *inasmuch as we conceive of them as possessing determinate properties.*

A useless discussion has been carried on as to whether things capable of being commodities must be material, or whether they may also be immaterial. It is necessary to reflect<sup>1</sup> that a pain may be alleviated, or a pleasure procured, only through something acting on our *senses*, or through its not so acting upon them, i.e. by their *remaining in a given state*; that, moreover, our senses cannot be affected, or preserved intact, otherwise than by the subsistence of some *relation* between them and *material objects*,<sup>2</sup> that being implied in the very conception of a material object; that consequently inasmuch as commodities are things that *appease wants*, i.e. remove pains or procure pleasures, *they cannot but be of a material nature*; and finally, that inasmuch as our notions are derived from our sensations, *we are not conscious of any other than material existences.* If it were discovered in what manner a thing supposed to be immaterial can beneficially or prejudicially affect us, who are in communication with the outer world and with ourselves, only by our senses, then we could admit the existence of immaterial commodities.<sup>3</sup> In the same way the question as to what the sphere of the conception *commodity* is, was solved more than thirty years ago by Francesco Ferrara. The moot point was, whether besides those objects arbitrarily designated as *material*, or *things*, the *services* which one individual can render to another are also commodities.

In this discussion the content and sphere of the conception *thing*, or *corporeal thing*, or *material commodity*, were necessarily undefined, as were also the content and sphere of the conception *service*. The first terms meant such things as e.g. food, clothing, lands, houses, etc., the last referred to the

<sup>1</sup> Franc. Ferrara, *Prefazioni al Say, allo Storch e al Dunoyer* in the *Biblioteca dell' economista*. Tullio Martello, *Appunti di E. P. Lezioni professate nella Scuola Superiore di Commercio in Venezia*, Treviso, D'Auris, 1882; §§ 33-38, pp. 113-123; § 53, pp. 189-195.

<sup>2</sup> A material object is an object that affects our senses.

<sup>3</sup> Among foreign treatises on the materiality or immateriality of commodities, the best is John B. Clark's *The Philosophy of Wealth*, Boston, 1887, chaps. i. and ii.

services *e.g.* of the physician, the lawyer, the actor, etc. It was debated whether labour must be *embodied* in any particular form in order to be deemed productive of an economic commodity; and a distinction was drawn between labour embodied in *matter pertaining to the world external to man*, and labour the effect of which is to modify *man himself*. Proceeding to analyse the conception of services, it was asked whether they do not include, for instance, the goodwill of a business (since this resolves itself ultimately into the fact that a number of persons are in the *habit of performing one act* rather than another, *i.e.* purchasing from one merchant rather than from another); an industrial patent (which also consists after all only of the right to *restrain* others from *performing a certain series of acts*, namely, manufacturing and selling a certain article, and to reserve to oneself the exclusive privilege of doing so); and in general every kind of action, or abstention from action, on the part of others, which an individual regards as conducive to the satisfaction of his wants. And just as among the so-called material things were included both *objects calculated to satisfy a want directly*, such as bread, a cloak, a house; and *objects calculated only to supply a want indirectly*, *i.e.* *instrumental* with reference to the former, such as grain, wool, stones, lime, or (even more remotely) lands, plants and animals that produce textile materials, quarries, and tools or instruments of every description; so too amongst services were reckoned not only such as minister directly to a want, *e.g.* the work of a surgeon who sets a dislocated limb, but such also as satisfy a want only indirectly, being instrumental with respect to the former, *e.g.* a knowledge of surgery, musical talent, etc.

A clean sweep may now be made of all these discussions.<sup>1</sup> Their net result may be summed up in a few propositions, of which the first is this: *Everything that affects our senses, whether it be a part of the external world in which men live, or a positive or negative act of one or more men with respect to another man, may be a commodity, i.e. it may satisfy a want, extinguish a painful sensation, or engender a pleasurable one.*

<sup>1</sup> Sax, Böhm-Bawerk, and some others still discuss this subject at length, being apparently unacquainted with the greater part of what has been written about it out of Germany. *Vide* Sax, *Grundlegung der theoretischen Staatswirtschaft*, Wien, 1887, A. Hoelder, part iv. § 33, p. 199; § 35, p. 209; § 38, p. 228.

What is necessary is, that what we consider a commodity should be brought to our knowledge, by means either of our nerves of general sensibility, or of our specific nerves; that is: it must either affect our sense of touch, appearing hard or soft, heavy or light, warm or cold; or else our senses of taste, smell, sight or hearing. Hence we must regard as being equally commodities: bread, clothing, medical advice, the speech or pleadings of counsel, the credit embodied in a bill of exchange or contract, the vocal performance of a *prima donna*, the resort of customers to a place of business, the abstention from competition on the part of manufacturers restrained by the exclusive patent rights of another, the abstention from bidding at an auction on the part of capitalists restrained by some (possibly altruistic) interest, and the discoveries of the scientific investigator. On the other hand, it must be borne in mind that whatever does not affect our senses is not, because it cannot be, a commodity; and hence we must regard as being equally not commodities: all forces of nature of which we are still ignorant, all undiscovered substances or unknown processes, the thoughts of men that are unexpressed in any shape that can affect the senses of others, their unrevealed mental acquirements, and their sentiments that are not translated into actions or into abstentions from determinate actions.<sup>1</sup> It is immaterial whether the things (and things include actions, for actions are always movements of things) satisfy wants directly or indirectly. In the same way that a field is a commodity because it is productive of wheat, which may be transformed into flour, which in its turn supplies us with bread; so, too, the written, or spoken, or otherwise manifested advice of the physician, which results in the administration of a medicament, and the instrument of a surgeon who is called in to effect a beneficial modification of a pathological phenomenon, are likewise commodities.

A second point that must be borne in mind is the following: *The effect of a commodity on a man is one thing; the commodity itself is another; and the ultimate causes of the commodity are yet another.* In fact, as regards the first point, every commodity produces *psychological effects*: the bread that is eaten produces ultimately a certain sensation; and so do

<sup>1</sup> Jennings, *ubi supra*, pp. 88, 89.

the clothes that are worn and the house that is occupied; the same applies to the physician's advice, the surgeon's operation, the singer's voice, the acts of the customers at a place of business, and the abstention of bidders from an auction. The effect of every commodity is always ultimately a modification of an individual's state of sensibility, under the influence of a longer or shorter series of operative causes. On the other hand, passing on to the second point, the commodity itself is always *the cause or instrument that produces the effect*; and this sometimes directly, sometimes consequently on its transformation into some other instrument which has that effect, and sometimes as a factor in the production of such an instrument. Finally, and this is the third point, a commodity exists as the result of determinate causes, which in so far as they are known, and therefore affect our senses, are instrumental commodities in relation to those that are derived from them, but which, in so far as they are unknown, or (which amounts to the same thing) do not affect our senses, *are not commodities at all*. Thus, for instance, we may ascend from the bread to one of its concomitant causes, flour,<sup>1</sup> from the flour to the wheat,

<sup>1</sup> Among the many causes that contribute to the production of a direct economic commodity, only some possess economic importance, and that in accordance with laws that are still somewhat imperfectly known to us, and which will be discussed in part ii. chap. iii. § 4, and in part iii. chap. i., in addition to what is contained on this subject in this part, chap. iv. § 5. At present it may suffice to indicate the nature of the problem, as expounded by Wieser, the economist to whom we are indebted for what we know with most certainty respecting it. If an economic commodity is due to the co-operation of several factors, *i.e.* if it is the effect of the simultaneous, or successive, operative concurrence of several causes, the question is not what part—still less which part—is *physically* due to each of the concomitant causes. As J. S. Mill observes, it is idle to attempt to decide which half of a pair of scissors has most to do in the act of cutting; or which of the factors five and six contributes most to the production of thirty.—J. S. Mill, *Principles of Political Economy*, book i. chap. i. § 3, p. 17. Just as a question may be raised (though *quaere* whether it can be solved) as to the proportion in which each of several physical causes contributes to produce an effect, so a like question may be raised as to the relation between an effect and its causes, under a moral or a legal aspect. As Wieser points out, a murderer is only one of the contributory causes of his victim's death, if the lethal result be viewed with reference to its physical causation; but he alone is the subject of legal imputability, nor can any part of it extend to the fact that the deceased was mortal, or that the knife was sharp. And in the same way that, in the problem of physical imputation, no account is taken of the principles that serve to determine moral or legal imputation, and *vice versa*, so, too, economic imputation constitutes an entirely distinct problem, and

from the wheat to the soil, and from this to its chemical constituents; and each of these factors of the ultimate product will be an instrumental commodity in relation to the preceding one; but already in this series,—if we consider the forces of nature that are in operation—and all the more so were we to extend the series, we arrive at unknown causes with which, for that very reason, we are unable to deal. In the same way, from the medicament we may ascend to one of its contributory causes, the *recipe*, and from this to the action of the physician who wrote it down; but the intellectual process which dictated it eludes our senses, nor do we know what, if any, chemico-physical action within his brain determined that process. To sum up what has been said, we have the following propositions of Professor Ferrara, consisting partly of definitions and partly of theorems: (*a*) those things are material which either directly or indirectly (*i.e.* by inference) affect our senses; (*b*) for man only material things have any existence; (*c*) any thing may be a commodity, provided it supplies a want; (*d*) the effect of a commodity is always psychologic; (*e*) the commodity and its effect are totally distinct phenomena; (*f*) the causes of commodities are themselves commodities, in so far as they are material and, therefore, known to us; whereas if they are immaterial, they are also unknown to us.

This being premised, there is no reason why, for the sake of convenience, we should not divide all things that are commodities into two classes, viz. into objects pertaining to the external world, or things strictly so called, and services, or positive human actions, and abstentions from actions which would inconvenience any one, or, as Genovesi terms them, non-actions. Tropes and inaccurate distinctions may be extremely useful, provided they do not mislead us; just as a defective tool may be serviceable if its defects are known.

(*d*) The third requisite is the *availability of a thing in a determinate quantity*. What, however, is meant here by the “*availability (disponibilità)* of a thing,” is a complex of conditions which require to be exactly enumerated:—

requires that abstraction be made of those factors of the phenomenon which are its causes under a physical, moral, or legal aspect, and that attention should be directed exclusively to those factors which are its causes on hedonimetric principles.—Wieser, *Der natürliche Werth*, pp. 70-76 and 85-88.

(1) In the first place, it is obvious that a thing is not, strictly speaking, a commodity except at the moment it affects our senses, either directly by procuring for us a pleasurable sensation, or indirectly, by saving our senses from being noxiously affected by any cause whatever. Briefly, we may say that a thing is a commodity only at the moment when it is consumed, and because it is consumed.<sup>1</sup> Food, clothes, means of enjoyment of every kind are not commodities for him who only sees them in the shop windows, but has no money to purchase them. Availability accordingly signifies, in the first place, the *presence of a thing in the shape and in the quantity* that are requisite for the *actual enjoyment thereof by him who esteems it a commodity, and who is a determinate individual.*

(2) If however, instead of regarding the matter from the point of view of a determinate individual, we regard it from the point of view of a group of individuals, we come to consider as commodities also those things which affect in a pleasurable manner the senses of any one of the individuals who compose the group, even though such things may be altogether indifferent to the other members, and we estimate the things as the group might, if considered as a person. Availability means then the presence of the thing in such a manner that *at least a section of a group of persons actually enjoys it*; whilst the quantity in which it is reputed to be present is indeterminate, and the forms in which it appears are various.

(3) But amplifying still further the meaning of the term availability, we proceed to observe that those things are commodities which, by reason of the present condition of the technical arts, are accessible to any one who can and will take the series of steps that are necessary to acquire them, and that the property of being commodities is denied only to things that are inaccessible to *mankind in general.*

Accordingly, those things are not available, or are inaccessible, which cannot in any way pleurably affect our senses, owing to their being beyond the range of the latter. For instance, fertile lands in regions we cannot penetrate, or mines hidden away in the bowels of the earth, are not commodities because they are inaccessible. Briefly, we may say that, in this

<sup>1</sup> Confer part ii. chap. i. § 1.

sense, the *inaccessibility of a thing is equivalent to its non-existence, or to its availability in a quantity equal to zero*, and conversely, that its availability is equivalent to its presence in an indeterminate quantity for the benefit of an indeterminate number of consumers.

Having set forth these different meanings of the term availability, which is used, now in one sense and now in another, with reference to commodities,<sup>1</sup> although only the first of such meanings is not vague and hazy, we must be on our guard against the supposition that the term availability implies any of the essentials pertaining to it in its legal acceptance.<sup>2</sup> The availability required by the economist will at times be a legal right to dispose of a thing, but as often it will not be so. In order to elucidate the difference between the meaning of this term in economics and in law, we shall proceed to show how availability may exist for the economist in cases where it does not exist for the jurist, and even in cases where it is not easy to perceive the existence of any physical availability.

In civilised communities certain forms of the power of disposing, or availing oneself, of things are recognised and protected by the law, such as ownership, possession, easements, etc., and as a rule economic and legal availability will coexist; but a thing may be an economic commodity even where this is not the case. Thus a *res furtiva* is a commodity in the hands of the thief, whilst the right of ownership is not a commodity for the person despoiled of his property.<sup>3</sup> Economic availability is any *condition of fact* that enables an individual to enjoy a thing, either conformably, or at variance, with the dictates of law and morality.

What circumstances of fact however constitute the kind of availability that entitles a thing to rank as a commodity, it is not always easy to determine. Thus, in the above-mentioned instance of the goodwill of a shop, what is available is the combination of circumstances that induces consumers of a certain product to purchase it of one person rather than of

<sup>1</sup> See chap. v. of this part, § 2 and following.

<sup>2</sup> The distinction here adverted to between the economic and the legal significance of the Italian "*disponibilità*," does not apply to "availability," by which, for want of a more exact equivalent, I have rendered that term.—Tr.

<sup>3</sup> Fabio Besta, *Corso di ragioneria*, part i. book i. chap. i. art. ii. pp. 87-91.



another. Future objects may be commodities, nor are they unavailable. Take *e.g.* a future crop, or a bill at three months' date. The future crop may fail and the bill be dishonoured; but until this is known to be actually the case, the crop and the bill are uncertain future commodities. Neither the crop nor the amount due on the bill is available; but already now is available,—in the form of an expectation based on knowledge of physical laws, in the case of the crop, and in the form of a contract, in the case of the bill—an object which satisfies our present desire to know, with a determinate degree of probability, that certain future wants of ours will be supplied. To apprehended pains there correspond expected commodities, and as those pains are present, so they are assuaged with objects which are likewise present, albeit their effects may only be realised at a future date.

Returning now to the various meanings that the term availability assumes in economics, according to circumstances, it remains for us to explain how and why it implies the presence of a thing in a *determinate quantity*.

We have seen that mere accessibility is only the negation of inaccessibility, which in its turn is the presence of the thing in a quantity equal to zero. Now what is required in order that a thing may be a commodity, is its accessibility or availability in one of the three significations aforementioned, *in a determinate quantity above zero*. We shall proceed to consider why this is the case, and how the quantity is determined in which it must be present.

According to the quantity in which a thing is present, it may come to be, not a commodity, but either a positive evil (discommodity), or an indifferent object. The determination of the quantity that renders a thing a commodity or a discommodity, depends on the magnitude of the want to which it relates. Thus, *e.g.*, two tumblers of water may be a commodity to a thirsty man; a third or fourth tumbler may already be fraught with inconvenience; whilst a fifth or sixth tumbler would be altogether intolerable. The want designated "thirst" had a determinate magnitude which was reduced by the first and second tumblers; the third and fourth effaced all trace of it; so that the fifth and sixth were no longer commodities, owing to the absence of the prime requisite: the existence of

a want.<sup>1</sup> A determinate quantity of rain may be beneficial; but supposing it to increase, a limit is reached beyond which it not only ceases to correspond with the need of agricultural irrigation, but becomes positively noxious, and has to be provided against. There is no object of which, making abstraction of any quantitative determination, it can be predicated that it is a commodity; for only *in so far as this determination is not lacking*, can it be said whether it does, or does not, correspond to a want which is itself endowed with dimensions. To speak of things as commodities, without referring to *concrete and definite quantities of the same*, with respect to wants of certain and limited magnitude, is precisely like speaking of the equality of a triangle, abstraction being made of its dimensions, with a parallelogram of definite magnitude.<sup>2</sup>

§ 3. *Of the Degree of Utility and of the Total Utility of Commodities; of the Initial Degree of Utility of one or more Commodities, and of the Final Degree of Utility.*

Commodities, for the very reason that they are commodities, are termed *useful*. Utility is therefore the abstract term denoting the pleasurable or hedonic effect produced by the complex of conditions which constitutes a thing a commodity. For the reasons above set forth, it cannot therefore be said that anything is useful without implicitly postulating: (1) the existence of a determinate want; (2) the existence of deter-

<sup>1</sup> See *ante*, chap. iii. § 2.

<sup>2</sup> With reference to this somewhat long and elaborate inquiry into the characteristics of the conception "commodity," it may perhaps be advisable to warn the reader against a mistake commonly made in seeking for definitions, and which is generally due to a habit contracted in literary pursuits. In each particular science, we are NEVER concerned to know what are the meanings attached to a term, *either in vulgar parlance, or in any other science than the one under consideration*, but only to *expound and determine its contents in the latter exclusively*, irrespectively of any other signification attached to the same term in any other connection. In literary studies, on the contrary, inquiry is often and properly directed towards the ascertainment of the *various acceptations* of a term, wherever it is met with. Let us therefore discard the baleful habit of perplexing economic discussions, and particularly those relating to definitions, with linguistic questions, and let us rather endeavour to ATTRIBUTE to every term the acceptance which renders it most fertile and useful, regardless of the associations it may possess, either for the vulgar, or for the votaries of other sciences.

minate properties in the thing, or the existence of the belief that it possesses determinate properties; (3) the availability of the thing in a determinate quantity. The same may be said, *mutatis mutandis*, of the predicate of disutility. Whence it follows that, supposing a want to have a certain magnitude at a given moment, and the estimate as to the properties of a commodity to remain the same, the utility of each minimum increment of such thing will depend on the quantity that was previously available, since this will have modified the original

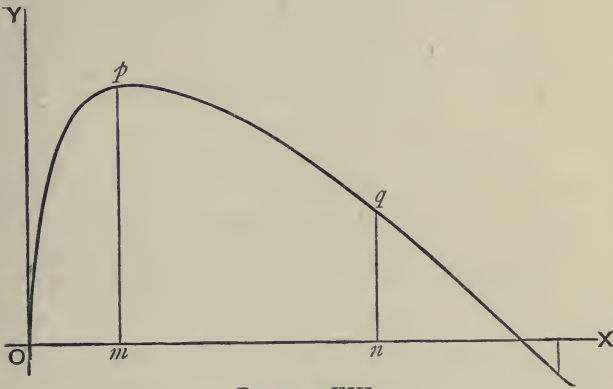


DIAGRAM XIV.

magnitude of the want. We shall call the utility of any increment of a commodity the *degree of utility* of that increment, and we shall express it graphically by means of an ordinate drawn to the segment of the abscissa that denotes the magnitude of the increment in question, and proportioned in length to the degree of utility we are concerned with, just as we expressed the several degrees of intensity of satisfaction due to successive increments of a means of satisfaction. See, *e.g.*,  $qn$ , corresponding with the quantity  $On$ , in diagram XIV. In fact, what we have before called *intensity of satisfaction*, is nothing but what we now call *degree of utility*.<sup>1</sup>

<sup>1</sup> Pareto proposes that the term *ophelimity* (from  $\omega\phi\epsilon\lambda\iota\mu\omicron\varsigma$ ) should be used instead of *utility*, and I agree with him. Many ambiguities would thus be avoided. In ordinary language, a thing is *useful*, if it is profitable to an individual, conducive to his wellbeing. Thus, medicine is useful in the case of a sick child; but it is not *ophelimitous*, *i.e.* it is not necessarily useful in the economic sense: so much so that the child will probably reject it. Alcohol is *ophelimitous* for the drunkard, though by no means useful to him in the ordinary

With respect to the degree of utility of the first portion of any commodity, some doubt may arise as to what its magnitude is, since there is no prior quantity available by which it may be determined; but it is obvious that it is equal to the degree of pleasure occasioned to us by the partial extinction of the want, in the measure in which such extinction is due to the quantity of commodity constituting the first portion. This first ordinate will be called the *initial degree of utility*.

If we suppose a first and infinitely small portion, the satisfaction we shall derive from it will be imperceptible, and will be expressed accordingly by a very short ordinate. We may therefore at once assume that every curve representing the degrees of utility of any commodity commences with zero, and rises rapidly to the culminating point, after which it declines more or less slowly, according to the nature of the commodity concerned. In diagram XIV. we have reproduced the exact form of the curve expressing the degrees of utility of any commodity, and have indicated increasing initial ordinates  $Op$ , intended to denote growing degrees of satisfaction until the quantity of commodity in question becomes an appreciable increment,  $Om$ . In future however, as we have indeed done in the preceding pages, we shall limit ourselves to considering and representing the part  $pX$  of the hedonic curve, and  $pm$  will therefore always be the ordinate denoting the initial degree of satisfaction.

In order to characterise with precision and brevity the nature of this curve, as of every other, a system of notation used by Professor Marshall will be found to be extremely convenient. Given a system of co-ordinates  $OX$  and  $OY$  (diagram XV.), we shall describe the direction of a curve as positive, if the describing point moves away from  $OX$  at the same time that it moves away from  $OY$ , *i.e.* if it moves as if subject to two forces, one drawing it in the direction  $Am$  and the other in the direction  $An$ , the forces being either equal or unequal. We shall, on the other hand, describe the direction of a curve as negative, if the describing point approaches  $OY$ , as it moves away from

sense, etc. See Pareto's *Cours d'économie politique*, § 4. Useful is "conformable to tribal hedonism"; *ophelimous* is "conformable to individual hedonism"; and this is what is nearly always intended in economics. If I were rewriting this *Manual*, I should adopt the term.

OX, *i.e.* if it moves as if subject to two forces, one drawing it in the direction  $Am$ , and the other in the direction  $Ao$ . We shall also describe as negative the curve whose describing point, whilst receding from OY, approaches OX, *i.e.* the motion of whose describing point is subject to two forces disposed as  $Am$  and  $Ap$ . Finally, we shall describe as positive the curve

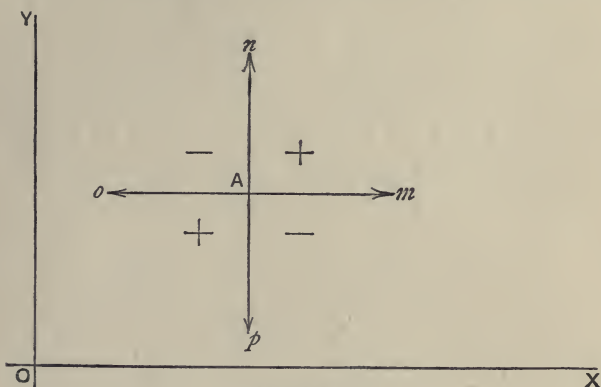


DIAGRAM XV.

which approaches simultaneously OY and OX, *i.e.* which is due to two forces acting in the directions  $Ao$  and  $Ap$ .

These terms being settled, it is clear that the characteristic of the curve of final degrees of utility is that it must be, at least ultimately, and as a rule entirely, negative and subject to forces following the directions  $Am$  and  $Ap$ ; that, however, the *initial motion* of the same for a brief space of time, or for very small quantities of commodity, *may be positive, i.e.* the effect of forces acting in the directions  $Am$  and  $An$ , the latter preponderating over the former.

We shall say further that the *total positive utility* of a commodity is equal to the sum of pleasure due to relief from the corresponding want, and we shall refer to such a quantity of a thing as will suffice to extinguish that want, or to such lesser quantity as is in question. Graphically, the total utility will be expressed, in the first case, by an area limited by an abscissa denoting the quantity of commodity in question; by the ordinate denoting the initial degree of utility, and by the curve constituted by the extremities of successive ordinates until they coincide with the abscissa; such an area, for

instance, as  $OpqX$  in diagram XIV. In the second case the area will be limited by a final ordinate drawn to the point of the abscissa corresponding with the last increment of the thing in question, as *e.g.* the area  $Opqn$ . The total utility may, as Messedaglia proposes, be very appropriately termed, *integral utility*.<sup>1</sup>

*Negative utility*, or *disutility*, will be expressed by the area exceeding the last, formed by negative ordinates; and it will express the hedonic effect of ulterior quantities, *i.e.* their neutral or noxious properties, as regards the *homo œconomicus*. If we suppose two or more commodities to be available in a quantity sufficient to extinguish the respective wants to which they refer, and if we consider proportional increments of each commodity, *e.g.* one-tenth of each of two commodities, the degrees of initial utility will be to each other as the importance we attach to the satisfaction in that measure of each of those two wants. We have already seen in chap. ii. § 6, diagrams VI.-X. pp. 34-37, with reference to Gossen's second hedonic theorem, a graphic expression of ordinates of various degrees of initial utility. Let us treat here as quantity of available commodity what is there treated as quantity of available time.

Lastly, we have to note the *final degree of utility*. Whatever may be the available mass of commodity, the last and smallest increment thereof has a hedonic effect which will be positive or negative, that is either a pleasure or a pain. If the available quantity of a commodity is exactly sufficient completely to extinguish a want, it will be almost a matter of indifference whether we obtain the last and smallest portion, or not. Graphically therefore the ordinate that expresses the degree of satisfaction it occasions us will indeed still be positive, but almost zero, as *e.g.* that drawn to  $X$  in the diagrams I.-IV. (pp. 29, 30, 31, 33). Any further increment, however small, will occasion a negative final degree of utility, and will be expressed by a negative ordinate, as *e.g.* here  $mm_1$ ; and if the available quantity of the commodity in question falls far short of satisfying the want it corresponds to, as *e.g.* in diagram XIV. p. 71, the quantity  $On$ , the final degree of utility

<sup>1</sup> A. Messedaglia, *La moneta ed il sistema monetario in generale*. From the *Archivio di statistica*, Loescher, Rome, 1882, chap. ii. p. 28.

will be the positive ordinate that denotes the intensity of the satisfaction occasioned by the last portion still available; *i.e.* it is equivalent to the pain we should experience if we were deprived of it, and it will be expressed graphically by  $nq$ .

It may be well to observe that the final degree of utility of the last available increment of any commodity may be attributed to any one portion of the mass, considering it as the last. In other words: the order in which the successive increments of a commodity are disposed is perfectly arbitrary. Assuming, for instance, that a commodity is divided into three portions, designated respectively as  $\alpha, \beta, \gamma$ , these can be interchanged in six different ways. Graphically this must be

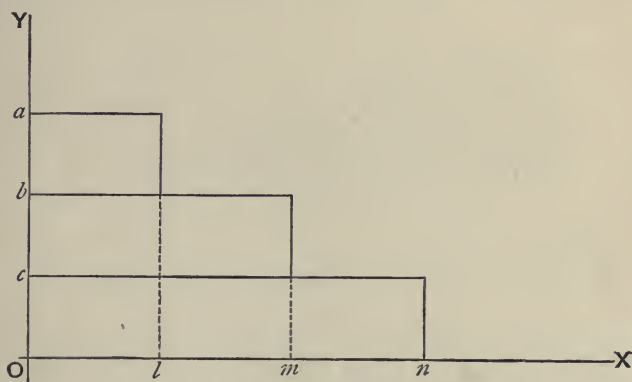


DIAGRAM XVI.

expressed as follows. Let  $Ol, lm, mn$ , in diagram XVI. be three perfectly equal increments of the same commodity; let the degree of utility of a first increment (*i.e.* the initial utility) be measured by the ordinate  $Oa$ , that of any second increment by  $Ob$ , and that of a third increment (*i.e.* in this case the final degree of utility) by  $Oc$ . Now the final degree of utility  $Oc$  may be attributed to any one of the three increments,  $Ol, lm, mn$ , supposing it to have been consumed last; which gives rise to the parallelogram formed by  $On \times Oc$  if we want to express the total utility of the three increments, and suppose each increment to be the last. We may next imagine that any one of two increments out of three is consumed in penultimate order, *i.e.* either  $Ol$  and  $lm$  when  $mn$  is third, or  $Ol$  and  $mn$  when  $lm$  is third, or  $lm$  and  $mn$  when  $Ol$  is third.

Let us suppose that  $mn$  is last; then the portions  $Ol$  and  $lm$  will both have a degree of utility  $Ob$ , and we shall have the figure  $Om \times Ob$  superposed on the former one, expressing the total utility of these two increments both supposed to be second. But either of the two portions,  $Ol$  and  $lm$ , may be consumed first, and thus be characterised by the initial degree of utility  $Oa$ . Let  $Ol$  be the one selected: its degree of utility will then be designated by the area  $Ol \times Oa$ .

If we imagine as infinitely small the increments into which a homogeneous mass of commodities  $On$  is divided, we

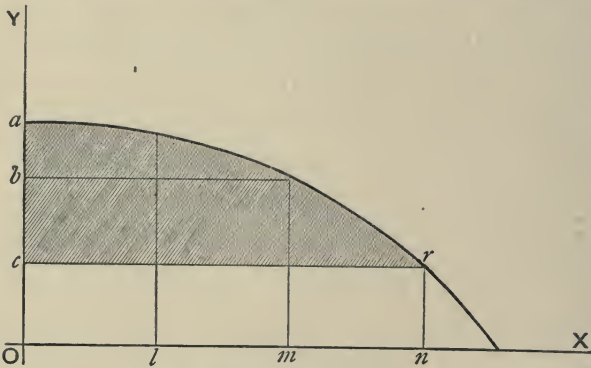


DIAGRAM XVII.

shall have diagram XVII. We may thus formulate the principle, that of a homogeneous mass of commodities,  $On$ , each part may be the last increment, and may have the final degree of utility  $rn$ ; and we shall find it convenient to designate by a special term, *e.g. residual utility*,<sup>1</sup> the utility we obtain by deducting from the total utility,  $Oa rn$ , that formed by attributing to each element of the mass a utility equal to the final degree  $rn$ , *i.e.* by deducting from  $Oa rn$  the area  $Oc rn$ , which leaves us the residual area  $car$ .

There is only one commodity which presents no residual utility, because its total utility is equal to its mass multiplied by its final degree of utility, which is constant. This commodity is money, which thus forms an apparent exception to Gossen's or Jevons's law of the decrease of final degrees of

<sup>1</sup> Consumer's rent in Professor A. Marshall, *The Pure Theory of Domestic Values*, chap. ii. p. 28. *Vide* part ii. chap. ii. § 1, and note.



utility. According to this law the degrees of utility of successive increments of any commodity decrease, and the total utility of increasing quantities of any commodity varies, according to a lower rate of progression than the increase in quantity. Now, in the case of money, we find that the degrees of utility of all the increments are equal, and that the total utility increases in the same ratio as the quantity.<sup>1</sup> Graphically, the curve of the degrees of utility becomes a straight line  $cr$ , parallel to the abscissa  $Ox$ , and the total

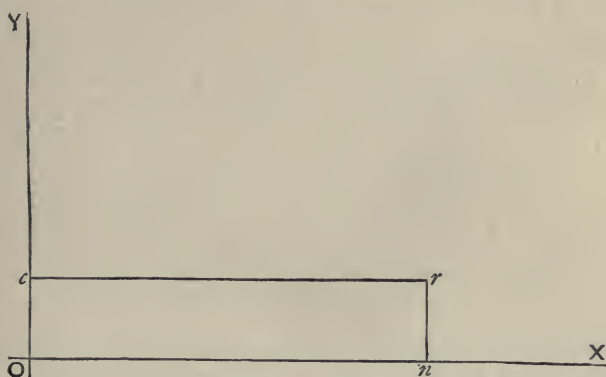


DIAGRAM XVIII.

utility  $Oc rn$  is always denoted by rectangles (see diagram XVIII.). That this constitutes an apparent exception to Gossen's law is easily perceived if we reflect, that if a thing is exclusively destined to be used as *money*, or is considered exclusively as *discharging this function*, there is no painful or pleasurable sensation with reference to which it can be a means of gratification, and in respect of which there can be *degrees of satiety* determining degrees of utility. Strictly speaking, money is not a commodity, in the acceptance in which we have hitherto used the term, and is not therefore

<sup>1</sup> A. Loria, *La teoria del valore negli economisti italiana*, 1882; *Archivio giuridico*, p. 35, § 2; H. Sidgwick, *The Principles of Political Economy*, London, 1883, Macmillan, bk. i. chap. iii. pp. 77, 85; bk. ii. chap. v. p. 267; Launhardt, *Abschn. I. § 13*, p. 54. Money has, for its owner, a marginal utility. It is an instrumental commodity, susceptible of being transformed into direct commodities by way of exchange. Hence it possesses the marginal utility which belongs to the last increments of direct commodities obtainable by its means. This marginal utility is reflex, like that of all instrumental commodities.

subject to the law that applies to all commodities. Whether there be more or less of it, is altogether immaterial as regards the satisfaction of every possible human want; and the monetary function of money is discharged equally well whether its mass be doubled or reduced to one-half. As we shall see farther on (part iii. chap. ii.), money possesses, strictly speaking, no utility, but only value, and for this reason its utility can only be expressed by the product of its mass multiplied by its final degree of utility, as seen in diagram XVIII.<sup>1</sup>

<sup>1</sup> The theory of the final degree of utility, which is now recognised as the pivot of every economic and financial doctrine, only excited the general attention of economists after the publication of Professor Jevons's work, *The Theory of Political Economy*, in 1871, and the publication of a paper read by L. Walras at the Academy of Moral and Political Sciences in Paris, in 1873. This is strange, as the theory was at that time by no means new. Jevons had already expounded it in 1862, at the Congress of the British Association, and again in 1866. Professor Marshall taught the theory of final degrees of utility and that of *residual* utility, in the University of Cambridge, as far back as 1869. The father of L. Walras, in 1831 and in 1849, in two different writings (*De la nature de la richesse et de l'origine de la valeur* and *Théorie de la richesse sociale*, etc.) had explained the essential features of the question, and in 1854 Gossen had published his *Laws of Human Commerce*, in which the doctrine of the final degree of utility is set forth so perfectly that until now very little has been added to, or modified in, his exposition. Moreover in 1844 and in 1849 Dupuit had contributed to the *Annales des ponts et chaussées* two papers entitled: *De la mesure de l'utilité des travaux publics*, and *De l'influence des péages sur l'utilité des voies de communication*, which had attracted considerable attention among engineers, and which set forth with great clearness the theory of final degrees of utility, as also the conception of *residual utility*. In 1847, in the same review, M. Bordas, and in 1850 M. Minard, discussed the subject, which interested even the French Senate. M. Bordas indeed elicited the second work of M. Dupuit by attacking the first. In England, a year after Gossen, Jennings expounded the law of the decrease of protracted enjoyments, pointing out its economic value. Finally, we must observe that amongst mathematicians the theory of the final degree of utility was well known in connection with the problems dealing with probabilities. It is found in D. Bernoulli, *Specimen theoriæ novæ de mensura sortis*, 1738; in Buffon, *Essai d'arithmétique morale*, in the thirteenth volume of his complete works translated by Boschi, Naples, 1877, p. 347; in Laplace, *Théorie analytique des probabilités*, 1812, and *Essai philosophique sur la théorie des probabilités*, 1840, and in Quetelet, *Lettres sur la théorie des probabilités*, 1846. In the economists of last century, such as Galiani, Genovesi, Condillac, Verri, and probably in several others as well (vide A. Loria, *La teoria del valore negli economisti italiani*, Bologna, Fava, 1882), the idea of decreasing degrees of utility is already clearly conceived; but it is not developed by them as it has been by more recent writers. Professor Walras has reminded us that this theory is to be found even in Bourlamaqui, 1694-1748. Ricardo, and Anderson before him, discovered and utilised a

§ 4. *Of Positive and Negative Utility, and the Division of Things into Positive and Negative Commodities*

When a thing satisfies a want, it is termed a commodity, and is said to possess utility. This utility is *positive*, that is, it consists of a quantity of pleasure, or of absence of pain due to possession of the thing.

When a thing does not satisfy a want, or creates in us the desire to rid ourselves of it, it is said to be useless, and this quality is considered as a *negative utility*, inasmuch as it consists of a quantity of pleasure which is suppressed, or of pain which is occasioned, through the instrumentality of the thing, or of the conditions in which the thing is placed with respect to us.

Now, we have already seen that if we suppose a want—which must necessarily be of some given magnitude;—and if we suppose the physico-chemical properties of a thing and our knowledge or opinion of such properties to be constant,

special instance of the general law of the decrease of final degrees of utility. For fuller details the reader may consult the *Storia critica della teoria del valore in Italia*, by Graziani, 1889, Hoepli, Milan, and R. Zuckerkandl's *Zur Theorie des Preises*, Leipzig, Humblot, 1889, both of which works are not free from partiality in the discussion of recent economists, but possess at the same time (particularly the first-named) considerable merit.

Among the best recent books on this subject we may name Wieser's two works: *Ueber den Ursprung und die Hauptgesetze des wirthschaftlichen Werthes*, 1884, and *Der natürliche Werth*, 1889, Hölder, Vienna; also Auspitz and Lieben's *Untersuchungen über die Theorie des Preises*, 1889, Dunker, Leipzig. Worthy of mention is also C. B. Antonelli's *Sulla teoria matematica della ec. pol.*, 1886, Folchetto, Pisa. But Gossen's and Jevons's works remain the standard authorities on the subject, and deserve the closest study. Besides the paper above referred to, Professor Walras has published a treatise on pure economics worthy to rank beside that of Professor Jevons, and superior to it in some respects. I regret my inability to quote this treatise as often as it would be appropriate to do so, owing to the fact that it often presupposes on the reader's part a greater proficiency in mathematics than I can claim. At present this writer is bringing out a new and considerably enlarged edition of his *Éléments d'économie pure*. He has also written *Théorie de la monnaie*, Lausanne, 1886, Corbaz, based on the same principle. I have expressed elsewhere my opinion on Menger's and Böhm-Bawerk's works, and have confirmed it in another note.

Now we possess two works of capital importance, the study of which is indispensable to whoever would perfect himself in economics, viz. Prof. A. Marshall's *Principles of Economics*, and Signor V. Pareto's *Cours d'économie politique*, 2 vols. 1896, Lausanne, F. Rouge.

then the utility of this thing is a function of its quantity, and, at first positive, ends by becoming negative. Every commodity may thus cease to be a commodity, and may become a thing of negative utility, or to put it more briefly than accurately, a negative commodity. But if, instead of the above-mentioned hypotheses, we suppose the available quantity of a thing to be a fixed quantity, whilst the magnitude or nature of our want is instead variable; or, supposing this also to be given, that the physico-chemical properties of the thing are variable, then we see at once that we can consider positive and negative utility as a function of one or other of these terms. In fact, as regards the variations in the magnitude of the want, it is self-evident that they are equivalent in their effects to the variations in the quantity of the thing, since the latter variations only give rise to various degrees of utility, inasmuch as the original dimension of the want is modified by each successive increment of commodity rendered available or appropriated. Moreover, changes in the nature of a want determine an instant transition from utility to disutility (and *vice versâ*) in the quality of things: they are equivalent to variations in the employment of things, and transform positive into negative utility, and *vice versâ*, as the case may be. There remain to be considered the variations of the physico-chemical properties and of our opinions of them. Now, it is clear that, speaking generally, in all things, together with the properties that qualify them to satisfy a want, there are an infinity of other properties that diminish this positive useful effect, or annul it altogether, unless they are removed. These latter properties are thus characterised by negative utility, and among them we may often reckon, *e.g.*, the perishableness of commodities, their indivisibility, weight, volume, inseparableness from other substances, etc. It is also clear that, given the invariability of a determinate want and the invariability of a determinate quantity of a thing, the latter may pass from the condition of utility to that of disutility, or *vice versâ*, solely in consequence of variations in its temperature, composition, velocity, or of any other physico-chemical property.

The reason therefore for dwelling on the utility of things, only as a function of their quantity, and not also as a function

of our wants, or of their physico-chemical properties, consists exclusively in the greater fecundity of this conception.

The negative commodity *par excellence* is cost; but this will be discussed in a separate section, in view of its paramount importance.

§ 5. *Of Direct, Complementary, and Instrumental Utility according to Gossen, and of a corresponding Division of Commodities into Direct, Complementary, and Instrumental.*

*The Law of Definite Proportions*

Certain commodities (whether supplied by nature, or procured by means of labour is immaterial) are fitted to supply a want directly they are placed in contact with our senses; and of these we say that they possess direct or immediate utility. Such commodities are, *e.g.*, food prepared for consumption, a suit of clothes, a chair, a furnished house, a ripe fruit, drinking water, etc. The only commodities man ultimately wants or needs are such as are possessed of *direct or immediate utility*; for what he really desires is the satisfaction of his wants, not the possession of things for their own sakes. Commodities belonging to this class have various names; sometimes they are called *direct* or *immediate commodities*, sometimes *commodities of the first degree*, sometimes *consumable commodities* or *consumer's wealth*.<sup>1</sup> The total utility of any such commodity is precisely equal to the sum of the pleasure it affords us.

There are moreover things (also supplied partly by nature, partly by human labour) which do not by themselves alone satisfy any want, but do so when combined with other things. A stove, for instance, requires fuel and fire, in order to give out heat; a coach, in order to serve as a means of conveyance, requires a motor force and a driver; and a certain portion of hydrogen must be combined with a certain portion of oxygen, that we may have water. These things considered singly, and apart from any direct or immediate utility they may possess, are negative utilities; but if combined with others, so as to produce, jointly with them, the satisfaction of some

<sup>1</sup> On commodities fitted for direct use, see J. S. Mill's *Principles of Political Economy*, 1880, p. 19.

want, they are termed *complementary commodities*, and possess a kind of utility which, in contradistinction from the former, is called *complementary utility*. Sometimes they are also called *correlative commodities*, and we speak of *correlative utilities*, or *correlation of utilities*, or auxiliary wealth.<sup>1</sup>

The total utility that complementary commodities are capable of producing, when *combined with others in definite proportions*, so as to satisfy an immediate want, is equal to the total utility of a direct commodity that would satisfy this same want. It is not easy to determine the proportions in which this total utility is distributed among the several complementary commodities that contribute to the satisfaction of a want, because it is only *in so far as they are combined in definite proportions* that they possess any utility. If however a person possesses all the complementary commodities, save one, required for the satisfaction of a want, and in the proportions required by the conditions of the technical art applicable to the case; or if he possesses also the final complementary commodity he requires, but in a proportion inadequate to his purpose, then the total utility of this last complementary commodity, or of the quantity thereof that

<sup>1</sup> Sidgwick, *The Principles of Political Economy*, book ii. chap. i. p. 164. Strictly speaking, every direct commodity may be considered as a combination of complementary commodities, and this under a twofold aspect. First, from a physico-chemical point of view it is a combination of many elements, which may be regarded as the joint factors of its production. Secondly, the usefulness of a direct commodity to the consumer is a function, not only of its own quantity, but also of that of all the other commodities he consumes together with it, of those he has consumed previously, and even of a portion, at least, of those he expects to consume later. Indeed the utility of a commodity depends further on the order in which other commodities have been consumed previously. Thus, for instance, the gratification a loaf of bread may afford depends not only on its size and on the appetite of the eater, but also on the other viands, if any, he partakes of with it, on the fact of his having quenched his thirst or possessing the means of doing so, of his feeling cold or warm, tired or fresh, sad or gay. The order in which dishes are served heightens, or detracts from, the hedonic effect of a dinner. Each of these conditions then may be regarded as a factor of production, and all of them together as forming a combination of factors of production, or of complementary elements. Considered from this point of view, the theory of complementary commodities assumes a very general aspect. Every problem of production or consumption will be transformed into a problem of complementary commodities or factors of production, and the most general theorem concerning complementary commodities will be the most general theorem concerning production and consumption.

is lacking, may attain to the limit of *the total utility of the direct commodity that would satisfy the want to which the complex of complementary commodities in question relates.*<sup>1</sup>

The law of definite proportions is one of the most generally applicable of natural laws, and economic science only recognises a particular aspect of it. It is well known that bodies combine chemically only in definite proportions, and that any quantity of an element, in excess of that required for combination with other elements present in definite quantities, remains *free*. If the quantity of one element is deficient with respect to that of other elements present, the combination only takes place to the extent the former element admits of. Just in the same way, any quantity of a commodity, in excess of the proportion in which nature, or any technical art, can combine it with a determinate quantity of other complementary commodities present, is *useless* or *noxious* as regards the economic result; and if all the complementary commodities requisite for the production of a direct commodity are present in various quantities, then the quantity of the complementary commodity that is present *in a lesser quantity than any other*, is that which determines the quantity that can be produced of the direct commodity in question; the superfluous quantities of the other complementary commodities being, for this purpose, destitute of utility. This law of definite proportions is of capital importance in explaining a very frequent form of economic crisis, consisting in the disproportionate production of complementary commodities. It must, however, not be understood as if there were only *one* definite proportion in which complementary commodities can be combined. There are generally a *great many*, but only one gives a maximum hedonic result. This *maximum* combination is the one towards which every economic effort *tends*.

<sup>1</sup> The problem of the distribution of the utility produced by a combination of complementary commodities among the latter as the causes of such utility, or in other words, the problem of the distribution of the utility produced by the concurrence of complementary commodities among the possessors (supposed to be distinct) of each such commodity, will be discussed in detail in chap. i. of part iii. instead of here, where it might be appropriately considered. This is owing to purely didactic reasons, so that any one already proficient in economic questions may complete this theme now, by passing on to part iii. chap. i.

The nature of the problem has been referred to in part i. chap. iv. § 2, note, and will be touched on again in part ii. chap. iii. § 3.

Finally, there is a third class of things and utilities, which in so far as they pertain to this class, never afford any direct satisfaction, whether considered singly or in conjunction with others, but which serve as *instruments* for the obtainment of immediate and of complementary commodities. Thus *e.g.* whilst bread is an immediate commodity, the flour, the wheat, the soil, are instrumental commodities, each more remote in degree with respect to the bread. To this category belong all raw materials which must undergo some transforming process in order to become consumable commodities, all machines or instruments required for the production of immediate commodities, and hence also most services, and especially the workman's labour. These *instrumental* commodities rank in degree according to their remoteness from the immediate commodities to whose production they are subservient, *i.e.* according as they are instruments for the production of an immediate commodity, or instruments for the production of an instrument required for the production of an immediate commodity, and so on. *Instrumental commodities* are also known by various names; sometimes they are called *commodities of a superior degree*, sometimes *capital*, sometimes *productive commodities*, or *producer's wealth*. It must above all be observed, that *every direct commodity may become an instrumental commodity, from the mere fact that its possessor decides to use it as an article of exchange*. In that case, its utility is measured by the utility of the thing procured through its instrumentality, by way of exchange.

It is clear that a commodity may be *simultaneously, but with respect to diverse wants or uses*, an immediate, a complementary, and an instrumental commodity. A piece of land, *e.g.*, may be an immediate commodity if suitable as a place of recreation, an instrumental commodity, if cultivated, and a complementary commodity for a tenant possessed of farming stock, live stock, and every other complementary commodity necessary to the carrying on of agriculture. Nearly all instrumental commodities are at the same time supplementary to other instrumental commodities.<sup>1</sup>

The total utility of instrumental commodities is determined,

<sup>1</sup> A special way in which instrumental commodities may become direct commodities is noticed by Mr. H. Spencer, *Data of Ethics*, p. 158.



like that of complementary commodities, by the satisfaction afforded by the extinction of the want to which they correspond, *i.e.* its maximum limit is the total utility of the direct commodity to the production of which they contribute. If an instrumental commodity cannot be transformed forthwith into a direct commodity, but requires the concurrence of other instrumental commodities, as is generally the case, we cannot discuss its utility, as such, *singly*, because it is subject to the law of complementary commodities. Here, too, recurs the phenomenon, that the single element that is lacking may come to possess the total utility due to the complex of instrumental commodities required for the production of a direct commodity. Instrumental commodities are also subject to the law of *definite proportions*.<sup>1</sup>

<sup>1</sup> The distinction between *immediate* or direct, and *instrumental* commodities, and the theorem derived from it concerning the total utility of the latter, owe their origin to Giammaria Ortes, in whose system they constitute a *cardinal point*. It has thus taken this theory nearly a hundred years to commend itself to the general acceptance of economists, viz. from 1774, the date of publication of the *Economia nazionale*, until 1871, when Menger rendered it current. Ortes explains: "that though lands are the groundwork of commodities, they cannot for that reason themselves rank as commodities; so that whatever extent of land be given, the sustenance accruing therefrom to the nation is attributable, not to the land, but to the commodities derived therefrom, unless we were to live on mud like the frogs, or underground like the moles." Nor can land be considered as equivalent to commodities: "so that again whatever extent of land be given, and whatever amount of produce be derived from it, a nation does not on this account find itself provided with any commodities for its sustenance, unless it be immaterial whether we eat chestnuts or acorns, cabbage or chicory, or whether we clothe ourselves with vine leaves or briars." And hence "*the whole relation of land to commodities, and the necessity of the former with respect to the latter, is limited to the possibility of deriving certain commodities from the former exclusively.*" See Ortes, *Dell' economia nazionale*, book iv. c. 2, pp. 13-16: c. 3, pp. 18-20; c. 18, pp. 103 *et seq.* vol. xxii. Collezione Custodi. The theory of immediate, complementary, and instrumental commodities was explained in the most masterly fashion by Gossen, *op. cit.* pp. 24-27; and Menger, to whom the theory is often attributed, added nothing to it.

The law of *definite proportions* is much more general than Gossen suspected; but Menger also failed to perceive the fact. In the most general form it signifies that every quality of things exists only in a given measure, either known or unknown, and that consequently every relation among things, of whatever kind, being a relation of quality, may be expressed *mathematically*. The theory of utility and of instrumental commodities has on the other hand made a notable advance—notable not in respect of its magnitude, but in respect of the difficulty of making it,—through v. Wieser. See *ante*, chap. iv. § 2, note; part ii. chap. iii. § 4; and part iii. chap. i. .

§ 6. *Of Actual and Prospective Utility, and of an Analogous Classification of Things as Actual and Prospective Commodities.*

Our wants are partly actual and partly prospective, *i.e.* we experience at the same moment a twofold series of wants, some due to the presence of a real cause of pain, and others due to the apprehension of pains which we consider as probable or certain in the future. In the same way, we are presently gratified as we become possessed of commodities, and we are also gratified by the anticipation that certain commodities will, at a determinate point of time, become ours. The conception of a future commodity supposes that we anticipate, not only the future availability of a thing, but also the existence, at that point of time, of the corresponding want. Now, there are many wants of which we can foresee the *continued duration*, or the *constantly renewed recurrence*, at all periods of our life,—notwithstanding the law of the variableness of our wants (chap. ii. § 2 and chap. iii. § 4, *ante*),—and there are also many wants of which we can foresee the *future existence*, in consequence of the law of the variableness of our wants. The tribal egoist moreover foresees the wants of others, *i.e.* of those to whom his egoistic cares extend.

Calculations as to prospective wants and commodities are always surrounded with great difficulties; it is necessary to foresee *when* the prospective wants will come into being, lest the provision made for their satisfaction should be premature or tardy; and we must also foresee their *magnitude*, lest such provision should be excessive or deficient. Evidently the hedonist, *i.e.* the *homo economicus*, must tend to maximise his enjoyments *for the entire probable duration of his life*, and not merely for the present instant, or for that immediately subsequent to it. The calculation is therefore further complicated by the estimate he has to form of *his own probable sensibility* to pleasure and pain, from time to time, during the probable course of his life; and he must distribute the painful efforts requisite to the production of commodities, and the enjoyment he can derive from the latter, in such a way as to achieve, on the whole, the maximum of pleasures and the

minimum of pains. Every one must see how many errors of hedonimetric calculation must be made, even by the acutest minds, and how different accordingly the theoretic action of the *homo economicus* must prove to be from the real course of human conduct. But nature treats men just as if they were omniscient and perfect hedonists, eliminating in the struggle for existence those who blunder, or debilitating them, if they do not succumb at the first stroke, so that they remain more liable to be eliminated by the second or third blow entailed by subsequent mistakes.

The present valuation of prospective commodities calls for some explanation. Prospective commodities are of two kinds, and it will be advisable in the first instance to consider the simpler kind, viz. those which can only once be productive of a service, or in other words, that only once are useful, and satisfy a want.

Now, supposing two commodities of simple productiveness, the one actual, the other prospective, but *equal in every other respect*, the question arises whether *their total present utility will be esteemed as equal or unequal*. A glass of water, *e.g.*, is an actual commodity of simple productiveness for any one who is thirsty, a loaf of bread for any one who is hungry, a sum of money for any one who requires to spend it; whilst instances of a prospective commodity of simple productiveness are a growing crop, or a credit maturing at a certain date, such as a bill of exchange. The hypothesis of two commodities pertaining, the one to the category of actual, the other to the category of prospective commodities, and being equal in every respect, except as regards the time at which they are available, implies the concurrence of numerous and complex conditions, and more especially: that their utility should be *equal in duration and intensity*, *i.e.* that their metrical quantity should be the same; that they should correspond to the same kind of wants; that these wants should be of even degree in the scale of wants, and equally intense at the two different times when the commodities in question reach maturity, and that they should be equally certain; and the question whether the total utility of the two commodities, at the present moment, is the same or different, is equivalent to the question whether they correspond, *at present*, to equally intense wants, and occupy the same rank in the scale of wants.

Now, we have already remarked above (chap. ii. § 4), that if a hedonist were quite certain that he would still be alive when the prospective commodity (or discommodity) matured; if he considered the prospective event as undoubted; and if he were further convinced that he would then possess the same sensibility to pleasures and pains in all respects as he is now endowed with, then he must estimate such prospective commodity (or discommodity) precisely in the same manner, attributing to it exactly the same quantity of utility (or disutility) as if it were present. There is only one case in which his estimate may possibly differ from the above, consistently with the hedonic postulate, namely, if it be a condition precedent of enjoying the prospective commodity at all, or of enjoying it with the same intensity, that the present commodity should have been enjoyed first. Thus, for instance, it is a necessary condition of our enjoying food at a future time, that we should continue alive until then, and consequently that we should partake of food in the meantime; and many present acts of consumption may be at the same time an indispensable condition of our enjoying prospective pleasures with the same degree of sensibility as we at present possess. In this special case of the *correlation* of present and prospective enjoyments, whose respective total utilities are compared, the latter will not be estimated as equal; but this very correlation constitutes a *contradiction* of the terms in which the problem was stated, viz.: *the equality in every respect, except that of maturity*, of the two commodities in question. We must therefore make abstraction of it; in which case the proposition of the absolute equality of present and prospective commodities in the estimation of a perfect hedonist, remains intact.

*A fortiori* we must argue that, on this hypothesis, two commodities, *prospective in various degrees*, are always equal *inter se*, if they are so in every respect save that of maturity.

On the other hand, it is a fact which calls for explanation, that prospective commodities, if equal in duration and intensity to present ones, are always estimated less than the latter. It is evident that we may admit, that men constantly err in their calculations, since nothing is more certain and normal than their blindness and incapacity to reason rightly. We may therefore agree that, as a matter of fact, pleasures in every

respect equal, but some of which are present, and the others remote, are variously estimated through error.<sup>1</sup> But this admission, though it can and must be made, in order to explain *real phenomena*, consisting of human actions, can never be adduced as explanatory of the phenomena of *pure or rational economics*, i.e. of what would occur *if all men were perfect hedonists*; and hence phenomena (such as, e.g., discount and interest are believed to be<sup>2</sup>) based precisely on a difference in the estimation of present and prospective commodities, must be deemed *non-existent in a state of pure economics*, if they were due to a constant error of valuation. But this is by no means the case; and though we do not deny the frequency of every kind of error in hedonic calculations in practical life, this hypothesis is unnecessary to explain the difference in the estimation of the utility of present and prospective commodities; the true reason of such difference being the vastly greater certainty of the enjoyment of present, *as compared with prospective commodities*. In other words, given the hypothesis that a prospective and a present commodity are equal in every respect save that of their maturity, there is no possible difference in the valuation of the two; but this proposition, which is true *a priori* (and which excludes, as regards these commodities, under these conditions, the possibility of the phenomena of discount and interest), is not invalidated by its discrepancy with the facts of everyday life; for the facts that fall under our daily observation occur in an environment in which there does not exist the postulated *equality, in every respect save that of maturity*, of present and prospective commodities; but on the contrary only the *equality in duration and intensity of the utility accruing from these commodities*, joined to a decided *inequality as to the certainty with which it is considered that they can be enjoyed*.

Assuming its duration and intensity of utility to be equal, a present commodity possesses greater utility than a prospective commodity, because it is doubtful whether the expected com-

<sup>1</sup> If the estimates are supposed to be vitiated through *incapacity*, then the errors, unless there exist constant, or variable, causes of error in one sense rather than in another,—which is either *excluded* by the hypothesis, or proves it to be *insufficient*,—must be of equal frequency and magnitude in either sense, and so eliminate each other.

<sup>2</sup> See *post*, part iii. chap. iii. § 3, p. 252.

modity will be realised; and even if it is, the point remains doubtful, whether the life of the expectant individual will last until the utility of the prospective commodity actually matures. It remains also open to question, whether every other element in the hedonic calculus is really correct; whether, for instance, at the future date the want to be satisfied will have continued in, or come into, existence, and whether it will be of the same intensity as was anticipated, and whether there may not then be some other means of supplying it.

Having set forth these premisses by way of explaining the *deterioration of the utility of prospective commodities*,<sup>1</sup> we proceed to consider how it is measured hedonically, first specifying its divisions. *Present commodities* always possess *simple productiveness*, or to speak with more precision, the repeated productiveness of present commodities is a *prospective utility*. Thus, *e.g.*, a fruit is a present commodity possessing simple productiveness; a dress, on the other hand, is a good possessing present utility of a determinate magnitude, coupled with a prospective utility which may be estimated by the party interested. A chair, a tool, a house are direct and instrumental commodities possessing both present and prospective utility; and a cultivated field, at any other period than the time of harvest, is an instrumental commodity possessing only prospective utility. The same observation applies to a certificate of *rente*, when the coupon due and payable has been detached.

<sup>1</sup> The theory we have expounded of the deterioration of the utility of prospective commodities is due to Ferdinando Galiani: "It was then recognised that the intrinsic value was always variable, according to the *degree of probability that something would or would not be enjoyed*, and it was recognised that 100 ducats out of one's hand, when there are 100 degrees of probability of their not being lost, and 10 of their being lost, become 90 ducats in hand, and must be reckoned as 90 ducats in any gaming contract or exchange. . . . Hence arose the kindred phenomena of exchange and interest: the one being an equation between money present and money distant in space, made with an apparent surplus added sometimes to the money present, sometimes to that at a distance, in order to equalise the intrinsic value of one or other, diminished by the lesser convenience or the greater danger. Interest is the same equation made between money present and money distant in time, time here operating in the same way as space; and the basis of either kind of contract is the equality of the true intrinsic value. So true is this, that sometimes, in exchanges, present money is worth less than money at a distance, and the exchange is said to be below par; and paper representing money, which after all is only future money, is often worth more than coin, the surplus being called *agio*."—*Della Moneta*, book v. chap. i. p. 243, vol. ii. tome iv. Collez. Custodi.

Prospectively useful commodities may be endowed with a widely varying repeated productiveness. There are obligations that yield a determinate series of annual payments, others that yield an indefinite series of such payments. There are commodities that are capable of rendering, for an almost indefinite duration of time, the same service in the same manner, *i.e.* of producing the same utility, and others that deteriorate within a lapse of time that may often be fixed beforehand with much precision. We must therefore conclude that present and prospective utility are found indiscriminately in direct, complementary, and instrumental commodities; that commodities are divided into commodities of simple productiveness, and commodities of repeated productiveness, and that these two classes are subdivided into commodities of present utility and commodities of future utility.<sup>1</sup> The subjoined table may serve to make this classification more clear.

|             |   |               |                            |   |   |
|-------------|---|---------------|----------------------------|---|---|
| Commodities | } | Direct        | of simple productiveness   | { | in the present only ( <i>i.e.</i> actual)     |
|             |   |               | of repeated productiveness | { | in the future only ( <i>i.e.</i> prospective) |
|             |   | Complementary | do.                        |   | do.   |
|             |   | Instrumental  | do.                        |   | do.   |

Now the determination of the total present or actual utility of a commodity endowed with prospective utility, may be effected in the following manner, in accordance with a rule laid down by Ortes:<sup>2</sup> Let the total utility of a present commodity be expressed by  $u$ ; then the utility this same

<sup>1</sup> On commodities of single and recurring utility see Walras's theory *du capital et du revenu*, in his *Éléments d'économie politique pure*, Lausanne, 1889, 2nd ed. p. 197; also Wicksteed's *Alphabet of Economic Science*, pp. 131, 137.

<sup>2</sup> In the solution of this problem I leave out of account a *complication* which always occurs in real life. The service that a thing renders in a series of years is not only affected by an element of deterioration, if it be estimated at the present moment, owing to the increasing remoteness of the successive increments of service, but each increment must have, *at maturity*, ITS OWN *final degree of utility*. This is rightly insisted on by Dupuit: "Mais il y a des choses qui sont susceptibles de rendre un certain nombre de services plus ou moins considérables; leur utilité est alors mesurée par la somme des prix qui nous auraient déterminés à nous en passer toutes les fois que nous nous en sommes servis: les travaux publics sont dans cette catégorie," p. 192.

commodity can produce during any given period of time  $t$ , e.g. a year, will be  $Eu$ ,  $E$  representing a coefficient dependent on  $t$ , and always less than the unit, i.e. a fraction of the same. The coefficient  $E$  expresses the *deterioration of the utility* with which the thing is endowed, owing to its being prospective instead of present. The utility the thing may produce after a second lapse of time equal to  $t$ , e.g. after two years, will be equal to  $Eu$ , if we suppose that it is estimated *at the end of the first period  $t$* , and hence it will be equal to  $E^2u$  *at the present moment*.<sup>1</sup> Hence, if we suppose that a commodity may, at intervals equal to  $t$ , yield  $n$  times a utility equal to  $u$ , its total

<sup>1</sup> I have given to the rule of Ortes the modern form suited to it, and which is found in W. Launhardt, *Mathematische Begründung der Volkswirtschaftslehre*, Leipzig, Engelmann, 1885, p. 6, § 2. The terms in which it is expressed by Ortes are: "It has been observed that *lands are equivalent to all the commodities that can possibly be gathered from them and subsequently qualified*, and that occupations are equivalent to all the actual commodities that may be derived from them and qualified. Nevertheless, that does not alter the fact that those lands cannot be compared with the *actual goods*, and so be exchanged for them as equivalents each for the other. . . . In fact, *since as lands they do not immediately satisfy the wants of any one*, considered as the basis of occupations, and consequently of commodities, *they meet this want more mediately than anything else*, and it thus becomes the common measure of the lands and the occupations, or of the lands and the actual commodities of which the occupations are the equivalent. . . . It is to be observed that the lands must be equivalent *to the more actual and consumable commodities*, in comparison with the only ones susceptible of consumption, inasmuch as the possible commodities are innumerable; and that they must be equivalent to less of actual and consumable commodities, inasmuch as these innumerable commodities are not actual like consumable commodities. . . . And as, on the one hand, the actual commodities are finite and the possible commodities infinite, it would seem that whatever number of the former could never enhance the value of the latter or of any limited extent of land capable of producing them. But, on the other hand, since the former commodities are all present at once, and realised by means of the past occupations, and the latter are only future and to be realised by means of occupations to come, the former will for this reason be infinitely preferred to the latter. The infinite being thus eliminated on either side, all the value of the possible, as compared with the actual, commodities, with reference to the want felt for the one or the other, will depend on a certain discretion exercised in the apprehension of the want for either. . . . In this way the lands which, compared with actual and finite commodities, are worth nothing as regards the supply of natural wants, are when compared with the possible and infinite commodities to be extracted from them by means of occupations, equivalent to twenty-five times more than the actual commodities gathered and qualified in one year for the purpose of supplying the said wants; because possibly men apprehend their future and possible wants twenty-five times more clearly than their actual and present wants."—Ortes, *op. cit.* pp. 105-107, c. xiii. book iv. Confer Wieser, *Der natürliche Werth*, p. 134, § 38; and Böhm-Bawerk, *Kapitalzins*, Innsbruck, Wagner, 1884, iv. pp. 78, 79.



utility  $U$  at the present moment will be given by the following formula :—

$$U = Eu + E^2u + E^3u \dots E^nu = u(E + E^2 + E^3 + \dots E^n),$$

and the sum of this progression will be :—

$$U = u \frac{E - E^{n+1}}{1 - E}.$$

It is easy to understand how, whilst the total utility of a present commodity is, *cæteris paribus*, greater than that of a prospective commodity, the latter may far outweigh the former, if its productiveness is manifold. Now, nearly all instrumental commodities may be used repeatedly during a prolonged period, and some for an indefinite duration. Thus, *e.g.*, a farm will yield yearly, with the concurrence of other complementary and instrumental commodities, a quantity, say of wheat. The utility of the quantity of wheat raised on this farm affords the measure of the combined utility of the farm and of the other instrumental commodities required to produce the crop; but since the land will presumably be susceptible of being so used for ever, and the other instrumental commodities for a number of years, the total utility of this combination of instrumental commodities is much superior to the utility of only one year's crop, and must, as indicated by the formula set forth above, be reckoned in proportion to the *present utility* of the *prospective and successive increments of direct commodities* that it will presumably yield during a series of years. Commodities susceptible of repeated prospective utility, as are almost all instrumental and many direct commodities, have been erroneously termed capital. This is already the second acceptance we have encountered of this term.

§ 7. *Of Economic Equivalents and of Genetic Groups of Commodities*

Many commodities render the same service, *i.e.* supply the same want, either in the same or in a different measure. Now

\* For a series of an infinite number of terms, *i.e.*:  $Eu + E^2u + E^3u \dots$  we get  $U = u \frac{E}{1 - E}$ , when the series is convergent, *i.e.*  $E < 1$ .

if  $m$  units of A commodity are required to obtain the same utility that is derived from  $n$  units of B commodity, these two quantities are *economic equivalents*. Certain kinds of wood, for instance, are equivalent to determinate quantities of coal in the production of caloric or mechanical force; and as a building material, it is a substitute, in definite proportions, for iron and stone. It is therefore evident that we can tabulate economic equivalents, subject to such modifications as the progress of the technical arts may require. The law of economic equivalents, originated by Augustin Cournot,<sup>1</sup> forms the basis of the explanation of a large class of *correlative prices*, *i.e.* of prices of commodities which cannot be modified without a correlative modification (either consonant or antithetical) in the prices of other commodities.

Another division of commodities into groups, which is important for its bearing on the explanation of correlative prices, and essential to the right understanding of the relation between the final degrees of utility and the cost of production of commodities, inasmuch as both these factors affect the value of commodities, is obtained by noting under each instrumental commodity the direct commodities derived from it, and *vice versa*, above each direct commodity the complex of instrumental commodities that contribute to its production. In other words we have to draw up genetic tables showing the descent and ascent of instrumental and direct commodities.

### § 8. *Jennings's Classification of Commodities as Primary and Secondary, and Laws based thereon*

It has frequently been attempted to divide commodities into classes denoting the order in which they are sought after by persons who possess nothing at all, *i.e.* into classes arranged with reference to an absolute scale of wants; but it has been found impossible to get beyond a vague description of wants that have as their respective objects *necessaries*, *comforts*, or *luxuries*, and an equally vague description of commodities classified in accordance with this principle. It is impossible

<sup>1</sup> *Principes de la théorie des richesses*, A. Cournot, Paris, Hachette, 1863, book i. chap. iv. §§ 33-35, pp. 61-64. Jevons, *op. cit.* pp. 145-148. *Vide* also Menger, *op. cit.* pp. 90, 91.

to lay down any line of demarcation between commodities that can, and commodities that cannot, be dispensed with without prejudice to an individual's capacity for discharging his proper functions; and yet one cannot designate as comforts, and *a fortiori* as luxuries, any other commodities than those respecting which it can be shown that they can be discarded without detriment to one's physical and mental capacities.<sup>1</sup> On the other hand, if we relinquish our search for the precise meaning of words in common use, and therefore wanting in precision, and take as our basis a physiological fact, we obtain a classification similar to that vainly attempted before, a classification most fruitful for economic science and which has been already expounded in chap. iii. § 3. The two classes of commodities which can be formed by reference to their respective action on the nerves of special, and on those of common sensation, will present some analogy to those based on the distinction between luxuries and necessaries, with this difference however, that no doubt can be entertained in any case as to which class a commodity should be assigned to. Let us therefore designate as *primary commodities* such as are objects of common sensation, and as *secondary commodities* such as are objects of special sensation. We have then as corollaries of this classification the following three principles which are a repetition, *mutatis mutandis*, of the three theorems already expounded concerning primary and secondary wants:—

- 1st. *That primary commodities may exhibit all their useful qualities, i.e. they may be to the fullest extent causes of satisfaction or pleasure, even in the absence of secondary commodities; and that, on the contrary, secondary commodities cannot be enjoyed, unless the desire for primary commodities has first been appeased.*
- 2nd. *That although the law determining the decrease of degrees of utility, in proportion to the quantity consumed (Gossen's law), applies to all commodities*

<sup>1</sup> That we have not advanced a single step in this direction may be seen at a glance by comparing what was written on the subject by A. Genovesi, who was appointed to the first chair of Political Economy that was founded, with what is written nowadays by some of its most authoritative exponents, such as Wagner, *Grundlegung*, 2nd ed. 1879, Winter, Leipzig, § 1, p. 9, § 96, pp. 138 *et. seq.*

*without distinction, the rate of decrease varies according as the commodities are primary or secondary, without however being uniform for either of the two classes.*

- 3rd. *That whilst the want of a secondary commodity can be supplied by another secondary commodity, e.g. an optic being substituted for an acoustic gratification, and vice versâ, no substitution can take place between primary commodities, unless they are economic equivalents.*<sup>1</sup>

§ 9. *Of Commodities, the Available Quantity of which is more or less than the Demand*

If we designate by the term *requirement* or *demand* the quantity of a thing that is required to satisfy a given want, during a certain time, we may divide all commodities into two classes, according as their available amount is more or less than such demand.<sup>2</sup> The demand thus comes to be the measure, or the quantitative expression, of the magnitude of any want. Since, in a state of civilisation, man experiences not only present, but also prospective, wants, his demand for any commodity is not merely the quantum which serves to extinguish his present want, but also the further quantum that will be required to extinguish the want when it again asserts itself; and in the case of the tribal egoist, such an additional amount as may be necessary to meet the requirements of those to whom his egoistic cares extend. Thus the *time* during which the quantum of commodity must supply a want, in order that the latter may equal or exceed the demand (as defined by us), may be comparatively long, and may comprise forecasts extending throughout years, a lifetime, or successive generations. Now, there are certain things which, however great the demand for them may be, are available in still larger measure, for all men, and under nearly all circumstances. Thus, *e.g.*, the air we breathe is diffused everywhere in lavish abundance. Nevertheless a man may be so situated with respect to it, that the amount of which he can avail

<sup>1</sup> Jennings, *op. cit.* book i. chap. i. §§ 5-8, pp. 87-102; book ii. chap. i. § 36, p. 211.

<sup>2</sup> F. Galiani, *Della moneta*, book i. chap. ii. pp. 58, 59, 1750, Collezione Custodi, vol. iii.; Ortes, *op. cit.* book iv. chap. viii. pp. 48, 49. The price of the commodity is supposed to be zero.

himself is inadequate to his need, *i.e.* that for him air, or at all events, good air is *scarce*. There are, however, many more things the available quantity of which has always been less than is required, or that have lapsed into the class of commodities the available quantity of which falls short of the demand, after having for a brief period exceeded the latter, either because the demand has increased with the advance of civilisation and the growth of population, or because the quantity originally available has diminished. Thus, for instance, cultivable land which exceeds the agricultural requirements of a small community, comes to be inadequate for its support as the population increases. A supply of drinking water far exceeding the needs of a village, proves deficient as the latter grows to the dimensions of a town. The spontaneous produce of the soil which amply satisfies the wants of a primitive race, proves inadequate to the requirements of their more numerous and civilised progeny. A forest which affords an inexhaustible supply of timber to its first despoilers, cannot, in its reduced condition, satisfy the demand of later comers. It is thus evident that commodities may pass from the class of things in excess, to that of things in defect, of the demand, in consequence of variations either in the demand or in the supply; so that this transition is not due to any intrinsic quality of the commodities.<sup>1</sup>

Now, it is obvious that the *homo economicus* will use commodities existing in a quantity exceeding his need, in a very different manner from commodities that exist only in a quantity inferior to his need. Being assured that he can at all times, and to any extent, satisfy his want of commodities of the first class, he has no interest in appropriating any portion of them either before or after the very moment when he wants to use it; nor has he any reason for doing anything to preserve any portion of such commodities, or to take them from any other person; nor does there exist any scale of urgency of his wants with respect to them. On the other hand, as regards commodities the supply of which is short of the

<sup>1</sup> To things that are superabundant as compared with our need, such as the air we breathe, some economists deny the rank of commodities, even though the superfluous portion may not be noxious. Strictly speaking, this is correct as regards the portion in excess of the need, to which utility can only be ascribed by such a stretch of the meaning of that term, as we pointed out when defining it.

demand, knowing, as he does, that he cannot in any case completely satisfy his need of them, he must, to avoid increasing his pain, do everything that may conduce to the preservation of the supply, avoiding all waste, not parting gratuitously with any portion, competing with others for the largest amount obtainable, and satisfying his wants therewith in accordance with their scale of urgency, *i.e.* appeasing first the most painful ones. To put it briefly, we may say, that we can have an *economic management*<sup>1</sup> only in respect of commodities of the second class.

Commodities existing in a quantity inferior to the demand are termed *scarce*, or *riches*, or *valuables*, to distinguish them from the rest, which retain simply the generic name of commodities. They have also been called *economic* commodities, *onerous* commodities, or *exchangeable* commodities, in contradistinction to *non-economic*, *gratuitous*, or *non-exchangeable* commodities.

It is evident that commodities exceeding the demand have always a final degree of utility either *equal to zero*, or *negative*. It is equal to zero if the quantity exceeding the demand is not injurious, *i.e.* if they are such that we can consume them to satiety without experiencing any discomfort from the quantity available in excess of our requirement. Such, for instance, is the air we breathe. On the other hand, they have a final degree of negative utility if the quantity exceeding our need requires to be removed as being noxious, or as forming in some way an obstacle to the increase of our happiness. Instances of such commodities are: virgin forests, and other exuberant growths, on soil that is brought for the first time under cultivation. In such cases the redundant portion may even need to be destroyed by fire. On the contrary, commodities the existing quantity of which is short of the demand, always have a positive final degree of utility, which is the greater, the more limited their supply. *Vice versa*, they naturally present a smaller total utility than the superabundant, but innocuous, commodities. The diagram of scarce commodities will always

<sup>1</sup> This distinction has been noticed by many economists, but chiefly by Hermann and Walras senior. It is admirably expounded in Carl Menger's *Grundsätze der Volkswirtschaftslehre*, Vienna, 1872, Braumüller, chap. ii. § 3, p. 51 and following.

assume, generically, the form of diagram XIX., and that of the superabundant commodities the form of diagrams XX. and XXI.

The two characteristics of *riches* most fertile in illations are

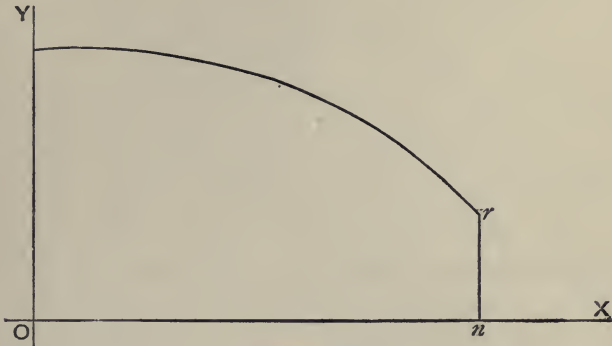


DIAGRAM XIX.

their *cost* and *exchangeability*. In fact, in proportion as certain commodities fall short of our requirement, we are disposed to submit, within certain limits, to a cost in order to procure

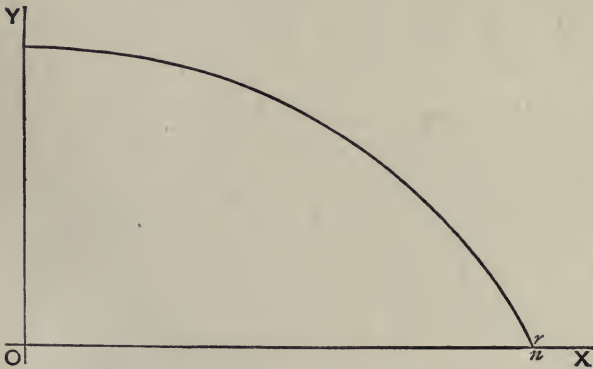


DIAGRAM XX.

them, or to procure a larger quantity of them; for their inadequacy to such requirement occasions the continuance of certain painful wants, and if these can be alleviated by the endurance of lesser ones, *i.e.* if we can increase the amount of such commodities at our disposal by submitting to some labour or cost, to do so is conformable to the hedonic postulate. This cannot

be the case with commodities existing in an amount greater than the demand; for the simple reason that there is no possibility of pain being caused by their absence. This is the

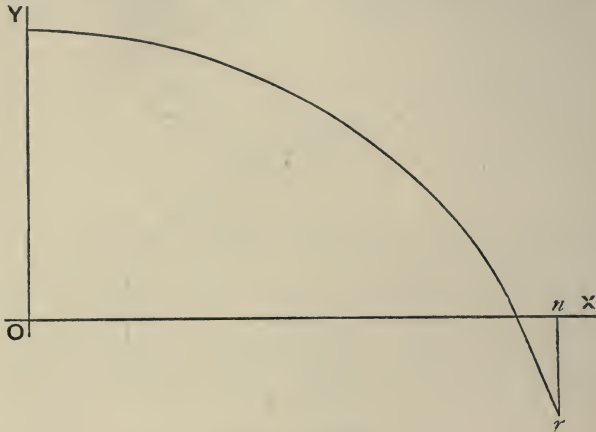


DIAGRAM XXI.

property we have in view when we say that riches have a *cost value*. We must guard however against a *ὑστερον πρότερον*, which consists in assuming that the *cause of the value of these commodities is their cost*.<sup>1</sup> Their value is determined by their aptitude to satisfy a want, and their cost

<sup>1</sup> This paralogism has been, and still is, extremely common. Some of the keenest thinkers, like Malthus, have been guilty of it, and others have even persisted in it after their error had been pointed out; *e.g.* M'Culloch, *The Principles of Political Economy*, pp. 11-15, 5th ed., notwithstanding the criticism contained in W. N. Senior's *Principles of Political Economy*. Before him, Galiani, after having explained that value is a *ratio* dependent on the *utility* and *scarcity* of things, *i.e.* on the *proportion between the quantity of a thing and the extent to which it is used*, says: "But most men, and B. Davanzati among them, reason thus: A natural calf is a nobler object than a golden calf, but how much less is it esteemed! I reply, if a natural calf were as *scarce* as one of gold, its price would exceed that of the golden calf, as much as the utility of, and need for, the former transcends the utility of, and need for, the latter. . . . Again, it is said that a pound of bread is more useful than a pound of gold! I reply, that that is a shameful paralogism, arising from a disregard of the fact that 'more, or less, useful' are relative terms, and are measured with reference to the various condition of the parties. If we are thinking of some one who lacks both bread and gold, certainly in his case, bread is more useful; but facts are in accord, and not at variance, with our proposition, because no one so situated will reject the bread, and preferring the gold, perish with hunger. Gold-diggers do not forget to eat and sleep. But what is more useless than bread to a full man?"—Galiani, *op. cit.* pp. 67-69.



is due to the circumstance that, being thus valuable, the existing amount of them is less than the demand. *Their cost is consequently the effect of a condition of fact in which these commodities are with respect to us, or in which we are with respect to them.*<sup>1</sup>

It is a corollary of their *cost value* that these commodities are *exchangeable*. In fact, a commodity the existing amount of which exceeds the demand, its cost being nil, will not be purchased by any one in exchange for another commodity; for either the commodity given in exchange for the first is also in excess of the demand, in which case neither party has acted so as to diminish his pain, *i.e.* hedonically; or else the second commodity exists in a quantity less than the demand, in which case one of the parties to the exchange has acted anti-hedonically. On the other hand, a commodity the existing amount of which is less than the demand, will be purchased indifferently, the painfulness being equal, either by means of some labour, or by the surrender of some other valuable which would otherwise be enjoyed; *i.e.* it will exhibit its cost value under either of these forms indifferently. The exchange power of such commodities is therefore only a form of their cost value, and is termed generically *value*, and more particularly *exchange value*, or *value in exchange*.<sup>2</sup>

### § 10. Of Cost

The cost of a commodity is any pain that must be submitted to in order to obtain it. The forms that cost may assume are various, but economically they are unimportant. Often expenses may have to be incurred in order to obtain possession of an object, that is, it may be necessary to forgo the enjoyment of other commodities, either by transferring these

<sup>1</sup> The expressions "gratuitous commodities" and "onerous commodities" should be discarded (1) because they imply, or easily induce, the belief that the cost is the cause of the diversity in our treatment of the two classes of commodities; (2) because they imply a natural, juridical or ethical *fundamentum divisionis*, instead of an economical one, *i.e.* of a condition of fact: the *magnitude of the demand*, and the *magnitude of the available mass*.

<sup>2</sup> To be precise we should say that commodities the existing amount of which exceeds the demand *have an infinitely small exchange value*. Condillac, *Le commerce et le gouvernement*; Guillaumin's *Collection des princ. économistes*, vol. xv. p. 253, note 27.

to other persons, or by destroying their useful qualities. Often, on the other hand, it may be necessary to perform some labour, or to submit passively to some kind of pain or abstinence from pleasure. Cost may always be considered as a negative commodity in the sense explained in § 4 of the present chapter; and it may be well to investigate its properties and function in the form it most frequently assumes, viz. that of labour, the form to which every other may be reduced by a legitimate extension of the meaning of this term beyond its ordinary acceptation.

Labour, in economics, means *every painful human effort*. The same acts, *i.e.* the same exertions of a man's body or mind, may be a *labour* or a *recreation*; the *one and sufficient* distinguishing characteristic of labour is its *painfulness*.<sup>1</sup> Dancing is often a pastime, but for the dancing-master it is a labour. The same applies to singing, fencing, etc. To be laborious, a movement must be such that a hedonist will want to desist from it, and that if he performs it, as is usually the case, for the sake of some remuneration or reward, he will want to reduce it to the narrowest limits compatible with the attainment of his reward.<sup>2</sup> Some writers have deemed it necessary to add as a requisite of labour, in order to distinguish it from other acts, that it must be a means, and not an end in itself; and further that it must consist of a series of acts constituting a profession or vocation, and not merely of any isolated act. But it is easy to see that the first of these requisites is only a formula,—and not a very accurate one—for expressing the fact that labour must be a painful act, and that the second is not even correct, since even a single act must be regarded as labour, when it is disagreeable.

Labour always consists ultimately of *the movement of things effected by means of some part of our body*.<sup>3</sup> We cannot act

<sup>1</sup> Jennings, *op. cit.* pp. 113-118.

<sup>2</sup> It has frequently been maintained that *all commodities cost us something*, even if it be only what is involved in their *appropriation* and *consumption*. It is obvious however that when the movements, or actions, or efforts by means of which we consume or enjoy are themselves pleasant or indifferent, it is a misnomer to describe them as labour or cost.

<sup>3</sup> This principle was thus enunciated by James Mill: "It is found that the agency of man can be traced to very simple elements. He does nothing but produce motion. He can move things towards one another, and he can separate them from one another. The properties of matter perform the rest. . . . In

in any other manner on the things in the midst of which we live, *i.e.* on our environment. The transformation of one or more bodies, which is what is aimed at by any one who labours, is always the result of the *operation of forces existing in nature independently of any effort of ours*, and which we have only brought to bear on our environment, in accordance with our interest, by moving the things towards one another, or separating them from one another.

Every voluntary movement of our body, provided it be

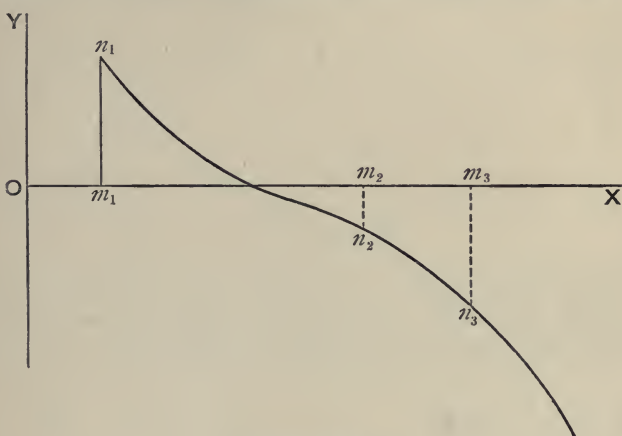


DIAGRAM XXII.

sufficiently protracted, becomes irksome, even though it may originally have been most pleasurable. Our bodily movements, in so far as they are pleasurable, are thus subject to the general law of Gossen or Jennings of the decrease of the degrees of pleasurableness of every sensation, in proportion to its duration or quantity; and the hedonic curve of every movement is therefore generically identical with that of every commodity. Let us, for instance, suppose any one to walk, or fence, or read for pleasure. A first bout of each of these exercises will give a hedonic result expressed by the

strictness of speech, it is matter itself, which produces the effects. All that men can do is to place the objects of nature in a certain position.”—*Elements of Political Economy*, 3rd ed. p. 5. See also Verri, *Meditazioni*, sec. 3: “to approach and to separate are the ultimate elements we find, on analysing the idea of reproduction.” Further, M. Gioja, *Nuovo prospetto*, part i. chap. iv. p. 32, Lugano, 1838.

positive ordinate  $m_1, n_1$  (diagram XXII). A second, third and perhaps even a fourth instalment will still afford pleasure, but always in decreasing measure, and a state of weariness cannot but supervene ultimately, in which all sense of pleasure afforded

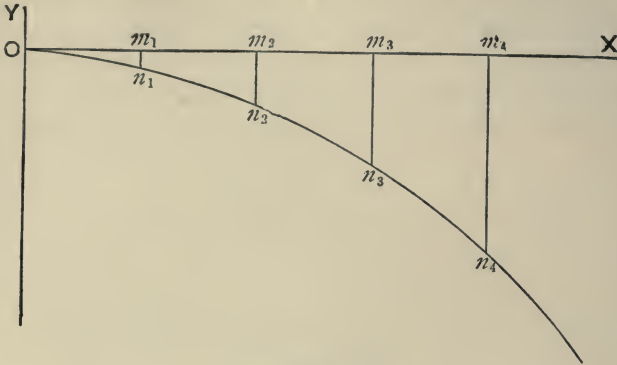


DIAGRAM XXIII.

by the exercise will have vanished. Beyond this point we shall have, with each further instalment, a growing sense of discomfort, until a state of intolerable suffering will be reached.

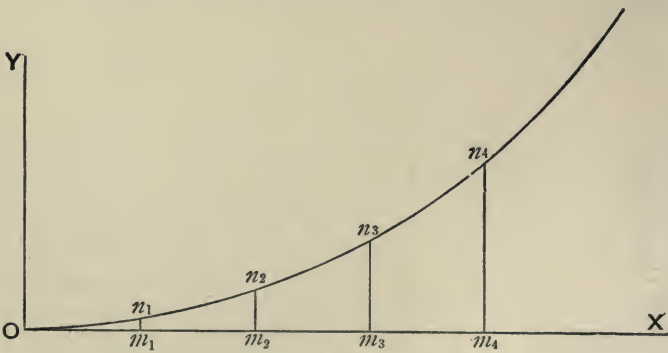


DIAGRAM XXIV.

Graphically, this process is expressed by means of lengthening negative ordinates:  $m_2, n_2, m_3, n_3$ , etc.

Now, we designate as labour every voluntary movement of our body which is originally painful, or which has become painful though it was originally pleasant. Hence its graphic expression consists of ordinates which *are all negative and increasing*. Usually they will be drawn in increasing order below the axis

of the abscissa, as in diagram XXIII.; but it may be convenient to produce them above the abscissa, as in diagram XXIV. As in the case of positive commodities, the total utility produced by them increases in a lower ratio than the quantity of them that is consumed, so in the case of negative commodities the converse theorem holds good, viz. that *their total disutility increases in a higher ratio than their quantity*; and as for the former we distinguish degrees of utility, so as regards these we must take into account their *degrees of disutility*.

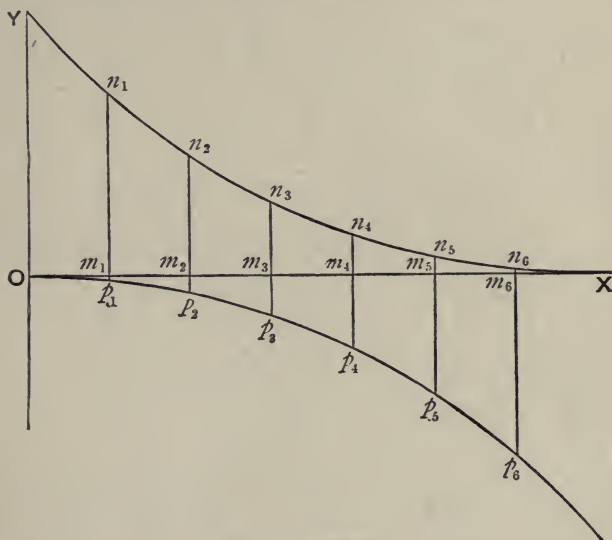


DIAGRAM XXV.

A painful act is performed by a hedonist only for the sake of a commodity that will afford him a larger sum of pleasure. Labour is for him only a means of increasing the sum of enjoyment which he is able to procure. It is therefore easy to indicate the point at which any labour will be desisted from, and the point up to which it will be carried on by a perfect hedonist.

Let there be indicated on the abscissa OX successive increments of any given kind of labour:  $m_1, m_2, m_3, m_4, m_5, m_6$  (see diagram XXV.). The positive ordinates  $m_1n_1, m_2n_2$ , etc., denote the degrees of utility of the products of the increments of labour to which they severally relate, viz.:  $m_1n_1$  the degree of

utility of the product of the increment of labour expressed by  $Om_1$ ,  $m_2n_2$  the degree of utility of the product of the increment of labour  $m_1m_2$ , and so on. The negative ordinates  $m_1p_1$ ,  $m_2p_2$ , etc., will indicate the degrees of painfulness or disutility of the increments of labour to which they relate, viz.:  $m_1p_1$  the disutility of the increment of labour  $Om_1$ ;  $m_2p_2$  the disutility of the increment of labour  $m_1m_2$ , and so on. Now, as the degrees of utility of the commodity we obtain by our labour decrease, whilst the degrees of disutility or painfulness of the labour increase, there must necessarily be a point at which the degree of utility of the produce of the labour is equal to the degree of painfulness of the labour. This point is found in diagram XXV. between  $m_3$  and  $m_4$ , because  $m_4n_4$  is already less than  $m_4p_4$ . The hedonist will not desist from his labour before this point is reached; but, on the other hand, he will not protract his labour beyond that point, *e.g.* up to  $m_5$  or  $m_6$ . In fact, until the amount of labour is such that its painfulness equals the enjoyment afforded by its remuneration, we may increase our happiness by continuing to work. Even this labour, though less productive, *i.e.* less remunerative than formerly, will nevertheless result in a balance of pleasure. On the other hand, once the point is passed when the pleasure due to the fruits of labour is less than its painfulness, the total amount of happiness is lessened with each ulterior increment of labour. All such increments are therefore anti-hedonic. Naturally in the case of each individual, even on the hypothesis of the same kind of labour and the same produce, the curves of the degrees of utility and disutility will be different, according as his sensibility to fatigue and his wants differ from those of other persons.

The intersection of the ordinates that denote degrees of utility and of disutility may, having regard to the foregoing observations, be also represented as in diagram XXVI.

The theorem we have been expounding may be briefly formulated as follows: *All labour will be carried on up to the point at which the degree of utility of the commodity obtained thereby equals the degree of painfulness of the labour itself, at which point a hedonic maximum is realised. More briefly still we may say: the final degrees of utility and of painfulness must be equal.*

This theorem is also due to H. Gossen and R. Jennings,<sup>1</sup> and was discovered later and independently by Jevons. It is called the theorem of the *final equivalence of positive and negative degrees of utility*.

To be obliged to submit to some cost in order to obtain some (positive) commodity is the ordinary lot of man. Nearly everything must be *produced*, in order that it may be adapted to our wants; it must be suitably *modified*, since *we can create nothing*. Now, we may consider cost as a negative commodity, and the positive commodities obtained by means of it, as the *uses to which it is intended to be put*. Then as the

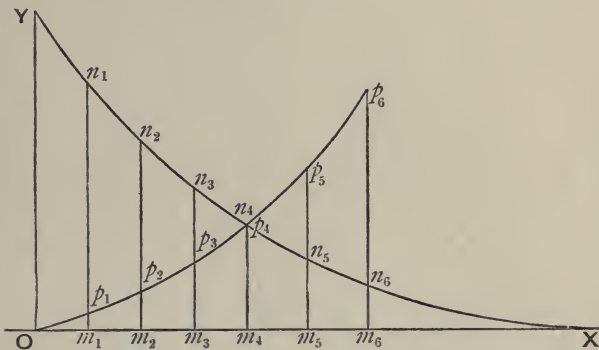


DIAGRAM XXVI.

amount of cost, or effort, or toil we can submit to, within a given period, is limited, *i.e.* determined by our physical constitution, there presents itself, with respect to the negative commodity we term cost, the same problem we have already discussed with reference to positive commodities which can be put to various uses, or to a determinate period of time which may be apportioned among several satisfactions, *i.e.* the problem of *dividing the amount of labour we are capable of within a given period* (say twenty-four hours) *among the innumerable uses to which we can apply it, so as to obtain a hedonic maximum*. And the position is the same, save for the greater complexity of the problem. In fact we must consider in the first place, that the various commodities which we can obtain by means of the same cost or labour, present *different totals of*

<sup>1</sup> Gossen, *op. cit.* pp. 34-39; Jennings, *op. cit.* p. 119; Jevons, *op. cit.* pp. 184-189; Launhardt, *op. cit.* pp. 89, 90.

utility, *i.e.* afford us *different sums of satisfaction*.<sup>1</sup> Hence if two equal abscissæ,  $OX$  and  $O_1X_1$  (see diagram XXVII.), denote equal quantities of labour, as regards duration and irksomeness, the enclosed space above the former,  $OXY$ , will be, say, double the enclosed space above the latter, *viz.*  $O_1X_1Y_1$ . In order to simplify the problem, let us suppose that the curves denoting degrees of utility are straight lines, or in other words, that *the equal decrements of utility of the products of labour correspond to equal increments of labour*. If, the duration of labour being equal, its painfulness were the same whatever commodity were produced, the available amount of labour must in that

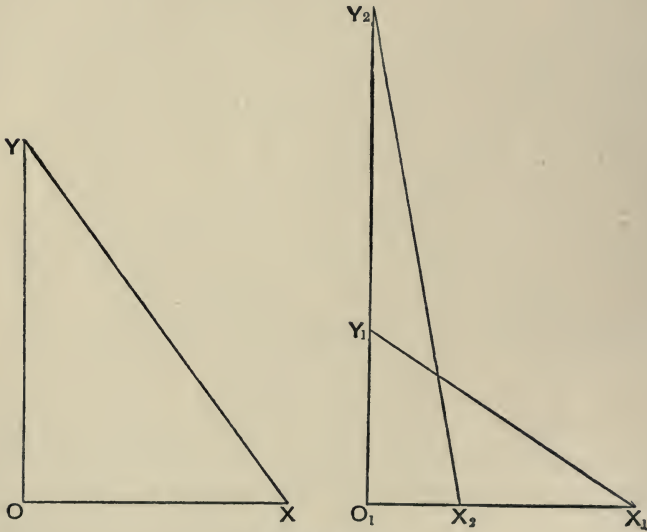


DIAGRAM XXVII.

case be expended exclusively on the most remunerative production, *i.e.* the one yielding the largest amount of gratification, until such a degree of satiety were arrived at as to render it equally profitable to devote a subsequent increment of labour to the production of the same, or of another, commodity; and from this point onwards the available amount of labour must be so disposed of as to make the final degrees of utility produced by it equal, whatever commodities were produced.

<sup>1</sup> Equal amounts of labour may afford different quantities of different products, and consequently different amounts of total utility, or equal quantities of different products having different quantities of total utility.



But, as a rule, it happens that *equal amounts of total utility*, derived from the production of equal or unequal quantities of commodities, cost *different efforts*.

Hence the labour to be disposed of must be distributed *in the compound ratio of these two principles*. That is, it is necessary that the abscissæ, OX and  $O_1X_1$ , instead of being equal, should be to one another in the same ratio as the costs required to obtain the total utilities denoted by the areas above them, *i.e.* the abscissæ must be such that equal portions of them, denoting labour applied to the production of different commodities, represent equal efforts. Now, if we modify the abscissæ in accordance with the ratio subsisting between the costs (*e.g.* if we suppose the production of the utility denoted by OYX to cost three times as much discomfort as the attainment of the utility denoted by  $O_1Y_1X_1$ ), we must modify the ordinates in an *inverse ratio*, in order to maintain the given difference in the productiveness of satisfaction, or total utility, of the two commodities in question. Our diagram XXVII. will therefore be modified as follows: the abscissa  $O_1X_1$  is reduced to one-third of its length and becomes  $O_1X_2$ , whilst  $O_1Y_1$  is trebled in length and becomes  $O_1Y_2$ , so that now equal parts of the abscissæ denote, for equal periods of time, equal quantities of effort or cost.<sup>1</sup>

Thus the problem is reduced to the simple form in which it is obvious, that the final degrees of utility attained must be equal. The solution of this question is therefore, that the labour to be disposed of must be so apportioned, that the final degree of utility of every commodity produced will be equal to the degree of painfulness that would be incidental to the said commodity, if the last portion of each commodity were obtained with the last increment of labour available. This theorem, which is also due to Gossen, is called the theorem of *equal ratios of the final degrees of utility to the final degrees of painfulness or cost*.<sup>2</sup>

<sup>1</sup> See *ante*, chap. ii. § 6; also Wicksteed's *Alphabet of Econ. Science*, pp. 58, 124, 128.

<sup>2</sup> Gossen, *op. cit.* pp. 40-45; Jevons, *op. cit.* pp. 198-201. The subject of cost will be resumed in part ii. chap. iii.

## CHAPTER V

### OF WEALTH AND THE METHODS OF ESTIMATING IT

#### § 1. *Wherein the Wealth of Individuals consists; how it is estimated; and why it is no Criterion of their Comfort*

THE wealth of an individual, as we have shown above, is the sum of the scarce, or costly,<sup>1</sup> or valuable things possessed by him. We know that, on the one hand, his wants furnish the criterion according to which some of the many things that surround him are ranked as *commodities*, whilst on the other, the quantity in which such commodities are available, and the extent of the demand, are the criteria in accordance with which some of these commodities are said to be scarce, or costly, or valuable.

It is very easy therefore, in view of the precision with which the various constituent elements of the conception "wealth" are determined, to make up the sum of a single individual's riches. In fact this sum may be ascertained, either by enumerating the metrical quantities of the several kinds of riches he possesses;<sup>1</sup> or by indicating their aggregate value, *i.e.* taking the metrical unit of any one kind of his riches as the unit of value, and indicating his aggregate wealth as a multiple of such unit;<sup>2</sup> or yet again by indicating the total cost of reproduction of his riches, on the basis of any given

<sup>1</sup> *e.g.* we may say that A has such and so many clothes, such and so many provisions, objects of recreation, etc.; in brief we may make an inventory according to quantity and quality.

<sup>2</sup> *e.g.* if A has 100 objects  $\alpha$ , 200 objects  $\beta$ , 300 objects  $\gamma$ , and the rates of interchange of these objects are given as 3 : 2 : 1, we may select, say,  $1\gamma$  as unit of value, and say that A possesses 1000  $\gamma$ .

unit of painfulness;<sup>1</sup> or finally, on the basis of the final degrees of utility of the several quantities he possesses.

But however we may measure an individual's riches, since these consist solely of commodities existing in a quantity smaller than the demand,<sup>2</sup> *i.e.* of commodities that are limited or scarce, it is obvious that their amount *is not a test of the absolute comfort enjoyed by him*; or that we may speak in two different senses of an increase or diminution of wealth. In fact it is obvious that a man who found at his disposal, in unlimited quantities, all the commodities corresponding to his wants, would enjoy the maximum of comfort. At the same time he would possess no riches. Similarly a man's comfort would be increased, if after having had a limited amount of a commodity, *i.e.* having been possessed of wealth, he should succeed in acquiring an unlimited abundance of it, thereby diminishing his riches. Whilst we find therefore that *the maximum of comfort is compatible with the absence of all riches*, we find also that *an increase of comfort is compatible with a diminution of riches*.<sup>3</sup> Were the progress of industry to result in the reduction to zero of the cost of every product, all riches would disappear, but would be replaced by universal affluence. *This does not warrant the conclusion that, in proportion as the progress of industry succeeds in approximating cost to that goal, and so increasing the available quantity of commodities, wealth will diminish and comfort increase.* For commodities become, or cease to be, riches at a certain point, *viz. when demand and available amount are equated.* Now, so long as the progress of industry reduces, but does not annul, the cost of particular commodities, and their available quantity remains less than the demand, they do not cease to be riches;

<sup>1</sup> *e.g.* we may say that A's wealth is equivalent to the pain he would experience if, say, for 100 days he had to work 8 hours at a stretch at a given kind of work, and under given sanitary and alimentary conditions, because that amount of work would be needed to reproduce his riches.

<sup>2</sup> Demand is here still intended to mean the quantity required at a price equal to zero. Later on this term will signify "quantity required at a determined price above zero." *Vide* part ii. chap. ii. § 1, note 1.

<sup>3</sup> Maitland, Earl of Lauderdale, *An Inquiry into the Nature and Origin of Public Wealth*, p. 41. J. B. Say, *Cours complet d'écon. pol. pratique*, ed. Gil-laumin, 1840, vol. i. part iii. chap. v. p. 371; *Traité*, book ii. chap. iv. p. 364, and book iii. chap. ix. p. 508, note 2; A. Clément, *Dictionnaire de l'écon. pol. voix Richesse*, vol. ii. p. 541.

and the increase in the general wellbeing occasioned by the perfecting of technical processes is not attended by any reduction of the *classes of things that constitute riches*, and still less of the *number of things comprised in each class*. Nor can it be said that certain commodities, limited in amount, *are riches in a lesser degree than others*, because they are less scarce than others, *i.e.* because their available quantity approximates more nearly than that of others to an amount commensurate with the demand. Their final degrees of utility, or cost value, or exchange value, will however be less than those of the other commodities; and were such a modification of their quantitative conditions to supervene, their cost value would decrease in comparison with what it was, and with what that of the other commodities is, and so too would their exchange value. Unfortunately, so far, the progress of the technical arts has only served to diminish the cost of things, approximating the available quantity of scarce things to the demand, *i.e.* increasing the general wellbeing, but not in proportion to the increase in the available quantity of commodities, and so without diminishing, but on the contrary, rather multiplying riches.

The amount of a person's riches may be a test of his comparative comfort, *i.e.* of his comfort as compared with that of another person *whose demand is the same as regards quantity and quality, and who has not a greater abundance of unlimited commodities at his disposal*. In this case it is obvious that the one who has more riches enjoys a greater degree of comfort. These premisses are nearly always tacitly implied in discussions on the increase or diminution of wealth; and the subject possesses special interest when, instead of private riches, we are concerned with a nation's wealth. But in this case fresh difficulties appear, which we shall proceed to examine.

§ 2. *Of the Wealth of a Group of Individuals, or of a Nation, considered at a given Time and Place*

Hitherto we have dealt with univocal and well-defined conceptions. But suppose now that we wish to indicate the aggregate wealth of two persons, at a given time and place. Their wants must either be identical or different. If they be

identical, the two persons may be considered as one. If however their wants differ, then also *the things that are to be deemed commodities with respect to each of them will be different*. A, for instance, is subject to attacks of malarial fever, and quinine is for him a commodity; B is exempt from such attacks, and for him quinine is useless, or positively hurtful. *Therefore also the things that are to be deemed riches with respect to each of them will be different*. Now, how is it possible to add up things that are commodities, and still more things that are riches, if what with respect to one individual should be included in the sum, must be omitted with respect to the other, and *vice versa*; in other words, how are we to proceed in the absence of a subject whose wants may constitute a univocal standard? Evidently we must either give up the attempt, or add up whatever is wealth for either of the two, extending the conception of commodity so as to comprise what is useful to some only of a group of persons.<sup>1</sup> Given this criterion, it will again be possible to have recourse to one or other of the four methods mentioned above. It may often be expedient (since the error would be slight) to suppose the wants to be identical in quality. If instead of estimating the wealth of two persons, *at a given time and place*, we want to reckon up the sum of the wealth of the millions of persons constituting a nation, the problem still remains the same; only the proposal becomes somewhat less objectionable, that we should treat as commodities and riches, things that are so estimated only by certain members of the group in question, *i.e.* things that amongst a nation are the objects of production and consumption.<sup>2</sup>

<sup>1</sup> *e.g.* if for A the objects  $\alpha, \beta, \gamma, \delta$ , are commodities, for B the objects  $\gamma, \delta, \epsilon, \zeta$ , the sum of their riches is obtained by adding up  $\alpha + \beta + \gamma + \delta + \epsilon + \zeta$ , and not merely the common elements  $\gamma + \delta$ . See *ante*, chap. iv. § 2, (d) (2) and (3).

<sup>2</sup> The bibliography of this subject is very copious. It will suffice to indicate the following works to the student:—A. de Foville, *Économiste français*, 28th Dec. 1878, No. 52; 4th Jan. 1879, No. 1; 18th Jan. 1879, No. 3; 22nd Feb. 1879, No. 8. P. Leroy-Beaulieu, *cod. loco*, 8th Feb. 1879, No. 6; 15th Feb. 1879, No. 7; 14th, 21st, 28th June 1884, Nos. 24, 25, 26. A. Soetbeer, *Umfang und Vertheilung des Volkseinkommens*, etc., Humblot, Leipzig, 1879. R. Giffen, *Essays in Finance*, 1st series, 1882, London, Bell, No. 7, p. 161; 2nd series, 1886, Nos. 10, 11, p. 365. V. Neumann-Spallart, *Uebersichten der Weltwirtschaft*, 1883-1884, publ. 1887, Stuttgart, Maier, No. 2, p. 8. *Bulletin de l'Institut international de statistique*, tome ii. première livraison, 1887, p. 150. E. Engel, *Bulletin de l'Institut*, etc., 1887, p. 50. R. Giffen, *The Growth of Capital*, London, 1889.

In dealing with the valuation of the wealth of one or more persons, or of a nation, there is no need to confine oneself to the direct riches they possess, to the exclusion of instrumental and complementary commodities. Only it must be observed that instrumental commodities are equivalent to future direct riches, that is, their direct utility is exhibited at a later period than that to which the valuation relates. We must, however, reckon potential, as an element of present, wealth; and since instrumental commodities (such as railways, factories, ships, canals, etc.) must be produced through the *consumption of direct commodities* (as will be shown in the sequel), it may chance that a person will be poorer, for the time being, than others in direct commodities, though he is certain, at an early date, to possess all the more of them, in respect of his having consumed a considerable quantity in the preparation of instrumental commodities the productiveness of which has not yet been developed.<sup>1</sup>

The riches of two or more individuals may be partly several and partly common. The valuation of these common, or collective, or public commodities, since they are such because they are useful to all (besides being characterised by other incidents that are unimportant in this connection), does not present the difficulty of the absence of a subject whose judgment determines their classification as riches;<sup>2</sup> but this valuation is rendered difficult in the case of a nation by the fact that they are deemed, and are frequently declared by law to be, inalien-

<sup>1</sup> The nation (or the individual) that undertakes the construction of railways, roads, canals, factories, the improvement of land, the perfecting of the public services, etc., *produces* instrumental commodities the fruits of which will be seen *in the course of time*, but has *actually consumed* enormous quantities of direct commodities and of instrumental commodities less remote than those produced, in the form of food, clothing, lodging, raw materials, appliances, etc., and is therefore provisionally *poorer than before as regards these direct commodities*. It may even happen that this provisional poverty in direct commodities should be so severe as to become most painful, in which case it is termed a *crisis due to excess of consumption*, or to *excess of investments*. This theorem is due to Professor Bonamy Price, *Chapters on Practical Political Economy*, 2nd ed., London, 1882, chap. iv. pp. 118-124. On a paradox which arises through not eliminating instrumental commodities, see Sidgwick, *Principles of Political Economy*, book ii. chap. xi. p. 375.

<sup>2</sup> How this calculation should be worked out is the chief subject of Dupuit's monograph on tolls, p. 209; but it is too long and subtle a question to be discussed here.

able. They may be scheduled like any other riches, as regards quantity and quality; their cost of reproduction may be indicated; the degree of utility they possess,—whether on the hypothesis of their being equally useful for all the members of the community, or on that of their having a different total utility for each,—is determined like that of any other commodity belonging to an individual; but the estimate of their exchange value must in some cases be fictitious, since we are dealing with commodities that are never actually offered for sale, *their utility for the nation being greater when they are enjoyed directly by the community as immediate riches, than if they were used by the latter as instrumental riches, i.e. as the means of obtaining other direct riches in exchange.*

The same difficulty may appear even in individual economics, for a person may possess many commodities which he considers it more profitable to utilise directly, *i.e. to enjoy them as direct or immediate commodities*, than as means of exchange, *i.e. as instrumental commodities*. And, strictly speaking, *we must consider as an instrumental commodity every thing that has an exchange value; and vice versâ, we cannot attribute any exchange value to a direct commodity, so long as it is so considered by its possessor.*<sup>1</sup> *Exchange value thus comes to be a species of instrumental utility.*

### § 3. *Of the Difficulty of Comparing the Wealth of two or more Individuals, or of two Nations at a given Period*

No comparison can be made of the respective wealth of two persons, until the riches of each have been severally estimated; and for the purpose of such estimate we must reckon as riches all possessions which correspond to a want and are available in a less amount than the demand. Now, the wants of two persons may happen to be of a very different character; whilst their environments may be so diverse, that a commodity which for the one is available only in a lesser quantity, is available for the other in a larger quantity, than the demand. One person, for instance, lives in a tropical

<sup>1</sup> When a thing is more useful as a direct commodity than as an instrument of exchange, its value in use is commonly said to be greater than its value of exchange, and the reverse in the contrary case.

climate and needs neither furs, nor fuel, nor a substantially built house; the other, living in a northern latitude, requires these means of protection against the inclemency of the climate.<sup>1</sup> One possesses an extent of land, and supplies of timber and drinking water, far exceeding his requirements; the other has to procure these things by dint of the hardest sacrifices, and by having recourse to every contrivance the technical arts afford. Assuming such diversity to exist, it would be perfectly correct to estimate the riches of each separately, in accordance with the principles we have already explained, and to pronounce that one to be the richer of the two who possesses the larger sum of scarce or valuable things. But this calculation would be an idle or barren operation, as it would not conduce to any ulterior conclusion, and above all, we should have to guard against the inference that the richer individual enjoys the larger measure of comfort. It may in fact easily be the case, that the schedule of one man's riches contains *direct and instrumental commodities* which do not appear in another's, simply because the second individual *possesses an amount of such commodities exceeding his need, i.e. he can substitute for them direct gratifications*. The sterility of a comparison between the respective wealth of two persons is enhanced in the case of two nations, on the like assumption. One nation may possess onerous riches, where the other disposes of gratuitous commodities; one constructs canals, where the other makes use of rivers and lakes; one has to procure coal for the development of caloric and motive power, whilst these wants are supplied in the case of the other by the heat of the sun and by waterfalls. The fertility of such comparisons presupposes therefore an (at least approximate) identity of wants and of available gratuitous commodities. And these two conditions are realised approximately as between individuals of the same nation, and as between nations that are equally civilised and situated in similar regions.

<sup>1</sup> As regards the amount of food required by man to keep up the temperature of his body, and to perform a certain amount of work, see Payen : *Précis théorique et pratique des substances alimentaires*; Moleschott, *Physiologie der Nahrungsmittel*; and Paul de Saint Robert, *Thermodynamique*, 2nd ed., Florence, p. 400.



§ 4. *Of the Difficulty of Comparing the Wealth possessed at different Times or Places by two or more Persons or by two Nations.*

The aim of investigations as to the wealth possessed by one or more nations is generally to compare: either a nation's present with its past economic condition, or the present economic condition of two nations situated in more or less diverse environments. The principal difficulties that beset the latter problem were indicated in the last paragraph, but to these a few others must be added, which will now be mentioned in connection with the first problem. For these two problems present exactly the same kind of difficulties, the same obstacles applying in the one to the estimation of differences between periods, as in the other to the estimation of differences between places.

Supposing the above difficulties to have been eliminated, viz. that of conceiving a sum of the commodities or riches of two or more persons, and the difficulty arising from the various *extent* of the conception wealth, according as wants vary from individual to individual and from group to group, or from nation to nation, and according as the ratio is of the available quantities of commodities to the demand,—we encounter a further difficulty due to the fact, that from one period to another the wants and the means of satisfying them may have increased *pari passu*. Now, even admitting that the new means to meet new wants are deficient in quantity, so as to warrant their ranking as riches, it does not appear satisfactory to say that one person, or a group of persons, or a nation is, or are, richer with respect to another, or others, of a preceding epoch, when the only difference in the conditions of life is that expressed in the hypothesis. The conclusion that wealth has increased cannot be avoided, but again it does not coincide with an increase of comfort, and therefore, albeit correct, it is destitute of practical value, being susceptible of no ulterior deductions.

In the same way, the difficulty of the valuation is greatly enhanced by the fact, that as times change, old wants and corresponding riches disappear, whilst new wants supervene,

inducing us to regard as riches what we did not so regard before. We may therefore discover in the inventory of a nation's wealth, a century ago, a number of things that are no longer riches, and in its present inventory a number of others that have become riches recently. At shorter intervals this difficulty assumes the shape of qualitative changes in certain commodities, which retain their name and enough of their original properties to warrant their being regarded as still of the same genus, but are so altered withal as to constitute different species.

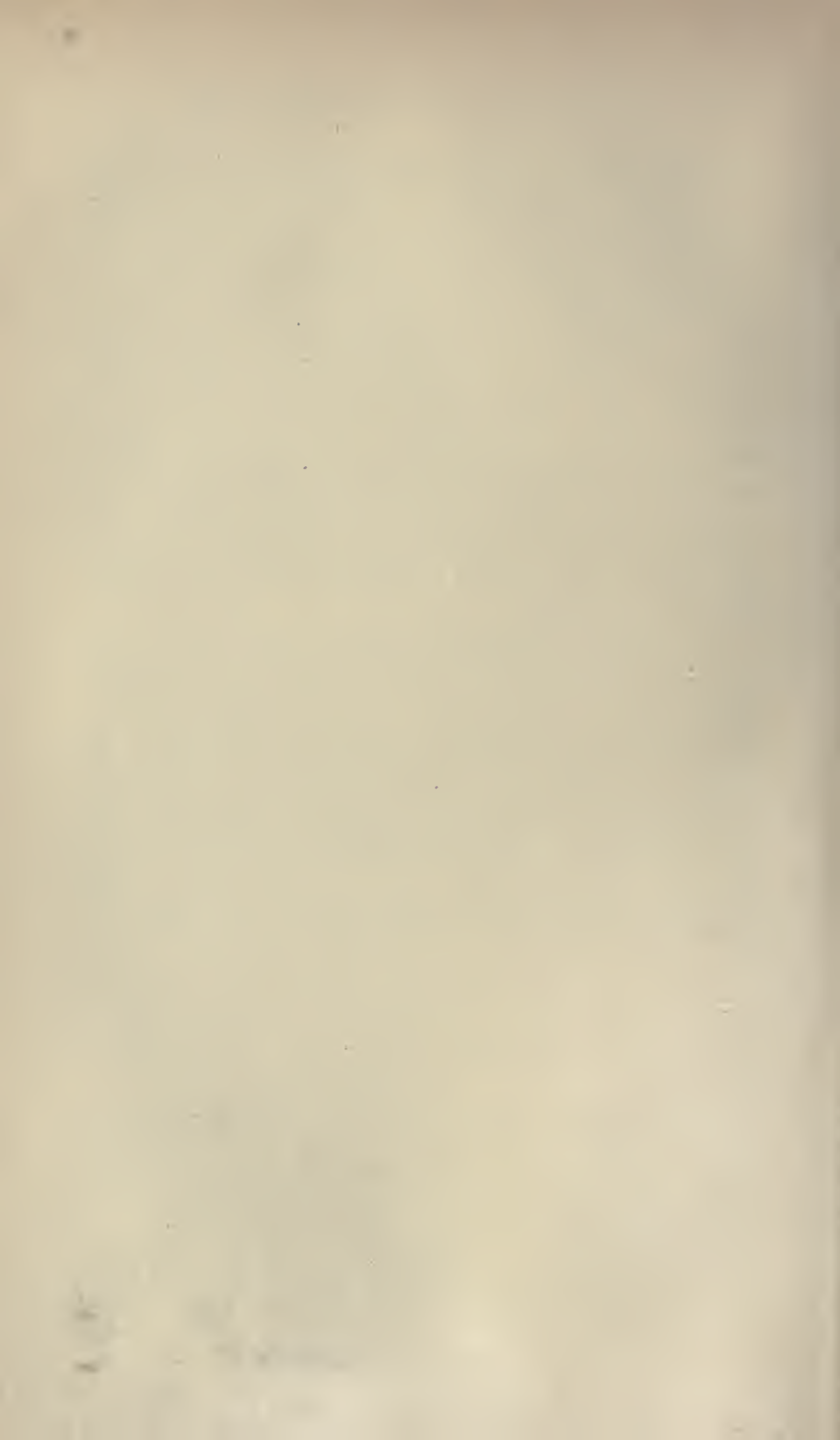
But the greatest difficulty is encountered in the research for a unit of value common to both periods, for of the various methods discussed hitherto for the valuation or measurement of masses of riches, the only one that yields any result (in cases where it can be applied) is that which consists in expressing masses of wealth in terms of their exchange value.<sup>1</sup> It is evident in fact, that the system of enumerating the metric quantities of the various kinds of riches they possess, cannot be utilised for the purpose of comparing the relative comfort of two individuals or nations, even supposing these to exist under identical conditions of time and place, for no sum can be made of heterogeneous units of measurement, nor can we balance the inferiority of the one in respect of certain kinds of riches by his superior opulence in respect of certain other kinds.

The system of mensuration based on the psychological cost of the riches respectively possessed by the parties is also unsuitable, for it presupposes the determination of such cost collectively, whereas each individual can only determine it as regards himself, the psychological cost of the wealth of others not being open to his scrutiny. Moreover, as regards the

<sup>1</sup> The following *baseless* objections have been made to this method: 1st, That there can be no such thing as a *sum of values*, because value is the rate of interchange of two products. But the sum is not of *rates of interchange*, but of the *units* which the various things constituting a mass of wealth represent, when each is expressed by a number equal to the *quantity of units of any one commodity for which it is, or could be, exchanged*. 2nd, That if we duplicate or halve a mass of wealth by duplicating or halving each of its parts, *the sum of the values does not vary*, because the *rates of interchange remain unvaried*. The rates of interchange do indeed remain unvaried, but *the sum of the units, reckoned as we have explained above, is duplicated or halved*, because the quantity of things is duplicated or halved.

valuation of wealth with reference to its final degree of utility, if we would avoid the objection just mentioned to the system of mensuration based on cost, we must obtain the variations of the final degrees of utility from the tangible or visible fact of the variations in the exchange values, of which after all,—as we shall explain in the sequel—they are the true and ultimate cause; hence by this means we fall back on the system of valuation based on exchange value. This does not necessitate our finding a specific commodity that has not changed in value during a lapse of time; but it involves the computation of the coefficient of the variation in value of any commodity; for we should then have a perfect standard for the mensuration of values belonging to distinct epochs. The methods of computing this coefficient of variation constitute however, as yet, one of the most controverted and difficult problems in economics.<sup>1</sup>

<sup>1</sup> The best works on the subject are the following in order of excellence: 1st, F. Y. Edgeworth, *Report of the Committee appointed for the Purpose of Investigating the best Methods of Ascertaining and Measuring Variations in the Value of the Monetary Standard*. Memorandum by the Secretary Brit. Assoc. Adv. of Science, 1887. 2nd, Giffen and Edgeworth, *Second Report of the Committee*, etc., and *Memorandum by the Secretary on the Accuracy of the proposed Calculation of Index Numbers*, 1888. 3rd, T. Lehr, *Beiträge zur Statistik der Preise*, Frankfurt a/M. Sauerländer, 1885, and *Das Verfahren zur Ermittlung des Geldpreises und seiner Aenderung*. 4th, M. W. Drobesch, *Ueber Mittelgrößen und die Anwendbarkeit derselben auf die Berechnung des Steigens und Sinkens des Geldwerthes*. Berichte der K. Sächs. Gesellschaft der Wiss.: Math. Phys. Classe, 1871, I. Leipzig, Hirzel. 5th, W. S. Jevons, *Investigations in Currency and Finance*, Macmillan, London, 1884, No. II. A Serious Fall, etc, and III. The Variation of Prices, etc.



PART II  
THE THEORY OF VALUE



## CHAPTER I

OF VALUE; HOW DEFINED; ITS CAUSES AND WITHIN  
WHAT LIMITS IT IS ARBITRARY

### § 1. *Definition of Value*

VALUE is the *ratio in which the unit of measure of one thing exchanges for a multiple, or fraction, of the unit of measure of any other determinate thing.* Thus, for instance, we may say that the value of a certain kind of wheat, at a given time and place, is thirty shillings, if a quarter of such wheat is actually exchanged, at that time and place, for thirty shillings. Value, in other words, is a mathematical proportion between two quantities of wealth exchanged against one another in a given market.<sup>1</sup>

It frequently happens that the quantity of one thing is called *the value* of another; as for instance, that thirty shillings is termed the value of a quarter of wheat. This mode of expression is elliptical; value is never an object possessed of dimensions; it is merely an abstract relation between two quantities of two things. If however we bear in mind the unit of measurement of one of the two things, we may, speaking elliptically, indicate the quantity of the one as the value of the other; just as in mathematics we may say that  $b$  is to  $c$  as  $d$ , instead of saying that  $b : c = d : 1$ .<sup>2</sup>

<sup>1</sup> *Confer ante*, part i. chap. ii. § 4.

<sup>2</sup> If we wish to indicate the *quantity of one thing* that we can purchase with another, it is advisable to use, instead of the term value, the term *price*, as recommended by Verri, instead of restricting the meaning of this word to the sole case in which the quantity we mean to designate as sold or purchased is a sum of money. Verri, *Sulle leggi vincolanti nel commercio dei grani*, p. 14, Custodi, tome xvi. vol. ii. of Verri's works.

The graphic expression of value is easily found. Let OX and OY be two axes at right angles to each other (diag. XXVIII.). Let a distance  $Om_1$  be measured along OX, denoting a determinate quantity of any given commodity, e.g. a quarter of wheat. Along OY let a distance,  $On_1$ , be measured, denoting the quantity of some other commodity for which the quantity  $Om_1$  of the first commodity is exchanged, say thirty shillings. Through  $m_1$  let a line be drawn parallel to OY, and through  $n_1$  a line parallel to OX, and let the intersection of these two parallel lines be at  $p_1$ . Then  $p_1m_1$  is equal to  $n_1O$ , and represents the quantity of one commodity (thirty shillings) for which in a given market the quantity  $Om_1$  of

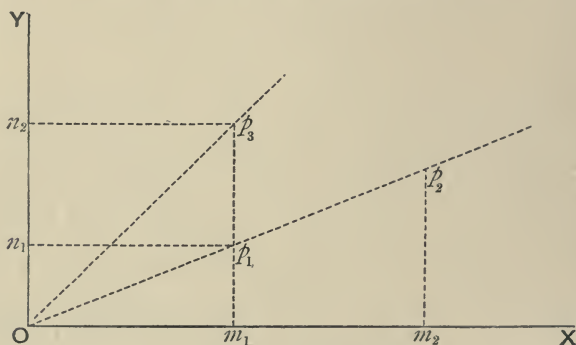


DIAGRAM XXVIII.

another commodity (a quarter of wheat) is exchanged. The value is therefore the ratio of  $p_1m_1$  to  $Om_1$ , i.e.  $p_1m_1 : Om_1$ .

Drawing the dotted line,  $Op_1$ , we perceive at once that  $\frac{p_1m_1}{Om_1}$  is

the trigonometric tangent of the angle  $p_1Om_1$ , and that the value and variations of the value are expressed graphically by the direction of  $Op_1$ . Value may therefore be defined as a *trigonometric tangent*, or an *angular magnitude*. In fact, so long as  $Op_1$  is in the former position, the rate of interchange is constant. Let us suppose a quantity double  $Om_1$ , viz.  $Om_2$ , and let the corresponding ordinate intersect  $Op_1$  produced at  $p_2$ ; then  $p_2m_2$  will be to  $Om_2$  as  $p_1m_1$  to  $Om_1$ ; that is, we shall have sixty shillings exchanging for two quarters of wheat, which is the same ratio as before. Let us suppose, on the other hand, that whilst  $p_1m_1$  remains the same,  $Om_1$  is



modified, or *vice versâ*, that is, that more or less wheat than formerly is given for the same amount of money, or that more or less money than formerly is given for the same quantity of wheat; in either of these cases we shall have a change in the direction of  $Op_1$ , that is an enlargement or a diminution of the angle  $p_1Om_1$ . In fact, let the quantity of money that is given in exchange for a quantity  $Om_1$  of some other commodity increase, that is, let  $n_1$  rise to  $n_2$  on OY, and let the parallels through  $n_2$  to OX, and through  $m_1$  to OY be

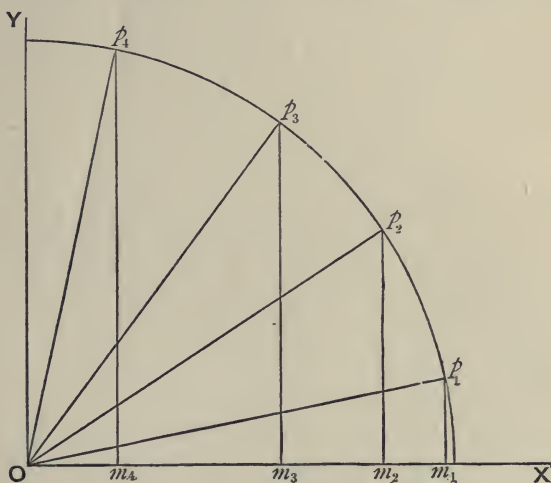


DIAGRAM XXIX.

intersected at  $p_3$ ; the rate of interchange will then be denoted by  $\frac{p_3 m_1}{Om_1}$ , or by the *trigonometric tangent* of the angle  $p_3Om_1$ , *i.e.* the new direction of  $Op_3$ . After this it is certainly unnecessary to exhibit graphically the further case of a plus or minus variation of  $Om_1$ ,  $On_1$  remaining unchanged; suffice it to observe that the owner of the commodity measured along OX (*i.e.* the wheat) will express its value by means of the tangent of the angle  $p_1OX$ , whilst the owner of the commodity the quantities of which are measured along OY (*i.e.* the money), will express its value by means of the co-tangent of angle  $p_1OX$ , or the tangent of angle  $p_1OY$ .

It is evident from the foregoing, that all the possible values of one commodity in terms of another, or all the

possible rates of interchange between two commodities, are expressed graphically by the revolution, from right to left, within a quadrant  $\left(\frac{\pi}{2}\right)$ , of a straight line passing through O.

In fact the nearer P (diagram XXIX.) approximates to OX, as for instance in the position  $OP_1$ , the smaller does  $P_1m_1$ , and the larger does  $Om_1$ , become, that is, the less does the *value* become of the quantity of commodity denoted by the length of  $Om_1$ . If  $OP_1$  were to coincide altogether with OX, that would mean that *the price of a quantity OM of commodity had become zero*. On the other hand, the more P approximates to OY revolving from right to left, and passing through the positions  $P_2 - P_3$  and reaching the position  $P_4$ , the smaller does OM become, passing through the values  $Om_2 - Om_3 - Om_4$ , whilst  $P_2m_2 - P_3m_3 - P_4m_4$  increases. In other words, *the quantity of commodity OX that is given in exchange decreases, and the quantity of commodity OY that is received in exchange increases*. If OP coincides finally with OY, that signifies that the price of a portion of commodity OX is infinitely great, because the OM's have become zero, and the PM's have attained a maximum length.<sup>1</sup>

*Value* being the rate of interchange of commodities, it does not really exist, save at the moment when the exchange takes place; just as the utility of a thing only exists at the moment when it is consumed or enjoyed. But just as utility is attributed to things that can be consumed and are reserved for that purpose, so too we speak of the value of one thing with respect to another, when it can be exchanged for it in determinate proportions. It will be said, for instance, that the

<sup>1</sup> Let the tangent  $\alpha = \frac{y}{x}$ . If the arc increases from  $0^\circ$  to  $90^\circ$ , the ordinate  $y$  increases and the abscissa  $x$  decreases; therefore the tangent increases with the arc, but not as the arc. For  $\alpha=0$ , we have  $y=0$  and  $x=1$ . For  $\alpha=\frac{\pi}{4}$  we have  $y=x$ . For  $\alpha=\frac{\pi}{2}$  we have  $y=1$  and  $x=0$ . Therefore tangent  $0^\circ=0$ ; tangent  $\frac{\pi}{4}=\text{tangent } 45^\circ=1$ ; tangent  $\frac{\pi}{2}=\text{tangent } 90^\circ=\frac{1}{0}=\infty$ . This system of graphic notation has been devised by Professor Marshall, *The Pure Theory of Foreign Trade*, chap. i. § 4, p. 7, and note to § 5, p. 9. Unfortunately Professor Marshall's eminently ingenious studies have only been printed for private circulation, and consequently are not accessible to the public. Jevons, *op. cit.* p. 90.

value of a quarter of wheat is thirty shillings, if it is well known that it could be exchanged for thirty shillings, where it is, at a given moment. In other words, value comes to mean the *exchange power* of a thing, or its *potential rate of interchange* (its "permutative power," as the old Italian economists call it; its purchasing power, as it is termed by English economists). It must be observed, that in speaking of the *exchange power* of a thing, or of its *value* in this *generic* sense, we mean the **MAXIMUM QUANTITY** of the other commodity which we can obtain in exchange for the first.<sup>1</sup>

It is consequently absurd to speak of the value of a thing as one of its *qualities*, unless by the quality of a thing we mean the *condition of fact* that it is exchangeable for some other thing, in a determinate ratio.

Value, being the rate of interchange of two things, presupposes the existence of at least two things; but it does not presuppose the existence of at least two persons, and hence, *a fortiori*, it does not presuppose the existence of a human society. In fact, given even an isolated individual, he can, with a view to maximising his comfort, submit to some labour in order to obtain some product; and by so doing he exchanges the pleasure he enjoyed, either in the form of rest, or of absence from that pain which is the concomitant of work, for the greater pleasure arising from the fruits of his labour. This, as the reader will remember, may be briefly formulated in the theorem due to Ferrara, that *value is, in the first instance, a phenomenon of individual or isolated economics*. It follows that all that group of economic theorems which are commonly expounded under the title of "production of wealth," and which set forth the *conditions under which the production of wealth gives rise to hedonic maxima*, are simply *phenomena of value*, in individual and social economics.<sup>2</sup>

<sup>1</sup> Wordsworth Donisthorpe, *Principles of Plutology*, Williams and Norgate, London, 1876, chap. ix. p. 133.

<sup>2</sup> The so-called *production of wealth* is a *form of exchange*, and the so-called *theory of the production of wealth* belongs to the *theory of exchange*. This is a necessary conclusion from Ferrara's doctrine, though it appears to be controverted by Martello, *op. cit.* § 66, pp. 243-245. See on the same subject Courcelle Seneuil, *Traité théorique et pratique d'économie politique*, tome i. livre ii. chap. i. § 2, p. 220, Amyot, Paris, 1867.

## § 2. Various Uses of the Term "Value"

It is of no consequence whatever to the economist to know what other meanings are attributed to the term "value," either in popular language, or in other branches of knowledge. Such researches are of interest for the lexicographer, and will yield diverse results for different languages; in economics it is essential that no doubt should exist as to the sense in which a word is used in that science, whether with or without the sanction of the philologist and man of letters.<sup>1</sup>

"Value" has been frequently, and is still, used as a synonym of total utility; since the time of Adam Smith, however, this meaning has been more commonly expressed by the term "value in use," "value" alone being used rather to denote "exchange value."

Moreover, and particularly of late, Austrian and German economists have used the term "value" to express what has hitherto been known as the final degree of utility, or the utility of the last small increment of a quantity of commodity, or yet again the importance for an individual of the satisfaction afforded him by the last small increment of a commodity in his possession, or the importance for him of the pain he is saved from by the possession of such last small increment. In order to avoid misapprehension, instead of using the term "value" alone, when the final degree of utility is meant, they say "subjective value," and when the rate of interchange is meant, they say "objective value." There is nothing to be said either for or against these vagaries, which neither assist nor impede the progress of economics.

Lastly, the term "cost value" is frequently used to denote either the cost, that is the sum of pains of every kind, that the production or appropriation of a thing has occasioned to its possessor; or the rate of interchange which a commodity

<sup>1</sup> It is absurd to oppose the introduction of neologisms in economics, when they are useful; and they are useful when they help to differentiate concepts which were not differentiated before, or to differentiate them better than they were differentiated before. In natural science no exception is taken to new terms, such as *potential*, *ergal*, *Kraefte-Funktion*, and hundreds of others. Why should economists object to *util* (Fisher), or to *ophelimity* (Pareto), *amount index* (Marshall) and the like?

would bear, if it were exchanged at a price that would exactly cover the expenses of production.

### § 3. *Of the Causes of Value, or the Conditions of every Exchange*

An exchange, not being in itself an act affecting our senses pleurably, is not made for the mere love of barter; and between persons supposed to be perfect egoists it only takes place to the extent that it realises the hedonic postulate, *i.e.* in so far as it augments the quantity of utility at the disposal of the persons making it. Hence, an exchange cannot take place, unless certain conditions exist, which are for that reason termed the *causes of value*, and which constitute at the same time the limits within which exchanges occur.

Thus, suppose two persons, each possessing a determinate quantity of different commodities (*e.g.* the one  $mA$ , the other  $nB$ ), it is necessary that there should be a *difference in the comparative degrees of final utility of the commodities in question*; and more particularly that each individual should attribute to a proportionate part of the other's commodity a greater final degree of utility than he attributes to a proportionate part of his own commodity (*e.g.* that the possessor of  $mA$  should attribute a greater final degree of utility to a first  $\frac{1}{n}$  of  $B$  than he does to the last  $\frac{1}{m}$  of  $A$  he possesses; and that the possessor of  $nB$  should judge in a different sense).<sup>1</sup>

<sup>1</sup> We say "a difference in the comparative degrees," because the difference must be as between Primus's appreciation of the final degree of utility of a portion of  $A$  and of a portion of  $B$ ; and the same, *mutatis mutandis*, as regards  $B$ ; and not as between Primus's and Secundus's appreciation with respect to portions of  $A$  or  $B$ . Respecting the fundamental condition for the possibility of an exchange, see any economist from Pompeo Neri onwards. Among modern Italians, more particularly Ferrara's 50th Lecture, and among foreign writers, Jevons, *op. cit.* pp. 129-132, and Gossen, *op. cit.* pp. 82-90. It is not necessary, as will be seen farther on, chap. iii. § 2, that the possessor of  $nB$  should judge in an *opposite* sense. He only needs to judge *differently*. He may, just like the possessor of  $mA$ , attribute to  $\frac{1}{n}$  of  $B$  a greater final utility than he does to  $\frac{1}{m}$  of  $A$ , if he only does so in a *different measure* than the possessor of  $mA$  does. A difference in comparative final utilities is *the one sufficient condition for exchanges*.

This is expressed in popular language by saying, that each party to a sale or exchange must deem the article purchased or received in exchange to be more useful to him than the thing sold or given in exchange. If this condition is realised, each party augments, by means of the exchange, the total utility at his disposal; since each substitutes for the quantity of utility he loses in parting with a portion of his wealth (the former,  $\frac{1}{m}A$ , the latter  $\frac{1}{n}B$ ), another quantity of wealth, which in his estimation has a greater final degree of utility, *i.e.* the part he receives of the other's wealth.<sup>1</sup>

<sup>1</sup> Two observations may perhaps be expedient to explain the conditions to which every exchange is subject. If Primus is disposed to give, say a book to Secundus for six shillings, and Secundus is disposed to give, say six shillings to Primus for the book, it is not allowable to infer that *Primus values six shillings more than Secundus does*, nor that *Secundus values the book more than Primus*. It may even be the case that, although Primus parts with the book in consideration of the six shillings, nevertheless he values it more than Secundus. This is so, if *Primus values the six shillings much more than the book, and yet values both the six shillings and the book much more than Secundus*. Let us suppose, for instance, that Primus is willing to work three days to obtain the book, but six to earn the six shillings, and that Secundus is only willing to work one day to acquire the book, and half a day to earn the six shillings; in that case it will certainly be to Primus's advantage to offer the book and accept the six shillings, and to Secundus's advantage to take the book and to give the six shillings, *although Primus desires the book much more than Secundus*. A rich man, for whom money possesses consequently a comparatively small final degree of utility, will be disposed to pay at an auction twice or three times as much for a piece of furniture as a poor man, who needs it much more, but who at the same time needs money much more than the rich man.

The fact of an exchange therefore only proves *the existence of a disparity between the comparative degrees of final utility for either contracting party; but it teaches us nothing as to the final degree of utility of a commodity for the two parties respectively*. This proposition, as we shall see, has been known by the name of the law of comparative costs since the time of Ricardo, and one is surprised to find Böhm-Bawerk treating it as a novelty.

The parties to an exchange always completely ignore the relations subsisting between the total utilities of the two commodities that are the subjects of the exchange, and fix their attention always exclusively on *the relations subsisting between the final degrees of utility of the two commodities*, which relations supply the *motives of their actions*.

In fact, each party to an exchange asks himself, whether what he receives ADDS a larger quantum to his stock of enjoyments than is TAKEN AWAY by what he has to give. The difference between the total utility of a commodity and the degrees of utility of the several increments thereof, we have so far expressed

It may be well to observe that the degrees of utility attributed by either party to the several increments of his own and of the other's commodity are not necessarily identical, or that the curves of the degrees of utility of the two commodities in question are not only two, common to both the contracting parties, but four, inasmuch as for either party there is a special scale of decrease of the degrees of utility of successive increments of either commodity. This at least will usually be the case, for only by a most fortuitous combination of circumstances will two persons experience absolutely the

graphically by the difference between an area and the ordinates that may be drawn within it. A fuller treatment of the subject may be interesting and useful. If we imagine an abscissa divided into equal parts, we may express, by means of such divisions, increasing quantities of a commodity; so that, for instance, the first division will signify one quarter of wheat, the second two quarters, the third three quarters, and so on; and not, as before, the first division a first quarter of wheat, the second division a second quarter, and so on. Next we may imagine an ordinate drawn to each division, proportionate in height to the total utility of the quantity of commodity denoted by it; so that, for instance, the division denoting one quarter has a small ordinate, the division representing the two quarters, one perhaps twice as long, and possibly even longer, and so on. These ordinates will go on increasing up to a certain limit, beyond which they will decrease rapidly, forming, if their extremities are joined, a curve like that of diagram XIV. Thus we shall have expressed the *total utility*, no longer by an area, but by a *curve*, which is a function of the quantity of commodity in question. This is expressed by the formula  $y=f(x)$ , in which  $y$  denotes the total utility and  $x$  the quantity of commodity; so that for each value of  $x$ , say for one, two, or three quarters of wheat, we shall have a value of  $y$ , *i.e.* a corresponding quantity of total utility. Now if we draw a tangent to this curve at any point, its inclination expresses *the ratio in which the curve increases* (or decreases) *at that point*; and since the curve expresses total utilities in function of a quantity of commodity, the inclination of the tangent expresses the *DEGREE OF UTILITY* that an *infinitesimal increment of commodity possesses* for one who is already supplied with the quantity of commodity registered by the abscissa, when cut by an ordinate passing through the point touched by the tangent. Hence the *degrees of utility* are expressed on such a curve by its *INCLINATION*, and this inclination in turn is a function of the quantity of commodity. This is expressed by the formula  $y=f^1(x)$ . Now, the inclination of every tangent to any point of the curve is expressed numerically by dividing the ordinate, which touches the point of contact of the tangent and the curve, by the abscissa limited by the last-mentioned ordinate and the intersection of the tangent with the axis of the abscissæ; in other words, the inclination is given by the trigonometric tangent of the angle formed by the axis of the abscissæ and the tangent. Hence we may construct a curve to represent the inclination of every possible tangent, in function of successive increments of commodity, *viz.* the curve already known to us of degrees of utility,  $y=f^1(x)$ . Coming now to the instance given in the text of Primus possessing  $nA$  and Secundus possessing  $nB$ , suppose Primus has given  $xA$  to Secundus in exchange

same wants, and theoretically a hypothesis of this kind would be a superfluous, if not indeed an erroneous, postulate.<sup>1</sup>

It must further be observed, that the quantity of utility lost by either party to an exchange by the delivery of a portion of his commodity to the other, may sometimes be very slight, or indeed even nil; as would be the case if such a quantity were possessed of the commodity in question, that the degrees of utility of one or more increments thereof would be very small, or equal to zero, or even negative; whilst, on the other hand, the quantity of utility gained may be very great, as would be the case if no portion of the commodity acquired by the exchange were as yet possessed by the person so obtaining it, and if each increment thereof corresponded to an intense want.

So long as conditions subsist that make trucking advantageous to both parties, exchanges will be effected. Each exchange however tends, *cæteris paribus*, to destroy these conditions, by diminishing the disparity between the comparative degrees of final utility of the two commodities in question. In fact, as with each exchange Primus's stock of the A commodity diminishes, its final degree of utility for him increases; whilst as simultaneously Secundus's stock of the same commodity increases, its final degree of utility for him diminishes.

for  $yB$ ; then Primus remains with  $(m-x)A+yB$ , and Secundus with  $(n-y)B+xA$ . The final degree of utility of his stock will be expressed for Primus by  $f^1(m-x)\phi^1(y)$ , and that of Secundus will be similarly expressed. But Primus (and the same applies to Secundus) will not cease exchanging, until the final degrees of utility of the two commodities possessed by him, A and B, become equal; *i.e.* until he finds  $f^1(m-x)dx = \phi^1(y)dy$ . In fact before the exchange, for Primus  $f^1(A)$  was less than  $f^1(B)$ ; but as with each successive exchange the quantity of B acquired by him increases, and the quantity of A remaining to him diminishes, a point of equivalence must be reached of the final degrees of utility of A and B, which puts an end to his interest in exchanging with Secundus. See Wicksteed's *Alphabet of Ec. Sc.*, pp. 20-36; Walras's *Éléments d'éc. pol. pure*, pp. 3-21; Pareto's *Cours d'éc. pol.*, §§ 47-55.

<sup>1</sup> Hence, if we express the degrees of utility of increments of A and B by numerical indices like Menger (pp. 163-167), we must give a different initial index and series to the indices that denote the degrees of utility of increments of A and B for Primus, and to those that denote the degrees of utility of increments of A and B for Secundus. This is done by Walras, Launhardt, Jevons, and Gossen. See *e.g.* Jevons, *op. cit.* pp. 103, 115; Launhardt, § 4, p. 16; Gossen, *op. cit.* pp. 82, 83; Walras, 10th and 11th Lectures, pp. 121-141, *Éléments d'économie politique pure*, 2nd ed.



And *vice versâ*, as Primus's stock of the commodity originally possessed by Secundus increases, whilst Secundus's stock decreases, the said commodity will have decreasing final degrees of utility for Primus, and increasing degrees for Secundus; whence it follows that after one or more exchanges, a time necessarily comes when Primus, on the one hand, attributes an equal final degree of utility to the quantity remaining to him of the A commodity, of which he was the original possessor, and to the quantity he has acquired of the B commodity; whilst Secundus, on the other hand, attributes an equal degree of utility to a further increment of Primus's commodity and to a fresh increment of his own. As soon as this point of the equivalence of the final degree of utility of his own original commodity, and of the commodity acquired from the other party, is attained in the estimation of either, the necessary condition and object of any further exchange fails.<sup>1</sup> However obvious these considerations may be, it seems advisable to add some observations to make the matter still clearer.

In the first place, it must be noticed<sup>2</sup> that, as the result of the exchanges effected, all disparity between the comparative degrees of final utility of each unit of commodity *for one of the parties* cannot have disappeared, if it still exists as regards *the other party*. A student's first impression is that Primus may have obtained enough of Secundus's commodity, so as not to desire to continue trucking, whilst Secundus has not yet had enough of Primus's commodity, and would be willing, in order to obtain a further portion of it, to give up some more of his own original commodity. This impression, however, does not bear careful scrutiny. The levelling up, or down, of comparative degrees of marginal utility can only happen for Primus, if it occurs simultaneously for Secundus. All the marginal utilities of all the commodities possessed by Primus will only then be equal, when all the marginal utilities of the commodities possessed by Secundus are equal to one another. Suppose, for a moment, this were not so, and that, *at a given ratio of exchange*, Primus should have bartered just so much of his original commodity against that

<sup>1</sup> Gossen, *op. cit.* pp. 84, 85. See the criticism of Gossen's formula in Walras's *Éléments d'économie pure*, 2nd ed. p. 189.

<sup>2</sup> See Pareto's *Cours d'économie politique*, 1896, Lausanne, § 52.

of Secundus, as not to be disposed to continue the transaction, whilst it should still be profitable for Secundus to continue trucking, evidently Secundus would be disposed to alter the former ratio of exchange to his own disadvantage, that is to say, he would be willing to continue exchanging, at a new ratio more favourable to Primus. And Primus, supposing him to be a *homo œconomicus*, must agree to do so; for if the equivalence of marginal utilities existed at the former ratio, it cannot at the same time exist at the new one. Moreover, it must be understood that our formula of the *equivalence of the comparative degrees of final utility* comprises, for instance, the case of the (B) commodity possessed by Secundus being so valuable for Primus, that he does not stop trucking, until he has exchanged *the whole of his own commodity* (A) for more or less of Secundus's commodity (B). In this case, albeit the final degree of utility of Secundus's commodity (B) decreases for Primus, as he goes on acquiring successive increments thereof, whilst that of his own commodity (A) increases with each successive alienation, nevertheless the degree of utility of the smallest increment of his own commodity (A) is less than the degree of utility of the last increment of Secundus's commodity (B) that he can still obtain by exchanging A for B, and the equivalence of the final degrees of utility is established between a negative quantity of A and a positive quantity of B. At bottom, this case, far from having anything singular or exceptional about it, is the one which realises in *the most typical and perfect* manner imaginable, the supreme condition of every exchange; for in it we have to do with a person for whom the disparity in the comparative degrees of final utility not only exists, but is so great as to be infinite, the final degree of utility of any increment of his own commodity being, in his estimation, equal to zero, in comparison with the final degree of utility of the quantity of the other person's commodity that he can purchase with his own.<sup>1</sup> Finally, it must be observed that

<sup>1</sup> This case is very frequent; every trader in a specific commodity is ready to sell even the whole of his stock to his customer at the same rate of interchange at which he lets him have a part, and even at a rate still more favourable to the customer. *Quæ* the customer, on the contrary, the former case is realised, *i.e.* the equivalence of the final degrees of utility of the commodity he gives (usually money) and the one he receives, is attained comparatively early. The second case is unfortunately often realised in exchanges of services for things. Rather

only in exchanges of commodities divisible *ad infinitum* can there be, in the case of either party, a perfect equivalence of the comparative final degrees of utility. For, if we suppose the case of indivisible commodities being exchanged for other indivisible commodities (indivisible commodities being such as deteriorate economically, if physically divided, such as animals, glass-ware, instruments, etc.), or of indivisible being exchanged for divisible commodities, it may easily occur that the equivalence of the comparative degrees of final utility is not attained,

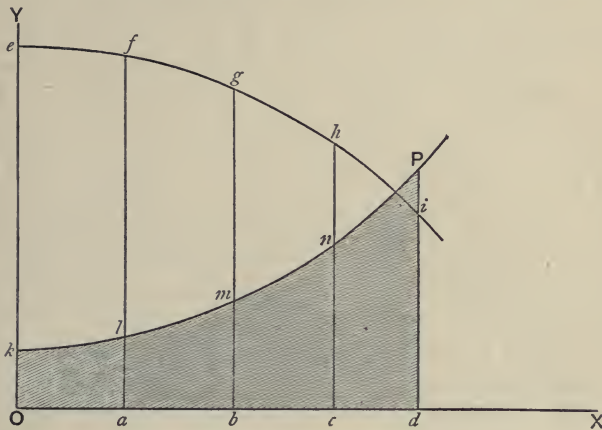


DIAGRAM XXX.

for one or both of the parties, save for fractional quantities of the indivisible commodities. Let us suppose, for instance, with Jevons, that a person wants ink and can only buy it in bottles of at least one shilling each; that three bottles certainly have a greater degree of final utility than three shillings; and that, as in diagram XXX., the first, second, and third bottles have the decreasing degrees of utility  $Oafe - abgf - bchg$ , whilst the three shillings which must be given to acquire them have the increasing degrees of utility  $Oalk - abml - bcnm$ .

than have no wages, a workman accepts any wage, because, given the division of labour and the specialising of trades, skill in one particular craft cannot at once be turned to account in another; and a person whose labour is not in request cannot himself set to make what he requires for his sustenance, and which he would have purchased with the wages of his labour. Therefore the final degree of utility of the latter soon sinks to zero in comparison with the final degree of utility of any wage.

Under these conditions an exchange will certainly result in an increase of utility for the person to whom the curves refer, denoted by the area enclosed by  $klmnhgfe$ .<sup>1</sup> But if we suppose,—as is likewise denoted by the curves,—that a portion of a fourth bottle, say two-thirds, would be still more useful to him than two-thirds of a shilling; but that the last third of a fourth bottle would not be more useful to him than the last third of a fourth shilling, will the exchange of a whole fourth bottle for a shilling take place, or not? In the first place, it must be observed that, if it does, the *perfect equivalence* of the comparative final degrees of utility is at an end; for the final degree of utility of the ink will be expressed by  $id$ , and that of the shilling by  $Pd$ ; if it does not take place, even then there is no perfect equivalence between the comparative degrees of utility, for the final degree of utility of the ink will be  $hc$ , whilst that of the shilling will be  $nc$ . In other words, either less ink will have been bought than there was reason for buying, or else a little more. A determination will be come to, in one or other sense, according as the inconvenience or dissatisfaction caused by buying, or not buying, is less, *i.e.* according as the area  $cdPn$  or  $cdih$  is greater.<sup>2</sup> If instead of obtaining the ink in exchange, say for money, it were produced directly, and the technical conditions were such that it could only be produced in quantities of a determinate magnitude, the same *ἀπορία* would result. In fact, all that is required is that we should consider the ascending ordinates, which before meant shillings, as now denoting increments of labour (*confer* part i. chap. iv. § 10).<sup>3</sup>

<sup>1</sup> Respecting this area, which is most important, especially for the science of finance, something will be said hereafter. At present it is sufficient to observe that it is called *residual utility*, and that its nature and functions were first recognised by J. Dupuit, *De l'influence des péages sur l'utilité des voies de communication*, p. 195 and following, No. 107, tome xxv. of the *Annales des ponts et chaussées*, 2nd series, 1849, Paris, Carillan-Gœury. See *ante*, part i. chap. iv. § 3.

<sup>2</sup> Jevons, *op. cit.* p. 136.

<sup>3</sup> Respecting the fundamental condition for the existence of whatever exchange, *viz.* that the final degree of utility of the thing received must be greater than that of the thing given, we would observe, that probably *there is a much more fundamental law*, which comprises this one as the genus comprises the species. We may take it that all wealth is *always* exchanged, and that if any one refuses to sell at the price offered to him, *he is himself the purchaser of his own substance*, *i.e.* *the party who makes the best offer*. Hence it would follow that *the supply is always equal to the demand*, without any distinction as to effective or non-effective,

§ 4. *Of the Maximum and Minimum Limits of Value in Isolated Economics and in the Economics of Exchange*<sup>1</sup>

Given the existence of conditions necessary to realise an exchange, many *rates of interchange*, or many prices, are compatible with them, both in isolated and in social economics.

We propose to examine this proposition, first on the hypothesis of the exchange of only two commodities by two persons; secondly, on that of isolated economics; and thirdly,

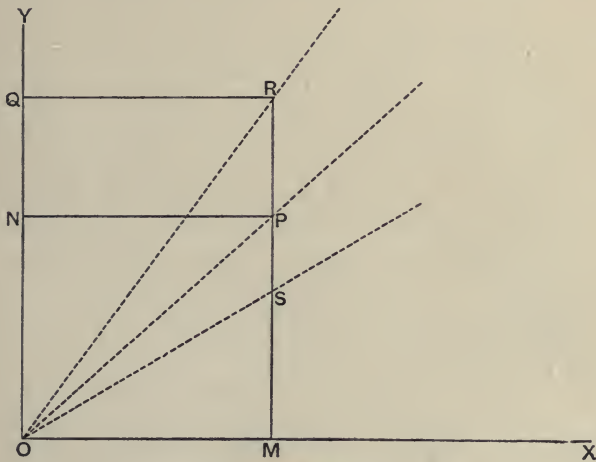


DIAGRAM XXXI.

on that of an exchange taking place between several competing vendors and one purchaser, or many competing purchasers and one vendor. This arrangement of the subject appears to be the most natural.

I. In diagram XXXI. let the quantity of a commodity possessed by Primus be marked off on OX; and thus let OM denote, for instance, a quarter of wheat, and let the quantities of some other commodity possessed by Secundus be marked off on OY; for instance, let ON denote thirty shillings.

or that *all wealth is always and necessarily sold*, or that *it is sold unconditionally*, and therefore even in the absence of the alleged fundamental condition set forth above (Donisthorpe, *loco cit.*).

<sup>1</sup> See Giovanni Rossi, *La matematica applicata alla teoria della ricchezza sociale*, 1889, Reggio Emilia, vol. i. No. 2, 2nd essay.

Now, assume that Primus is not disposed to sell a quarter of wheat for less than thirty shillings, and that because for him the final degree of utility of thirty shillings is not greater than that of a quarter of wheat; in that case he would naturally accept with pleasure any greater quantity of money he could get in exchange for his quarter of wheat. If we draw through N a parallel to OX, and through M another to OY, which will intersect at P, we shall say that the least advantageous rate of interchange Primus will be satisfied with is given by  $\frac{ON}{OM}$ , or by  $\frac{PM}{OM}$ , or yet again by the tangent of the angle POM (see part ii. chap. i. § 1).

As regards Secundus, let us suppose him willing to give, if need be, much more than thirty shillings for a quarter of wheat; but however great may be in his estimation the final degree of utility of a quarter of wheat, having regard to his need and to the scarcity of the supply, and however limited may be for him the final degree of utility of money, having regard to the abundant supply he possesses, as compared with his requirements, nevertheless both will necessarily be definite, and we may suppose that Secundus would not pay more than thirty-five shillings for a quarter of wheat.

Let the price of thirty-five shillings be expressed on OY by the segment OQ, and let the parallel to OX through Q intersect the parallel through M to OY at R. Hence the least advantageous rate of interchange that Secundus will be satisfied to accept is given by  $\frac{OQ}{OM}$ , or by  $\frac{RM}{OM}$ , or yet again by the tangent of angle ROM.

As Primus and Secundus are actuated solely by hedonic motives, the first will try to obtain for OM of wheat a higher remuneration than PM of money, and the second to pay for OM of wheat less than RM of money; but each of them will prefer to accept any rate of interchange within these limits, rather than forgo the exchange. Now, it is clear that between the minimum rate of interchange  $\frac{PM}{OM}$ , which is the least advantageous that Primus will accept, and the maximum rate of interchange  $\frac{RM}{OM}$ , which is the most advantageous that

Secundus will agree to, there are an *infinite* number of rates which satisfy the requirements of both parties, and which they will rather accept than lose the opportunity of an exchange. In fact, the prices of thirty-one shillings, thirty-two, thirty-three, thirty-four, and up to thirty-five shillings per quarter, are within the difference between the comparative degrees of final utility for both parties. Graphically, it is evident that every ordinate greater than PM, and less than RM, satisfies the conditions given by the magnitude of the final degrees of utility of money and of wheat for the two parties respectively, and that an exchange may be effected with mutual, but diverse, advantage for every position that OP duly produced, *i.e.* the side of angle POM may assume, revolving about the fixed point O to the left, from P to R.

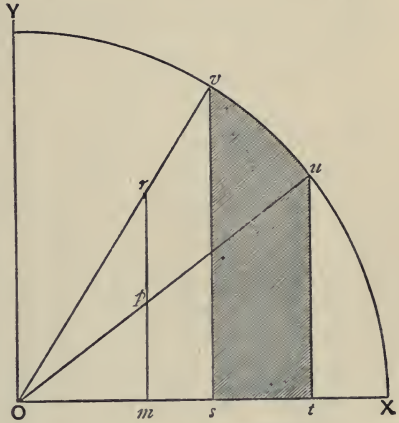


DIAGRAM XXXII.

Supposing OX and OY in diagram XXXII. to be equal to the unit, as we have already done in diagram XXIX., and supposing a quarter of wheat to be denoted by Om, and the minimum price that Primus will accept in exchange for it by pm, and the maximum price that Secundus will give by rm, we shall produce Op to its intersection with the curve YX at u, and similarly Or to v. Then, drawing the parallels to OY through v and u and obtaining the right lines vs and ut, we shall say that the prices acceptable to both parties lie between the tangent vOX and the tangent uOX, *i.e.* between the maximum rate of interchange  $\frac{vs}{Os}$  and the minimum  $\frac{ut}{Ot}$ \* These prices, which are acceptable to both parties, are denoted by the dotted lines perpendicular to OX through s and t.

\* The reader will readily observe that  $\frac{vs}{Os} = \frac{rm}{Om}$  and that  $\frac{ut}{Ot} = \frac{pm}{Om}$ .

Jevons,<sup>1</sup> and with him Menger, have held that only anti-economic factors (*i.e.* above all the multifarious circumstances that render one individual more expert at bartering than another<sup>2</sup>) will decide which among the infinite possible ratios will actually be selected. This is open to question, if we consider that Primus and Secundus cease trucking when, for one or other, the equivalence of the final degrees of utility of the commodities given and received is attained; but that for each of them this equivalence is attained in respect of different masses of the commodity they give and receive, *according to the rate of interchange*. In fact the final degree of utility of wheat rises for Primus with each sale, whilst that of money falls; now if the rate of interchange is very favourable to Primus, the equivalence of the final degrees of utility is reached at a moment when he is in possession of a *quantity of wheat that is still considerable, with a low final degree of utility; in other words, the final degree of utility of money will have fallen much more rapidly than that of wheat will have risen, and equivalence will have been reached at a point which leaves to Primus a large total utility both for wheat and for money*. If, on the contrary, the rate of interchange is very unfavourable to Primus, the equivalence of the final degrees of utility is reached only after he has parted with a large amount of wheat, *i.e.* when the latter has a high degree of final utility and presents a comparatively small total utility; in other words, *the final degree of utility of money will have fallen much less rapidly than that of wheat rose, and equivalence will have been reached at a point at which the final degrees of utility are different from what they were in the former case*.<sup>3</sup> Now,

<sup>1</sup> Jevons, *op. cit.* p. 134; Menger, *op. cit.* chap. v. § 1, pp. 175-179; Böhm-Bawerk, *Grundzüge der Theorie des wirtschaftlichen Güterwerths*, Theil II. n. iii. A. p. 492; *Jahrb. für Nationalök. und Statistik*. Bd. xiii. Heft vi. 1886.

<sup>2</sup> On the subject of anti-economic factors of exchange, see principally: A. de Johannis, *Analisi psicologica ed economica del valore*, Venezia, Fontana, 1883; and the same author's *Discussioni economiche*, Padova, Drucker, 1881, part ii. chap. vi.

<sup>3</sup> In exchanges of indivisible things, or of indivisible for divisible things, the arbitrariness of the rate of interchange exists effectually within given limits. Primus does not wish to sell a book for less than six shillings, whilst Secundus is willing to pay as much as ten shillings. Between six and ten any price is possible. But that arises from the fact that in these exchanges we have not even a true equivalence of the comparative degrees of final utility.



if this is true, it is not impossible that a *hedonic maximum* may be furnished by one among the infinite possible rates of interchange; and perhaps even that it may vary according as the object is to realise a cumulative maximum of the satisfactions of Primus and Secundus, or two distinct, but compatible, maxima for Primus and Secundus; in which case this is the rate of interchange that hedonists will agree in selecting among the many.<sup>1</sup> The theoretical point of equilibrium can be determined graphically as follows:—

Suppose an object is bargained for between Primus and

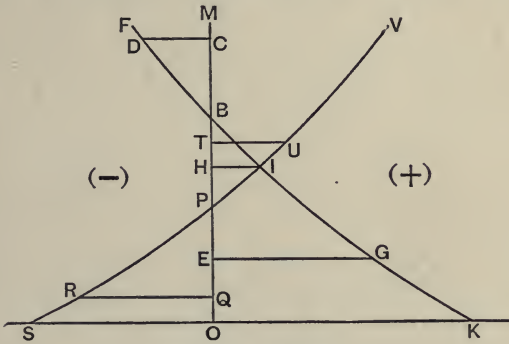


DIAGRAM XXXIII.

Secundus. Let all possible prices be measured on OM (diagram XXXIII.). Say OP is the *least* price Primus is disposed to receive. If he were to accept a smaller price, say OQ, let his loss in utility be measured by QR. The loss, in terms of utility, of any price between O and P will be measured by an abscissa like QR, infinite, perhaps, in O and zero at the price P. Curve PRS measures this loss in terms of utility for any possible price between zero and P. Now, let Primus obtain a price greater than P, say T. His gain in utility will be measured by TU. The curve PUV

<sup>1</sup> Jevons says that among the many prices possible, the choice must be left to an arbitrator. But according to what criterion can this arbitrator decide, unless there exists at least *one* hedonic maximum? On the other hand, if this exists, it will be found by two perfect hedonists, without the aid of an arbitrator. It is also worthy of note, for the solution of this problem, that a rate of interchange exists, among the many possible ones, that presents a stable equilibrium (Marshall, *Foreign Trade*; note on Mill's treatment of an exceptional case, p. 15; see *post*, chap. iii. § 7), as may be perceived at once by treating the question graphically. See G. Rossi, *op. cit.* pp. 67-69.

will measure his gain in terms of utility for any price above P. The whole curve SRPUV is Primus's curve of utility (negative or positive) in function of the price obtained by him.

Let Secundus not be disposed to give *more* than OB for the object which is being bartered. If he had to pay more for it, he would be a loser. Let his loss be measured, for any price above B, by the abscissa which cuts the curve BF. At a price OC he would lose CD. If he can get the object for less than B, he is a gainer, in terms of consumer's rent, or utility. If he got it for OE he would gain EG. The curve FDBGK is a curve of utility in function of price for Secundus. A bargain is possible, *id est*, advantageous for both parties at *any price* between P and B. But *only* a price corresponding to the intersection of the utility curves SV and FK, the price OH, is an *equilibrium price*, giving both parties *equal gain in terms of utility*. And this price must be reached, if both are perfect hedonists, because at this price the strain is equal on both sides.

II. The theorem we have demonstrated as regards two contracting parties, holds good also in isolated economics. If Primus is struggling against the niggardliness of nature, he will say to himself that a quarter of wheat is worth, say, twenty days of labour, but certainly not more than thirty. Therefore he will grow wheat, not only on land requiring twenty days of labour, but also on such as necessitates more, up to thirty days; but he will do without wheat if he finds only land that requires thirty-one days of labour. And, just as in the case of an exchange by two persons, if he finds land that yields its return with twenty-two days' labour, he will let other land which requires more lie fallow, provided the quantity of wheat the most fertile land can yield suffices for his wants.

III. The above theorem naturally holds good likewise in the case of more than two parties to an exchange, *i.e.* of two vendors and one purchaser, or of two purchasers and one vendor, and so on for any number of parties. Only, it must be observed that if the disparities in the comparative degrees of final utility differ as regards the several parties, the arbitrariness of the rate of interchange will always have as its limits the rate of interchange of the seller or purchaser to whom

such rate is most unfavourable, and the rate of interchange of the seller or purchaser who stands next as regards the unfavourableness of such rate to himself.<sup>1</sup> The following observations make this obvious.<sup>2</sup> Suppose that whilst Secundus is the only purchaser of wheat, and the maximum price he is disposed to give is thirty-five shillings per quarter,—as in the previous example,—an offer of wheat is made, not only by Primus, but also by Tertius.

Primus is unwilling to sell a quarter of wheat for less than thirty shillings. Now, if Tertius attributes to a determinate quantity of money a higher final degree of utility than Primus does, or a lower final degree of utility to a quarter of wheat, *i.e.* if the comparative degrees of final utility of whatever determinate quantities of wheat and money present a greater disparity in Tertius's estimate than in that of Primus, he will be disposed to give a quarter of wheat for say, even twenty-eight shillings. On that hypothesis, any price between thirty and thirty-five shillings will meet the requirements of Primus and Secundus, and any price between twenty-eight and thirty-five those of Secundus and Tertius. Now, it is evident that Tertius will prevent Primus, by means of his own more advantageous offer, from effecting any sale with Secundus at a price ranging between thirty and thirty-five shillings, and that Primus will prevent Tertius from effecting any sale with Secundus at a price between thirty and thirty-five. Therefore the price can only vary between eighteen and nineteen; or in other words, the arbitrariness of the rate of interchange is limited below by the minimum rate of interchange of the vendor to whom such rate is most unfavourable (Tertius), and above by the minimum rate of the vendor who stands immediately above him as regards the lowness or unfavourableness of the rate of interchange to himself.<sup>3</sup> If

<sup>1</sup> Readers already acquainted with the Ricardian theory of *comparative costs* will at once perceive its analogy to that of the comparative degrees of final utility. In fact the two theories are substantially *identical*. This is one proof among many that could be adduced to show that the *classic or orthodox economics of Ricardo, Mill, and Cairnes, can only be improved in form, but that in substance it remains what these great masters have made it.*

<sup>2</sup> Menger, chap. v. § 2, pp. 179-186.

<sup>3</sup> Ferrara calls Primus's price the *cost of economic reproduction*; but we shall return to this later.

now a fourth vendor, Quartus, were to offer a quarter of wheat of equal quality at twenty-five shillings, he would shut out Primus and Tertius from any sale; but the latter's offer would in turn prevent his getting a price above twenty-eight shillings, or rather twenty-seven shillings and eleven pence; and again the arbitrariness of the rate of interchange would only range between the minimum prices that Quartus and Tertius are satisfied with respectively. Graphically, these conclusions are shown with the greatest clearness. In fact, returning to diagram XXXI., as long as Primus was the only seller Secundus had, the rate of interchange could have any magnitude within the limits of the angle ROM – POM. With the advent of Tertius, the arbitrariness of the rate of interchange is given by POM – SOM, *i.e.* by the *difference* between the angle POM, which expresses the minimum rate of interchange accepted by Primus, and the angle SOM which expresses the minimum rate of Tertius.<sup>1</sup>

If Tertius, instead of being satisfied with a minimum price (twenty-eight shillings) below that of Primus (thirty shillings), had wanted a higher minimum price than Primus, say thirty-three shillings, Secundus would have exchanged with Primus, but the arbitrariness of the rate of interchange would have ranged between thirty and thirty-three shillings.

Having ascertained the limits of the arbitrariness of the rate of interchange in the case of several vendors competing for one purchaser, let us determine what limits apply in the case of several purchasers dealing with one vendor. Graphically, the solution of this problem is contained in the proof of the last one, since if the ordinates change place with the abscissæ, all that has been said applies to the new case; but if it is desired to repeat the demonstration briefly, let us suppose, that whilst Primus who owns the wheat will not part with it for less than thirty shillings per quarter, Secundus is willing to buy even at thirty-three shillings, and Tertius even at thirty-five shillings. Primus will not deal with Secundus

<sup>1</sup> It must not be said that the arbitrariness of the rate of interchange is *restricted*, for the disparity may be even greater than before. For instance, Titius does not want to sell a book for less than seven shillings; Caius is willing to pay even ten for it; the disparity then is three shillings. But now Sempronius is willing to sell a similar book for one shilling; the disparity in this case is six shillings, *i.e.* 7 – 1, which is more than in the former case.

at a price between thirty and thirty-three, because Tertius will always offer him one shilling more than his competitor. Nor can Tertius deal with Primus at less than thirty-three shillings, because Secundus's offer at that figure will prevent him. Therefore the rate of interchange can only fluctuate between thirty-five and thirty-three; *i.e.* it will be limited above by the maximum rate of the purchaser to whom the rate of interchange is least favourable, and below by the maximum rate of the purchaser who stands next as regards the elevation of the rate of interchange. If now a Quartus arrived offering to buy at forty shillings, the arbitrariness of the rate of interchange would be limited by forty and thirty-five.<sup>1</sup>

To sum up the fundamental propositions expounded in this and the preceding paragraph, we may say: 1st, That an exchange can only take place if, in the estimation of both parties, there is a *difference* in the comparative degrees of final utility of the commodities to be exchanged; 2nd, That within assignable limits, the rate of interchange is arbitrary; 3rd, That in the case of several purchasers, or several vendors, the interchange takes place between those for whom there is the greatest difference in the comparative degrees of final utility; or in other words, that the *conditio sine qua non* for a purchaser or seller who wishes to shut out a rival from the transaction, is the existence of a difference between his own comparative degrees of final utility greater than the difference between his rival's comparative degrees of final utility.

It only remains for us to observe that if, in the case of

<sup>1</sup> With reference to this discussion, the note to the end of the preceding paragraph should be borne in mind; for if this exposition were developed on the lines there set forth, there would be no *excluded* competitors, *i.e.* competitors that remain empty-handed; but this conception is too subtle to be expounded in this manual. Moreover it must be observed that at an auction there is the same arbitrary limit to the price; which however is variously fixed, according to the nature of the auction, at the maximum or minimum limit of the above-described arbitrary limit of the rate of interchange. Thus, in a Dutch auction, the thing to be sold is first offered at a higher price than any purchaser is likely to give, and the price is gradually abated until a bid is obtained. For this reason each purchaser hastens to offer the highest price he is willing to give, lest he should be forestalled by another. In the English system of auction, the biddings commence at a minimum price, and are successively increased, until only one purchaser remains who is willing to give that amount. See Marshall, *Economics of Industry*, London, Macmillan, 1881, book iii. chap. vi. § 2, note p. 200.

the two or more purchasers dealing with one vendor, or in that of the two or more vendors dealing with one purchaser, the comparative degrees of final utility present equal differences, only anti-economic factors can decide with which purchaser in the one case, and with which vendor in the other, an exchange will be concluded.

## CHAPTER II

DETERMINATION OF THE RATE OF INTERCHANGE IN THE  
RESPECTIVE CASES OF MONOPOLY AND OF FREE COMPETITION

### § 1. *Determination of the Rate of Interchange of Monopolised Commodities and Distribution of the Latter amongst Competitors*

LET us designate as a "monopolist" the sole owner of whatever commodity, in whatever given, but determinate, quantity; and in the same market with him let there be many owners of various quantities of some other commodity; and let there subsist between them and the monopolist the fundamental condition required to determine exchanges. This set of circumstances gives rise to the following questions, viz.: At what prices can the monopolist sell various quantities of his commodity? or, What quantities thereof can he sell at each of such prices? and, In what manner will the quantity sold be distributed among the many competing purchasers?

It is desirable to solve these problems, in the first instance, on the simplest hypotheses imaginable, as regards the final degrees of utility for the several parties, before formulating more general solutions; and accordingly to follow Menger in his analysis of an example.

Let A then be a monopolist having any given quantity of a commodity. Let B<sup>1</sup> be a purchaser for whom a first portion of A's commodity has a final degree of utility expressed by a numerical index, say 8, or in other words, let him be willing to pay eight shillings for it; whilst a second increment of the same commodity possesses for him only a final degree of utility expressed by 7, so that he is unwilling to give more than seven shillings for it. For a third increment

he is only willing to give six shillings, and for each successive increment he will only give one shilling less than for the preceding one. We shall accordingly measure along an abscissa the successive equal increments of A's commodity, and by means of ordinates proportionable to the prices  $B^1$  is disposed to pay for each increment, we shall denote the final degrees of utility that the respective increments have for  $B^1$ , *i.e.* the prices he is willing to pay for them.

Let  $B^2$  be a purchaser whose demand<sup>1</sup> for A's commodity is less than that of  $B^1$ , or in other words, is such that for a

<sup>1</sup> I use the term *demand* advisedly, in order that the reader may have the opportunity of making himself acquainted with the precise import of this word in economics. Here demand is to be understood in the sense of *scale of the degrees of utility* of successive increments of a commodity, and a *variation in the demand* consists of a *variation in this scale*, consequent on a *variation of the wants and tastes of consumers*. A *determinate scale* of the final degrees of utility, though not noticed otherwise, is a postulate whenever we discuss the effect of variations of prices in a determinate market, and we then say that a *law of demand* is postulated, *i.e.* a determinate scale of degrees of utility, and a variation of this scale is termed a *variation in the law of demand*. The classic economists, who attach specific meanings to technical terms, designate a variation of the scale of degrees of utility (as for instance, the fact that the wants of  $B^2$  become greater than those of  $B^1$ , or that those of  $B^1$  are so modified that he is disposed to pay nine for what he formerly considered worth eight at most) a *rise* or *fall* of the demand, that is of the *law of demand*. On the other hand when, *given a determinate scale of degrees of utility, or a determinate law of demand, prices rise or fall*, this fact is referred to as an *extension* or *restriction* of the demand. When prices fall, a determinate scale of wants being given, more consumers purchase; when, on the contrary, prices rise, fewer consumers purchase. Here we have to do with the extension and restriction of *consumption* in accordance with a *given and determinate law of demand*; but this extension or restriction of consumption is termed an extension or restriction of the demand, which gives rise to endless ambiguities. See *ante*, part i. chap. iii. § 2, note and text, *post*, part ii. chap. iii. § 1. Also Walras, *op. cit.* p. 494; Wicksteed, *op. cit.* p. 98.

By the use of graphic systems these ambiguities are avoided. In fact a law of demand is a determinate curve uniting the extremities of the ordinates that denote the degrees of utility of successive increments of a commodity for a consumer, or for a group of consumers. The rise or fall of the demand is the uniform or irregular, upward or downward trend of this curve; *i.e.* the line formed by connecting the extremities of successive longer or shorter ordinates. The extension or restriction of the demand is, on the contrary, as will clearly appear from the following exposition, determined by a straight horizontal line parallel to the abscissa and more or less proximate to the latter, which marks off the quantity of commodity that will be consumed by one consumer, or by a group of consumers, according to the level of prices, whilst the curve denoting the final degrees of utility of successive increments of commodity for the consumer, or group of consumers, remains the same.



first portion of A's commodity he is disposed to pay seven shillings, for a second increment six, for a third five, and so on. We shall accordingly mark off on the same abscissa, by means of proportionate ordinates, the prices that B<sup>2</sup> is disposed to pay for successive increments of A's commodity. Let B<sup>3</sup> be a purchaser whose demand of A's commodity is still less than that of B<sup>2</sup>, *i.e.* such that for a first portion of A's commodity he is disposed to pay only six shillings, for a second five, for a third four, and so on.

Further, let B<sup>4</sup> be a purchaser of a first portion of A's commodity at the price of five shillings, B<sup>5</sup> a purchaser at the price of four shillings, and so on; the price that each of these purchasers is disposed to pay for each successive increment diminishing by one shilling. If we now so arrange these numerical data in a diagram, as to indicate by means of abscissæ the successive increments of A's commodity, and by means of ordinates the prices each purchaser is disposed to pay for successive increments; so that the prices offered by B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>, etc., for successive increments of A's commodity come to be disposed in the form of a curve of the final degrees of utility, we shall have the following Mengerian table, which coincides with the diagrams of demand of Cournot, Jevons, Marshall,<sup>1</sup> and other writers who have treated this subject analytically, or by means of graphic systems. Now, it is evident from what was stated in the preceding paragraph, that if A offers for sale only one increment of his commodity, it will be

<sup>1</sup> A. Cournot, *Principii matematici della teorica della ricchezza*, chap. v. § 26, p. 101 *et seq.*; *Biblioteca dell' economista*, vol. ii.; A. Marshall, *The Pure Theory of Domestic Values*. The Mengerian table is read diagonally; the price, for instance, that B<sup>1</sup> is disposed to pay is found, for the first increment, at the top of the first ordinate, at number eight; for the second increment, to the right and lower down, *i.e.* at the top of the second ordinate, at number seven; for the third increment, still farther to the right, and a square lower down, at the top of the third ordinate, at number six. The price that B<sup>2</sup> is disposed to pay for a first increment is found on the first ordinate, at number seven; what he is disposed to pay for a second increment, on the second ordinate, *i.e.* still proceeding towards the right and descending by one square to number six, and so on. The price that B<sup>3</sup> is disposed to pay for a first increment is found at number one on the first ordinate; the price he would be disposed to pay for a second increment should be sought to the right on the second ordinate, one square down, *i.e.* it would be zero, and is therefore omitted from the table; for a third increment it would be -1, *i.e.* two squares below the third ordinate. This table constitutes the *pons asinorum* for students of economics.

purchased by B<sup>1</sup> at a price between seven and eight shillings. If the monopolist is disposed to sell three increments of his commodity, the second increment would not be purchased by B<sup>1</sup> at more than seven shillings, nor the third at more than six; whilst B<sup>2</sup> is disposed to give seven shillings for a first increment and six shillings for a second. Therefore, B<sup>1</sup> will be exposed to the competition of B<sup>2</sup> in the purchase of two

|                                  | 1 <sup>st</sup> Increment | 2 <sup>nd</sup> Increment | 3 <sup>rd</sup> Increment | 4 <sup>th</sup> Increment | 5 <sup>th</sup> Increment | 6 <sup>th</sup> Increment | 7 <sup>th</sup> Increment | 8 <sup>th</sup> Increment |
|----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Demand of B <sup>1</sup> . . . . | 8                         |                           |                           |                           |                           |                           |                           |                           |
| " B <sup>2</sup> . . . .         | 7                         | 7                         |                           |                           |                           |                           |                           |                           |
| " B <sup>3</sup> . . . .         | 6                         | 6                         | 6                         |                           |                           |                           |                           |                           |
| " B <sup>4</sup> . . . .         | 5                         | 5                         | 5                         | 5                         |                           |                           |                           |                           |
| " B <sup>5</sup> . . . .         | 4                         | 4                         | 4                         | 4                         | 4                         |                           |                           |                           |
| " B <sup>6</sup> . . . .         | 3                         | 3                         | 3                         | 3                         | 3                         | 3                         |                           |                           |
| " B <sup>7</sup> . . . .         | 2                         | 2                         | 2                         | 2                         | 2                         | 2                         | 2                         |                           |
| " B <sup>8</sup> . . . .         | 1                         | 1                         | 1                         | 1                         | 1                         | 1                         | 1                         | 1                         |

MENGER'S TABLE.

increments out of three. He could secure a first increment, to the exclusion of all competition, by paying more than seven and less than eight shillings for it; for a second increment it is not to his advantage to offer more than seven shillings, which offer is made also by B<sup>2</sup>; for a third increment he cannot pay more than six shillings, whilst B<sup>2</sup> is disposed to pay this price for a second increment. Being thus unable to exclude B<sup>2</sup> from some share in A's commodity, without undue sacrifice, he is jointly interested with B<sup>2</sup> in paying as little as possible for such share of A's commodity as he can obtain. If B<sup>1</sup> and B<sup>2</sup> were to offer less than six shillings for each increment of A's commodity, B<sup>3</sup> would enter into competition with them, he being disposed to pay six shillings for a first increment.

Hence the price of the three increments must come to be over six shillings; but it will not exceed seven, because any one of the three increments may be treated as the third,<sup>1</sup> and

<sup>1</sup> Jevons formulates this proposition as a law by itself, called the *law of indifference*. It is as follows: *In an open market, at a given moment, there cannot*

if A wanted a larger price for any one of them, he could get it only by withdrawing such increment from the market. The three increments are therefore distributed between  $B^1$  and  $B^2$  in such a way, that  $B^1$  receives two and  $B^2$  receives one; and all are paid for at the rate of between six and seven shillings, those being the limits within which the price is arbitrary.

If A, instead of offering the three increments in the market, at the same time, were to offer them one by one, waiting for the first to be sold before he offered the second, and so on, he would obtain for the first, which would go to  $B^1$ , a price ranging between seven and eight shillings; the second increment would fetch only from six to seven shillings, and would fall to  $B^1$  or  $B^2$ , according to anti-economic criteria; and the third likewise would only fetch between six and seven shillings, and would be acquired by that one of the two purchasers who had not obtained the second.<sup>1</sup>

If A were to put on the market six portions of his commodity,  $B^1$  would receive three,  $B^2$  two, and  $B^3$  one; and the price of each portion would come to be between five and six shillings, *i.e.* it would be determined by the price that the purchaser is disposed to pay for whom the final degree of utility of a portion is least, or in other words, who receives the last disposable portion.

What has been said of  $B^1$ ,  $B^2$ , etc., may be said equally of the social groups of consumers represented by them. Let us now set forth the conclusions that follow from the above reasoning.

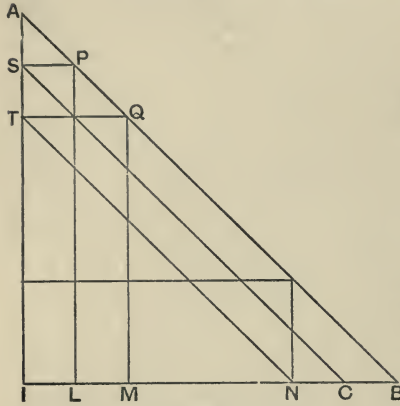
I. In the first place, as regards the question, What rate of interchange will result from the conflict of egoistic forces in any given case?—it is easy to see graphically that this ratio is determined by the ordinate denoting the final degree of utility of the last portion received by any purchaser (whilst the abscissa denotes the quantity of commodity received by each one), or by the ordinate denoting the final degree of utility for the purchaser who receives the last portion, or the least quantity.

*be two prices for the same quantity of a commodity of uniform quality.* Jevons, *op. cit.* p. 99. This law is a deduction from the hedonic postulate and from the premiss of the existence of competition.

<sup>1</sup> See *post*, end of this chapter, § 2.

In diagram XXXIV. let the straight line AB be the curve of the degrees of utility of successive increments of a commodity for B<sup>1</sup>, which were indicated above by numerical indices and small squares; and let these be conceived of as mere points.

Similarly let SC be the curve for B<sup>2</sup>, TN for B<sup>3</sup>, and so on. Let point A be where index 8 was before, the points



P and S where the indices 7 were, and Q and T where the two sixes were in the Mengerian table.

The price of three portions of A commodity apportioned between B<sup>1</sup> and B<sup>2</sup> proved to be, in the foregoing numerical example, between six and seven shillings; now, graphically, these prices are denoted by PL or SI. But what are these ordinates if not, PL the final

degree of utility of the second and last increment of A commodity received by B<sup>1</sup>, and SI the final degree of utility of the only and therefore last portion received by B<sup>2</sup>?

The price of six portions of A commodity distributed among B<sup>1</sup>, B<sup>2</sup>, and B<sup>3</sup>, in the proportions of three increments for the first, two for the second, and one for the third, proved to be, in the former example, between five and six shillings, *i.e.* it is expressed graphically by the ordinates QM and TI. But QM is the final degree of utility of the third increment for B<sup>1</sup>, *i.e.* the last received by him, and TI is the final degree of utility of the first and last portion received by B<sup>3</sup>.

Consequently the rate of interchange is given by the final degree of utility of the last portion obtained by each purchaser, and the mass of commodity obtained by each purchaser at that price, is measured by the abscissa, and coincides with the final degree of utility.

It may seem that the abscissa registers only two increments of A commodity in the first case, instead of three, and three in the second instead of six; but it is obvious that, only in so far as successive increments of the same commodity

are given to the same person, does Gossen's law of the decrease of the final degrees of utility become operative. In fact, if  $B^1$  were the only purchaser, and received all the six portions of the last example, the price would dwindle to the ordinate drawn through  $N$  to where it intersects  $AB$ . For the rest, the six portions are to be found in the diagram; only they must be read thus: Portions  $I + L + M$  for  $B^1$ ; Portions  $I + L$  for  $B^2$ ; and Portion  $I$  for  $B^3$ .

II. Moreover, still with reference to the rate of interchange, from the matters already expounded may be deduced a fundamental law, which we shall call the law of Augustin Cournot,<sup>1</sup> according to which, *given the quantity of a commodity that a monopolist desires to dispose of, the price at which he can do so is not arbitrary; and vice versa, if the monopolist fixes the price at which he desires to sell each portion of his commodity, the quantity he will succeed in selling is not arbitrary.* To put it more briefly, the price is a function of the quantity sold, and the quantity that can be sold is a function of the price. The monopolist may treat as an arbitrary or as an independent variable, either the price or the quantity to be sold; but either the quantity sold or else the price is a dependent variable.

This relation between price and quantity of commodity sold or to be sold, arises from the fact that in every market there exists a *determinate scale of the degrees of utility of the various increments of the commodity in question for each individual purchaser, i.e.* there exists a *law of demand*. From Menger's example it appeared that, the greater were the quantities of commodity offered by the monopolist, the lower was the price of each unit of commodity, and the larger was the number of purchasers who obtained a proportionate part of the stock; and

<sup>1</sup> Cournot, *loco cit.* This law is erroneously called by some the *law of outlets*, which name must be reserved for the economic phenomenon to which it was appropriated by J. B. Say, and which signifies that each new product, *i.e.* every commodity freshly produced, is an outlet for those existing previously. J. B. Say, *Traité*, livre i. chap. xv. p. 138, éd. Guillaumin, Collec. prin. écon., tome x. J. B. Say, however, knew the law that regulates the relation between price and quantity sold, and even expressed this relation graphically. *Cours Complet*, vol. i. part iii. ch. iv. p. 360, éd. Guillaumin, tome xi. of the collection. See also John Prince Smith, *Gesammelte Schriften*, Band I. Zur Physiologie des Verkehrs; Der Markt, pp. 4-7 (1863), Berlin, Herbig, 1877; also Menger, pp. 191-193.

the reason and measure of this phenomenon were likewise made apparent, inasmuch as each determinate mass of commodity that is for sale will not be obtained by each consumer, save at prices predetermined by the comparative degrees of final utility of the quantity of commodity that each one receives, and of the quantity of the thing that he must give in exchange. As, however, we have already deduced from the foregoing observations the theorem, that the value of a mass of commodity is determined by its final degree of utility for the purchaser, we may present Cournot's theorem as a simple corollary of that law, since the final degree of utility of a mass of commodity is in its turn determined by the quantity of the latter, given the scale of intensity of the want to which it corresponds.<sup>1</sup>

It is further equally easy to perceive that if the price is predetermined, the quantity that can be sold is no longer arbitrary. If the price were fixed by the monopolist at a point above the degree of utility a portion possesses for the purchaser for whom its utility is greatest, the quantity sold would be nil, owing to the absence of the fundamental condition of every exchange.<sup>2</sup> If the monopolist were to fix the price of each portion at a point between the final degree of utility of a portion for the purchaser for whom its utility is greatest, and the corresponding degree of such a portion for the purchaser for whom its utility is next in order of magnitude, he could only exchange a portion with the first purchaser; for with regard to the second, the fundamental condition of every exchange would again not be realised. If the monopolist were to fix the price of each portion at a level between the final degree of utility of a portion for the second purchaser and the final degree of such a portion for the purchaser for whom its utility is next in order of magnitude, he can only sell three portions, viz. two to the first purchaser, and one to the second; because with regard to the third purchaser the essential condition for the realisation of every exchange is wanting. The same reasoning applies to subsequent purchasers.

III. In the third place, from the preceding diagram XXXIV.

<sup>1</sup> See part i. chap. iii. § 2, and chap. iv. § 3.

<sup>2</sup> See last chapter, § 3.

we may easily ascertain the gross proceeds of the sales effected by the monopolist, or, yet again, we may measure the total utility gained by each purchaser from the transactions effected.

In fact, if six portions of a commodity are sold at the price QM, it is clear that B<sup>1</sup>, who was disposed to pay AI for a first portion, PL for a second, and QM for a third, but who only paid for each of the three portions an equivalent of the degree of utility of the third, and for whom the total utility of the three portions is measured by the area enclosed by APQMLI, has gained on the exchange a net utility equal to the area of the figure enclosed by APQTS, *i.e.* equal to the aforementioned area minus the area enclosed by TQMI.

The same reasoning applies to B<sup>2</sup> and B<sup>3</sup>. This introduces us to Dupuit's theorem, according to which: *In exchanges, each purchaser increases the total utility at his disposal, in the measure obtained by subtracting from the sum of the prices he would be disposed to pay for each successive increment of the quantity purchased by him, the price of the last increment multiplied by the number of increments purchased.*<sup>1</sup>

<sup>1</sup> *Ex. gr.* for B<sup>1</sup> the first portion had in Menger's example a degree of utility equal to eight shillings, the second seven, the third six; hence B<sup>1</sup> would have been disposed to pay  $8+7+6=21$ . This is the total utility for him of the three portions. Instead, he paid between five and six shillings for each of the three portions, *i.e.* between fifteen and eighteen shillings in all. His profit is therefore between  $21-18$  and  $21-15$ , *i.e.* between three and six shillings. A. Marshall, *ubi supra*, chap. ii. p. 21. I may further remark that the term "consumer's rent," which at first sight may seem less appropriate than the alternative "residual rent," not only because it is less elegant, but also because it does not at once reveal the nature of the rent in question, or in other words, because it seems less genetic than the other, is instead the better term, and the one that should be universally adopted. In fact, the reader who is already acquainted with economics will at once recognise the analogy of this rent with the Ricardian rent, and he will further perceive that Ricardo's *law of rent* is only a special case of the general law of *rent*. Further, the consumer's rent is the one to be considered in all questions that relate to the effects of taxes of all kinds; *i.e.* it is the basis of more than half the financial theorems that we as yet know how to formulate and demonstrate. Now, also in this respect, the term "consumer's rent" is much more significant than the alternative term. See J. Dupuit, *ubi supra*. The reason why it is necessary to treat the marginal utility of money as constant, if it is desired that this method of estimating consumer's rent should be accurate, is explained in Pareto's *Cours d'économie politique*, Lausanne, 1896, § 83. In strictness, we should estimate the variations of *total utility*, rather than the variations of the consumer's rent. Walras was the first to point out the difference between curves of utility and curves of price, or demand.

The total utility thus gained we have already termed elsewhere (part i. chap. iv. § 3) *residual utility*, or as Mr. Marshall prefers to call it, *consumer's rent*.

As regards the monopolist, his gross proceeds are arrived at by multiplying the number of increments sold by the price at which he sold them, *i.e.* in the case of six increments being sold, the proceeds are  $QM(3I + 2L + 1M)$ .

We may easily obtain a graphic expression of the gross proceeds realisable by the monopolist at each individual price, and hence the indication of the price at which his proceeds are maximised.

For this purpose we have only to dispose on the axis of the abscissæ, OX, the series of prices, and on the axis of the ordinates, OY, the quantities sold at each price, on the hypothesis of a determinate scale of final degrees of utility, *i.e.* given a law of demand. Evidently, at a price equal to zero at O (see diagram XXXV.), the sales will be maximised. On the other hand, at a price greater than the final degree of utility of a portion of commodity for the purchaser for whom its utility is greatest, *i.e.* at B, the sales will be zero. Therefore the curve that denotes sales as a function of prices, will be negative throughout the whole of its course, commencing with a maximum ordinate, AO, and ending with a minimum ordinate at B. Now if we multiply each price by the corresponding quantity sold, *i.e.* each ordinate by the abscissa to which it belongs (*ex. gr.* AO by the abscissa zero; *mn* by *On*; *pq* by *Oq*; *rs* by *Os*; the ordinate zero B by OB),<sup>1</sup> we shall have a series of data showing the gross proceeds of the monopolist at each of the respective prices; which proceeds, starting from zero, rise to a maximum point, and again decline to zero; and if denoted by means of ordinates on the same abscissa, OB, at the points that mark the prices to which they correspond, give us the curve of the gross proceeds, *OcdEB*.<sup>2</sup> This curve teaches us that the monopolist, acting as a *homo æconomicus*, will not determine

<sup>1</sup> The area given by the ordinates multiplied by the abscissæ is also the offer of the other party. Walras, *op. cit.* p. 80.

<sup>2</sup> J. de la Gournerie, *Études, etc., sur l'exploitation des chemins de fer*, Paris, Gauthier-Villars, 1880, partie iv. pp. 125-129; E. Cheysson, *La statistique géométrique, méthode pour la solution des problèmes commerciaux et industriels*, p. 12, Paris, 1887.



arbitrarily the price at which he desires to sell the mass at his disposal, but will fix on such a price as, abstracting from the cost, will give him the maximum sale. If, however, he must take the cost into consideration, it will be easy for him

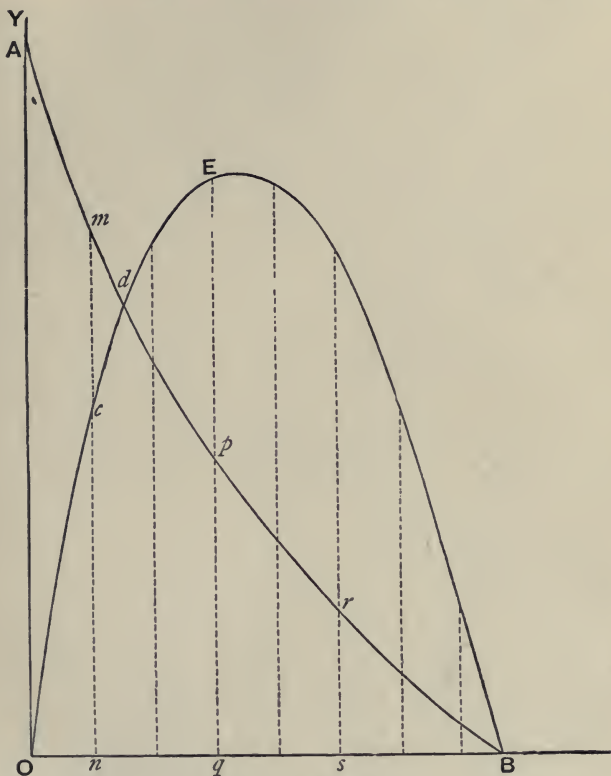


DIAGRAM XXXV.

to determine by the same method the price that will give him the maximum net proceeds.<sup>1</sup>

Let us now address ourselves to the questions relating to the distribution among the various competitors of the mass sold by the monopolist. From the consideration of Menger's example, as also from the diagram representing it graphically,

<sup>1</sup> Let the monopolist know that at a price  $x$  (measured on the abscissa) he can sell a quantity  $y$  (measured on the ordinate), and let  $z$  be the cost of each metrical unit of commodity for the quantity  $y$ ; evidently he will have to arrange so that  $xy - yz$  will be a maximum.

it is apparent at a glance that the distribution of the mass sold is always effected in such a manner that all the purchasers, *i.e.* all the competitors who succeed in purchasing, attribute on their distinct hedonic scales an equal proportionate importance to the final degree of utility of the last increment of commodity received by each of them; and that for all of them, *i.e.* for all the successful competitors, the final degree of utility of the last increment of commodity received is greater than it would be for all the competitors who did not succeed in purchasing. This means that the commodity is distributed

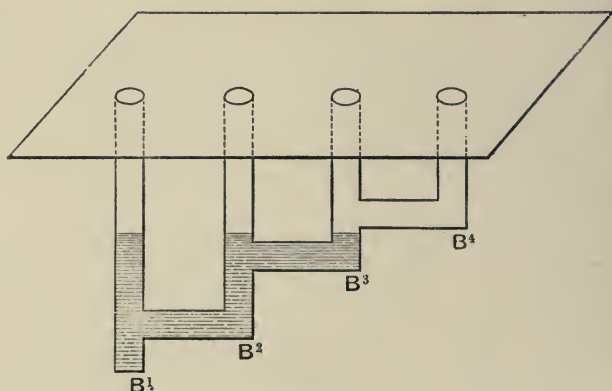


DIAGRAM XXXVI.

among those for whom the difference in the comparative degrees of final utility is relatively a maximum.<sup>1</sup>

If we imagine a table perforated by tubes of equal diameter, but of various lengths, proportionate to the scale of degrees of utility of the competitors, and that each tube communicates at its extremity with the one next to it in length, a quantity of water poured on to the table will be distributed among the various tubes precisely in the same manner as the monopolist's commodity among the various competitors. This will be obvious if we compare diagram XXXVI. with

<sup>1</sup> This proposition, as we have already observed in a note to the last chapter, is the Ricardian theorem, in accordance with which, one nation cannot exclude another from the market of a third, unless the difference in its comparative costs is greater than in the case of the other. This may be so, not only when its work is more efficient in the production of the commodity exported, but even if it be less efficient in the direct production of the imported commodity. See chap. iii. §2.

Menger's table, or with diagram XXXIV., of which it is only an inverted replica.

Moreover it is evident that all those are purchasers, for whom a portion of the monopolist's commodity, at the price fixed by himself, possesses a final degree of utility greater than the price asked.<sup>1</sup>

Having expounded the theory of the rate of interchange, and that of the distribution of the mass of commodity sold, in the case of a monopoly, with reference to a concrete example, we must now observe, that the hypothesis of maximum simplicity we made, respecting the scale of degrees of utility a commodity possesses for the various competitors, is altogether accessory or insignificant, as regards the correctness of the theorems enunciated. In fact, for Menger's table, in which the degrees of utility of successive increments of a commodity decrease uniformly for all the competitors, and in decreasing arithmetical progression for each, we may substitute a much more complex diagram of curves of degrees of utility intersecting each other in the most varied manner;<sup>2</sup> but the same reasoning will apply to them, leading up to the same theorems.

§ 2. *Determination of the Rate of Interchange of a Commodity exchanged under Conditions of Free Competition, and of the Distribution of the Mass sold among the Competitors.*<sup>3</sup>

Let us suppose a commodity to be offered in a market by a series of competing vendors,  $A^1$ ,  $A^2$ ,  $A^3$ , etc., and the curves to be traced of the degrees of utility of each increment thereof for each of the competing purchasers. If we suppose these

<sup>1</sup> If the less wealthy purchasers do not want to be excluded from the purchase of a commodity which the monopolist does not wish to divide beyond a given limit, *several of them must combine for the purchase of an entire portion and divide it amongst themselves.* Let there be *ex. gr.* 250 bidders at an auction of loaves. The monopolist has only 230 loaves, and will not cut any of them up. Let him fix the price at twopence, and find at this price 220 purchasers. The 30 who are excluded may combine, 20 contributing, say, a half-penny each to purchase 5 loaves, and 10 contributing one penny each to purchase other 5 loaves. Thus 230 loaves will be distributed among 250 competitors of various degrees of solvency.—Donisthorpe.

<sup>2</sup> These curves obey only one law: their *direction* must be NEGATIVE. See following diagram XXXVII.

<sup>3</sup> Cournot, *ubi supra*, chap. vii. pp. 116-122, and chap. viii. pp. 122-128. Menger, *ubi supra*, pp. 203-205.

curves to possess the simplicity of gradation and order attributed to them in Menger's table, it is at once apparent that the price for which a given mass of commodity is sold does not depend in the least on the number of vendors, but exclusively on the quantity of commodity offered for sale. In fact, if two competing vendors,  $A^1$  and  $A^2$ , offer only two portions of commodity, these can only be purchased by  $B^1$ , who is disposed to pay a price that no other competing purchaser can reach, viz. seven shillings for each portion. At this price he makes no profit on the second portion, but he does on the first, which possesses for him a degree of utility equal to eight. The price for the two portions will be the same, in consequence of Jevons's law of indifference. If the two vendors offer three portions,  $B^1$  will take two, and  $B^2$  will take one, at a price ranging between six and seven shillings. If  $A^1$  and  $A^2$  offer six portions,  $B^1$  will take three,  $B^2$  two, and  $B^3$  one, and all the six portions will be sold at from five to six shillings, those being the limits within which the price is arbitrary. As a general proposition, let the series of degrees of utility of the vendor's commodity be given, for  $B^1$  by the curve  $b^1c$ , for  $B^2$  by the curve  $b^2c$ , and so on for all the competing purchasers; and let there be offered by a number of independent (*i.e.* not associated) vendors, thirteen portions and a quarter of the commodity in question; then these portions will be distributed in the following manner (see diagram XXXVII.):—

$B^1$  will buy six and a half portions, *i.e.* the mass  $Op$ ;

$B^2$  will buy two and a half portions, *i.e.* the mass  $Om$ ;

$B^3$  will buy three and a quarter portions, *i.e.* the mass  $On$ ;

$B^4$  will buy only one portion, *i.e.* the mass  $O$ .

The price will be for each purchaser equal to the final degree of utility of the last portion received by him, and equal to the price paid by every other purchaser. It is indicated by the horizontal line passing through  $b^4$ .

Just as these two theorems, so too every other that has been expounded in the theory of monopoly, will be equally true in the event of bilateral competition.<sup>1</sup> It must, above all,

<sup>1</sup> It is clear that the most complex form of the hypothesis, such as that of bilateral competition, comprises in its solution the simpler ones already explained, and not *vice versa*. Every complex case comprises simpler ones, in the sense that it can be reduced to the latter, by giving a value equal to zero, or to a

be observed, that even in this case, a portion of the available commodity is only obtained by those for whom the *difference in the comparative degrees of final utility is relatively a maximum*.<sup>1</sup> But if, both in the case of monopoly and in that of free competition, the quantity of commodity actually offered for sale determines the price at which it will be sold, and if the price fixed by the vendors determines the quantity of

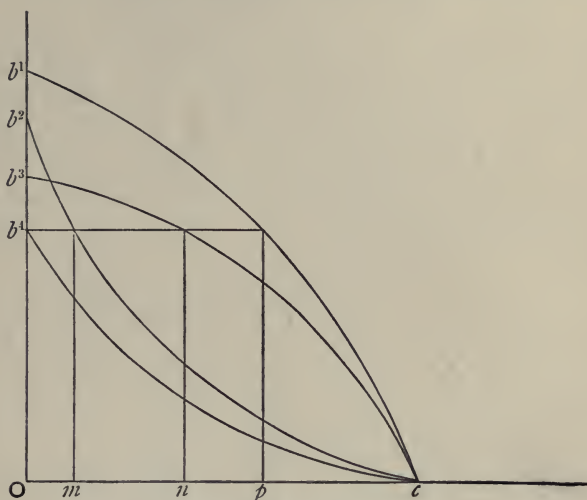


DIAGRAM XXXVII.

commodity that can be sold, it is clear that the difference (if any) between monopoly and free competition can only consist in this, that it may be to the monopolist's interest to fix on different prices, or different quantities of commodity, from what the competing vendors' interest would lead them to fix, in view of the gross or net proceeds accruing from the exchange.

And so it is in fact;<sup>2</sup> for in § 1 of this chapter we have seen (diagram XXXV.), that the total gross proceeds the

unit, to a larger or smaller number of the conditions which constitute it, and which have no parallel in the simpler cases.

<sup>1</sup> Launhardt, *ubi supra*, § 8, pp. 30-35. Here as in Marshall, *Economics of Industry*, book ii. chap. i. § 6, p. 70, we are cautioned against the mistake of inferring from such distribution, that it coincides necessarily with that which realises the maximum of general happiness, *i.e.* the largest sum of happiness of which a group of individuals are capable.

<sup>2</sup> N. W. Senior, *Principles of Political Economy*, Distribution of Wealth, Monopolies, p. 592. Menger, *ubi supra*.

monopolist can obtain by selling increasing quantities of a commodity, do not increase with the increase of the quantity sold, but are augmented only up to a maximum limit, after which they go on decreasing to zero; and that, because the prices per unit decrease in some ratio with the increase of the quantity sold. Suppose, for example, that the monopolist, by selling 100 units of his commodity, obtains only one shilling for each unit; or that by asking one shilling for each unit of commodity, he only succeeds in selling one hundred, and suppose that at the price of two shillings he sells ninety, or that by selling ninety, he obtains two shillings for each unit; then if we continue to work out this hypothesis as regards increased prices and diminished quantities, we shall have a scale of prices, quantities sold, and gross proceeds constituted in the following manner:—

| Prices. | Quantities. | Price per Quantity<br>=Gross proceeds. |
|---------|-------------|--|
| 1       | 100         | 100                                    |
| 2       | 90          | 180                                    |
| 3       | 80          | 240                                    |
| 4       | 70          | 280                                    |
| 5       | 60          | 300                                    |
| 6       | 50          | 300                                    |
| 7       | 40          | 280                                    |
| 8       | 30          | 240                                    |
| 9       | 20          | 180                                    |
| 10      | 10          | 100                                    |

Now if the monopolist<sup>1</sup> has 100 units of his commodity, it is not to his interest to sell them all, because he gains more by selling only ninety; indeed, he will not even want to sell this quantity, because the gross proceeds are larger if he sells eighty. If we pursue this reasoning, it is easy to see that it is not to his interest to sell fewer than fifty, nor more than sixty, portions, as he thereby realises the maximum gross profit of 300 shillings. And if he is fixing the price of his goods, he will do so neither at ten, nor nine, nor eight shillings; nor

<sup>1</sup> We still abstract from the influence that the cost may have on the gross proceeds.

yet at one, two, nor three shillings, but either at five or six shillings, because these prices mark the point at which the sales yield the maximum gross returns.

Hence whenever the quantity of commodity at his disposal exceeds that on which he realises the maximum gross profits, it will be to his interest to destroy part thereof, or otherwise to withdraw it effectually from the market; and above all not to produce it. Or at all events it will be to his interest to offer his commodity in successive portions, in order that he may gradually obtain the benefit of the highest final degrees of utility it presents for the series of purchasers.<sup>1</sup> If, on the other hand, the monopolist prefers to determine the price, he will first select the higher prices, diminishing them only as he perceives that he thereby procures a larger gross profit. On the contrary, in the case of competition between vendors, it will never be to the interest of any one of them to withhold a part of his stock, or to destroy it, or to limit the amount of his produce; because the increase of price he would thereby occasion would certainly benefit his rivals, who would increase their production. If this should not be possible, the case should be considered as one of monopoly. Moreover, it will be impossible to raise the market prices by the offer of successive portions, because, as each vendor will want to do so, practically the whole disposable mass will be offered at each moment. Finally, as regards the determination of the price of each unit of commodity, each competitor will have, from the first, to quote the minimum that admits of a profit, in order to ensure the clearance of the whole disposable quantity, in his hands; and only after having noted the ready sale of this quantity, will he venture to raise the prices, until warned by the opposite phenomenon that he has reached the point that yields the maximum gross profit.

<sup>1</sup> See last note, § 4, chap. i. part ii. respecting the difference between the English and the Dutch systems of auction.

## CHAPTER III

### THE LAW OF DEMAND AND SUPPLY

§ 1. *Of the Remote Factors that determine the Curve of Degrees of Utility and the Disposable Quantity of a Commodity.*

FROM the matters set forth in the last chapter it was made plain, that the price at which each portion of any commodity can be sold is fully determined: (a) by the scale of degrees of utility existing at a given time and place<sup>1</sup> for successive portions of that commodity; and (b) by the quantity of such commodity that is disposable<sup>2</sup> at that time and place; in other words, we have seen that these two factors are the proximate and sufficient determining causes of the price. It has been further shown that these same factors determine the distribution of the commodity among the purchasers. But even the quantity of the commodity that may be sold in a market has ceased to be arbitrary; and we have seen that, given the price at which it is sold and the scale of degrees of utility, we have the proximate and sufficient causes that determine it; and that, in this case also, its distribution among

<sup>1</sup> "Place" is not to be understood *topographically*, but as a *market* in the wide sense attached to this term by economists. By market is meant the fact of a group of persons being in business relations with each other, irrespective of where they may reside. Thus the bankers of the principal cities of Europe and of the United States of America may at a given moment form a single market.

<sup>2</sup> The quantity disposable, in accordance with what has been set forth in the first part, may comprise future commodities, *e.g.* next year's harvest, or an industrial product not yet manufactured, may be dealt in, in the market.



the consumers<sup>1</sup> is predetermined, being dependent on those same causes.

Now, it is this complex of causal relations that has always, and particularly since the time of J. Stuart Mill,<sup>2</sup> been meant by the proposition, that *prices depend on the relation between supply and demand*. In fact, the scale of final degrees of utility for successive portions of a commodity has been termed the *demand*, and the quantity disposable, the *supply* of such commodity. Hence we say, that if the demand *increases*, prices, *cæteris paribus*, rise; and that if the demand decreases, prices fall. This means that if the scale of degrees of utility of successive increments of a commodity changes, so that the *degree of utility of each increment* of commodity for the consumers increases, or in other words, that the *difference in the comparative degrees of utility for them of the commodity and of the price is increased*, they must and will pay a larger price than before for equal quantities. That this is so, admits of no doubt, in view of what has been set forth above. In the same way we say, that if the scale of degrees of utility remains unaltered, but the disposable quantity of commodity increases, the price falls; and *vice versâ* if the supply increases, the demand remaining stationary, the price falls; whilst if the supply diminishes, the price rises.

The variation prices undergo, if either the scale of degrees of utility, *i.e.* the *law of demand* (see *ante*, part ii. chap. ii. § 1, note), or the supply be modified, is indeed in a direct ratio to the demand, and an inverse ratio to the supply; but it is impossible as a general proposition to determine either ratio according to numerical proportions. For each commodity is governed by its own law of demand, and this law varies from one moment to another; and each commodity has its own laws of supply, which likewise vary from one moment to another.

<sup>1</sup> Since therefore the price, or the quantity of commodity sold, its distribution, and the secondary phenomena considered in the preceding chapter in connection therewith, *are the effects of two CONDITIONS OF FACT*, *viz.* of the curve of final degrees of utility, and of the price or disposable quantity of commodity, economists say that the price, or the quantity sold, and the distribution of such quantity, are *natural phenomena*, or phenomena caused by *natural laws*, *i.e.* they are never *arbitrary*, or artificially variable, unless the artifice affects the nature of the said conditions of fact.

<sup>2</sup> J. Stuart Mill, *Principles of Political Economy*, Longmans, People's ed. 1883, book iii. chap. ii. § 4, p. 271.

It is also said that if the price rises, the demand is restricted, and that if the price falls, the demand is enlarged or extended. This too is substantially true; but having regard to the last proposition, it is not free of ambiguity, for it signifies that the LAW OF DEMAND, *i.e. the scale of degrees of utility of a commodity, REMAINING STATIONARY*, a reduction in price renders the commodity accessible to more consumers, whilst a rise renders it accessible to fewer; in other words, the *consumption*, to speak accurately, or figuratively the demand, is extended or restricted; but it neither *rises* nor *falls*.

Lastly, it is said that prices attain the level at which demand and supply are equated. In this case again, an invariable *law of demand, i.e. a scale of degrees of utility*, is presupposed; and what is meant is, that *for every quantity of commodity that is offered, there is a price at which the quantity demanded, i.e. consumed by the consumers, is precisely equal*. This is a simple corollary of the preceding proposition, and is only defective in this respect, that it ignores the case of there being *various prices at which the equation between supply and demand is realised*.

Deferring at present a minute investigation of the laws of demand and supply, and by way of clearing the ground for this investigation, it will be well to examine the more remote causes of those laws, *i.e. the causes owing to which the curve of final degrees of utility*<sup>1</sup> follows one direction rather than another, and the disposable quantity of a commodity comes to be what it is.

As regards the final degree of utility of a commodity, we know that it is determined by the place of the corresponding want in the scale of intensity of an individual's numerous coexistent wants (part i. chap. iii. § 2; and chap. iv. § 3), and by the quantity of that commodity already possessed by such

<sup>1</sup> Of the causes that determine whether the curves are many or few nothing of a general character can be predicated. Every commodity appears to us to have special technical properties of its own, and these too are for the most part imperfectly known. The subject is also vague, because the doctrine of the variety of wants and of the degrees of absolute intensity of wants is vague. Respecting some commodities there are excellent monographs, those on the precious metals being most numerous. See also Jevons's *Coal Question*, and Cairnes's *Leading Principles*, 2nd ed. 1883, Macmillan, part i. chap. ii. § 6, p. 36.

individual. These two conditions of fact determine, on the one hand as regards the purchaser, the final degree of utility of the commodity he desires and that is in the vendor's possession, and the final degree of utility of the commodity he will eventually give in exchange, and that is in his possession, *i.e.* the price; and on the other hand, as regards the vendor, the final degree of utility of the commodity he desires, *viz.* the price, and that of the commodity he is disposed to give in exchange, *i.e.* the subject-matter of the sale.

This doctrine however is complicated by the fact, that the final degree of utility of a commodity may be immediately determined by that of another commodity.

These cases may be grouped under three headings:—

1st. If we cease to have a commodity that was in our possession,—or a portion of a determinate quantity of commodity—and such commodity or portion thereof may be replaced by our labour, we must differentiate the case of the pain or cost (see part i. chap. ii. § 4) of reproduction being greater than the pain of doing without the commodity, from the case in which it is less. If the *cost of reproduction is greater*, a hedonist will not incur it, preferring to endure the lesser pain caused by the total or partial non-satisfaction of a want, owing to the loss of the commodity capable of satisfying it; but if the *cost of reproduction is less*, a hedonist will prefer to incur it. Now on this last hypothesis, the loss of the commodity in question has not occasioned him as much pain as he would have had to suffer had it not been susceptible of reproduction, but only the lesser pain involved in the labour of reproduction. Hence the final degree of utility of the commodity, in the several cases of its being acquired, dispensed with, or lost, is no longer its own intrinsic degree, but that of another commodity possessing a lower degree of utility; or to use Ferrara's words, it is equal to the cost of the *physical reproduction* of the commodity. The law of exchange remains what it was; only the final degree of utility, which is one of its factors, attains a level it would not otherwise reach.

2nd. If we cease to have a commodity that was in our possession—or a portion of a determinate quantity of commodity—and such commodity, or portion thereof, is either not susceptible of physical reproduction, or is so only at a cost that

represents a final degree of negative utility greater than the final degree of positive utility of the commodity we have lost, it may be that we can substitute for it—*ex. gr.*, by means of labour—another commodity possessing a final degree of utility greater than its cost (*i.e.* than the final degree of negative utility of the requisite labour). In this case the loss of the commodity has not entailed on us all the pain its deprivation would otherwise involve; but only a differential pain, always less, and often much less, than would otherwise be the case. In fact we have forfeited the entire utility of the commodity we have lost, and in addition we have suffered the pain entailed by the cost of production of its substitute; but we have acquired the utility of this substitute, which according to our hypothesis is greater than its cost of production, and which therefore constitutes a partial set-off against the pain caused us by the loss of the first commodity. Hence the final degree of utility of this commodity comes to be, not the whole of its own degree, but its own degree minus a part of the final degree of another, in consequence, as Ferrara says, of the *cost of reproduction by substitution*. We must again observe that this condition of things in no way alters the law of exchange, as we are dealing with factors that determine the final degree of utility of commodities, which degree is considered generically with reference to this law.

3rd. All riches, *i.e.* all commodities having an exchange value, MAY have a final degree of utility that mediately is not their own. If any such commodity, or a portion thereof, fails us, we can always, by the sacrifice of another commodity, termed price, obtain a duplicate of it. Hence the loss of a commodity having an exchange value may entail on us, not the non-satisfaction of the corresponding want, or degree of want, but the non-satisfaction of that other want which the commodity we give to obtain a duplicate of the first commodity would have satisfied. Now, one or other of these two conditions must be realised with respect to a commodity having an exchange value: either it possesses for us a final degree of utility less than that of its price, in which case the hedonist will not repurchase it,<sup>1</sup> and its loss will be measured exactly by its final degree of utility; or else it has a final

<sup>1</sup> In equilibrium this case is impossible, because a hedonist would have sold it.

degree of utility greater than that of its price, and we have consequently the same case as we had before, when considering the cost of physical reproduction; that is to say, the loss of the said commodity will only entail on us a smaller, frequently a much smaller, sacrifice, equivalent to the final degree of utility of the commodity which is its price, or in Ferrara's words, to its *cost of reproduction by exchange*. It is obvious however that the existence of a cost of reproduction by exchange, cannot affect the final degree of utility of a commodity in a market, *unless there exists another independent market in which the reproduction by means of exchange at a lesser price may be effected*; and that therefore this possibility or condition of things *cannot be a determining factor of the final degrees of utility of commodities in the market IN GENERAL, i.e. on the hypothesis of one universal market*.<sup>1</sup>

Apart from these three cases, in which the final degree of utility of a commodity is not its own, but that of another commodity—of which three, however, only the first two are important as regards the theory of exchange,—the factors that can affect it are those we have discussed already (part i. chap. iv. § 3), and it only remains for us to speak of the causes that determine the greater or lesser availability of a given kind of riches.

These causes, on which the available quantity of a commodity depends, are divided into two categories, viz. : on the one hand, causes that are in no way subject to the human will,—and that consist of invariable conditions of fact of the environment,<sup>2</sup>—and on the other, causes that are at least partially subject to the human will, and that may all be comprised in the conception of the cost of production of things.

This division is not based on any diversity in the operation of the causes according to the category to which they

<sup>1</sup> The error so frequently committed of reckoning as a factor of the rates of interchange in general, the cost of reproduction by means of exchange in another market, is admirably exposed and criticised by Böhm-Bawerk, *ubi supra*, p. 516. This work is however devoid, down to its minutest details, of all originality. On cost of reproduction, see: Maiorana Senior and G. Maiorana, *Teoria del valore*; Martello, *Appendice alla moneta*, p. 533; G. Rossi, *La matematica applicata alla teoria della ricchezza sociale*; Loria, *Il valore negli economisti italiani*; Carey, *Bibl. dell' Econ.*, serie i. vol. xiii. c. ii. pp. 336-343; Ferrara, *Introduzione*, vol. v. serie i. p. lvi.; vol. xi. pp. lxxv.-lxxviii.

<sup>2</sup> For instance, the comparative abundance of gold and silver strata.

respectively belong ;<sup>1</sup> but on the fact that when they belong to the former, nothing can be predicated of them that does not pertain to some purely technical branch of science, whilst if they belong to the latter, they afford ample scope for observations pertaining to the theory of value.

In fact we recently found the cost of production among the causes that sometimes determine the final degree of utility of commodities ; and if we find it likewise amongst those that affect the available quantity of commodity, it is evident that this phenomenon possesses singular importance, and deserves to be discussed *ab ovo*.

§ 2. *Of the Identity of the Cost of Production and Final Degree of Utility of Commodities and of some of the Principal Deductions from this Theorem.*

Most riches are in a certain sense the fruit of human activity. Men, it is true, cannot produce even the least of things ; and matter and the properties of matter, or forces, have ever been, and ever will be, an invariable cosmological fact. But men can, according to the measure of their technical knowledge, produce utilities, that is, they so dispose matter and the forces that operate on matter, as to satisfy their wants. Men *move* things into such positions that their natural properties yield results subservient to human wants. And this movement which men impart to things, in order to render them useful, is wrought ultimately by means of the *employment and expenditure of muscular force* ;<sup>2</sup> which is accompanied by *painful* sensations (see part i. chap. iv. § 10).

Now, the original and precise meaning of the term cost of production, is *the sacrifice or pain submitted to in order to*

<sup>1</sup> "It is true that wherever there is utility, the addition of labour necessary to production constitutes value, because, the supply of labour being limited, it follows that the object, to the supply of which it is necessary, is by that very necessity limited in supply. But any other cause limiting supply is just as efficient a cause of value in an article as the necessity of labour to its production. And in fact, if all the commodities used by man were supplied by nature without any intervention whatever of human labour, but were supplied in precisely the same quantities as they now are, there is no reason to suppose either that they would cease to be valuable or would exchange in any other than their present proportions."—N. W. Senior, *Principles of Political Economy*, p. 24.

<sup>2</sup> R. Jennings, *op. cit.* chap. ii. p. 105 ; Gossen, *op. cit.* p. 35.

*obtain a commodity.* The forms this sacrifice may assume are various, *ex. gr.* work in its narrower sense, vigilant attention, forethought, abstinence from some immediate enjoyment, etc.; but economically these forms are indifferent; they may all be comprised under the generic conception of *labour, or cost, or pain.*<sup>1</sup>

According to this meaning of the term, the cost of production of a thing is primarily *only another term for its final degree of utility.* This is easily shown to be the case. Suppose the scale of intensity of a want to be given, *ex. gr.* the various degrees of painfulness that may accompany the want of food; and let there be given a determinate quantity of the commodity corresponding to the given want, *ex. gr.* a quantity of food, say eight increments, corresponding to eight different degrees of the want. Then according to what has been stated (part i. chap. iv. § 3), the measure of the utility of the eighth increment of the commodity in question is determined, either by the pain caused by its loss to the person who had the eight, or by the pleasure experienced by the person who has the seven increments, if an eighth be added to his stock. In other words, in either case, it is equal to *the hedonic quantity constituted by the eighth degree of intensity of the want in question*, and it may be expressed indifferently in terms of pleasure or of pain (part i. chap. iii. § 2).

But moreover we already know (part i. chap. ii. § 4), that if the loss of one increment of a commodity does not necessarily entail on us the pain consisting in the non-satisfaction of the corresponding degree of want, but leaves us the option of submitting either to that pain or to another due to the less painful non-satisfaction of some other degree of *another want, it is this second pain that is the measure of the degree of utility of the increment in question*; because this will be the only pain actually submitted to by a hedonist. Thus, too, if the acquisition of an increment of commodity may be made by submitting *disjunctively* to pains of varying intensity, it is still only *the least of them* that is the measure of its degree of utility. Therefore if a thing, or a portion of a homogeneous quantity of things, *ex. gr.* an eighth increment of food, may be obtained by a determinate amount of labour, say two hours'

<sup>1</sup> J. E. Cairnes, *op. cit.* part i. chap. iii. § 5, p. 57.

work, which is less painful to us than the degree of discomfort we should experience by forgoing the satisfaction of the corresponding degree of want, the two hours' work, or rather the sacrifice it imports, will be the measure of the degree of utility of the said increment, *i.e. the cost of production will coincide with the final degree of utility.* And if one thing is obtainable by the sacrifice of another (say of one shilling) the want of which is less painful to us, the commodity we forgo will be the cost or price of the other, and will coincide with its final degree of utility.<sup>1</sup>

But if the cost of production is the final degree of utility of commodities,—provided they be susceptible of reproduction, and that their cost be less painful than the absence of the satisfaction their possession affords us,—it follows necessarily that if the commodity in question be such that it can only be obtained *by means of production*, the cost of the last increment produced *is always its final degree of utility*; for, if it exists, it must have been produced, and if it has been produced, the non-satisfaction that would otherwise have ensued would have been more painful than the cost that has been incurred. This doctrine of the identity of the final degree of utility and the cost of the last increment is already known to us in connection with the questions discussed in the last paragraph, in which we found that for the final degree of utility of a given commodity we must, under determinate conditions, substitute that of another, *i.e.* sometimes the cost of its physical reproduction, sometimes the cost of its reproduction by way of exchange, and sometimes the cost of its reproduction by means of a substitute.<sup>2</sup>

Having thus ascertained that the cost of production of a commodity *MAY* be its final degree of utility, if it be susceptible of reproduction; and that such cost of production *MUST* be the final degree of utility if the commodity is of a kind obtainable only by production, it follows that all the theorems we have expounded respecting the final degree of utility are applicable

<sup>1</sup> In perfect equilibrium these cases are impossible, because the last increment of every commodity possessed has a final degree of utility standing in the same proportion to its cost; but, practically, equilibrium is never perfect, and these substitutions must therefore be also considered theoretically.

<sup>2</sup> In this last case, the reader will remember, that there is no effectual constitution of final degrees of utility, but a diminution of its own original degree.



to the cost of production.<sup>1</sup> This constitutes a proposition of capital importance, for it enables us to solve economic problems indifferently, in terms of cost, or of degrees of utility, according as is most convenient in any given case,—just as in mathematics we may have recourse to analytic or geometric methods,—and it enables us, in the demonstration of economic theorems, to pass from one form of expression to the other, whenever this transition may facilitate the comprehension of the relations of the problem.

It may be well to translate into terms of cost of production, and to demonstrate independently, some of the propositions relating to the final degree of utility which we have demonstrated above; and this not only by way of example, but also in view of their importance with reference to numerous questions of applied economics.

1st. "In order that an exchange may take place between two individuals, there must be a difference between the comparative degrees of final utility of the respective commodities for each of them."<sup>2</sup> This theorem may thus be translated in terms of cost:—

<sup>1</sup> It seems to me that the identity, or at least the equivalence of *final cost*, *i.e.* cost of the last increment of commodity at our disposal, or required by the market, or that we wish to produce, etc., and *final utility*, *i.e.* utility of the last increment of commodity at our disposal, or required by the market, or that we wish to produce, etc., requires no new demonstration, since it is not even a corollary of the Gossen-Jevons theorem of the equivalence of the ordinates of painfulness and pleasure at the moment when a hedonist breaks off any work he is engaged in (part i. chap. iv. § 10), but merely a PARAPHRASE of that theorem. But whoever admits this, must recognise that the new doctrines of the final degrees of utility are a no less unexpected than crushing demonstration of the precision, elegance, and truth of all the theorems of the orthodox and classic economists.

<sup>2</sup> It is important to note, that the condition that the *comparative degrees of utility*, or of *cost*, should be *in an inverse order for the two parties*, is not necessary. That is the case in the instance given above, and many text-books lay down this condition as essential, but it is really superfluous, the first alone being necessary and sufficient. Thus, let the costs be  $\frac{5}{8}$  and  $\frac{8}{5} = \frac{4}{3}$  and  $\frac{4}{3}$ . The rates of exchange will be the reciprocals of the fractions  $\frac{3}{4}$ ,  $\frac{3}{4}$ . In fact, Primus gives 54 increments of commodity A to Secundus, spending  $54 \times 45$ . Secundus would have had to spend  $48 \times 54$ . Secundus gives 46 increments of commodity B to Primus at a cost of  $46 \times 54$ . Therefore, Secundus gains  $(48 - 46) 54$ . Primus receives 46 increments of B, which would cost him  $54 \times 46$ , but for which he actually pays 54 increments of A =  $54 \times 45$ . Therefore Primus gains  $(46 - 45) 54$ . In order to make the point quite clear, I shall modify the example in the text so as not to realise the superfluous condition. Let the cost of production of *n* yards of silk be 80 for the First country, and the cost of

“ In order that an interchange may take place between two individuals (or between two groups of individuals constituting close markets, *i.e.* groups so constituted that capital and labour cannot migrate from the one to the other, or between two countries) there must be a difference in the comparative cost of production.” In fact, let us consider the case of two countries supposed to be close markets. Let the First produce a determinate quantity of silk, at a cost of 80, and a determinate quantity of cotton at a cost of 96; and let the Second produce the same quantity of silk at a cost of 120, and the same quantity of cotton at a cost of 100.<sup>1</sup> The First will ask itself: Do I obtain more cotton at an equal cost, or the same quantity of cotton at a less cost, by manufacturing it at home, or by manufacturing silk and exchanging it for the other country’s cotton? And the Second will ask itself, whether it will obtain more silk, or the same quantity of silk at a less cost, by not producing it at home, but by producing cotton instead, and exchanging it for the silk of the First. For both countries there is a notable difference in the comparative cost: for the First a difference constituted by the cost of the silk at 80 and that of the cotton at 96, *i.e.* sixteen units, equal to 16·6 per cent; for the Second a difference constituted by the cost of the cotton at 100 and of the silk at 120, *i.e.* by twenty units, also equal to 16·6 per cent. It is immaterial that the

$m$  yards of cotton, 96 for the Second. On the other hand, let  $n$  yards of silk cost the Second country 110 to produce, and  $m$  yards of cotton 120. We have thus a difference in the comparative cost of production of the two commodities in the two countries; but the difference is consilient; in both countries it costs less to produce  $n$  yards of silk than  $m$  yards of cotton. Is this a sufficient and necessary condition to induce an interchange? It is. Let the First offer 95 days’ labour in silk, or  $1·187 n$  yards of silk for  $m$  cotton to Secundus. If the exchange is accepted, the First will gain one day’s labour, for each barter, as compared with the position it would be in, if it were itself to produce cotton by 96 days’ labour. The Second will also accept the proposed interchange, because by delivering  $m$  yards of cotton, at a cost of 120 days’ labour, it obtains  $1·187 n$  yards of silk which would cost it 130·570 days to produce. In fact  $1n = 110$  days’ labour; therefore  $1·187n = 110 \times 1·187 = 130·570$  days. The same result is arrived at, if we reflect that the 80 days’ labour in silk of the First are to the 110 days of the Second, as the 95 of the First are to the 130·570 of the Second.

<sup>1</sup> David Ricardo, *Principles of Political Economy and Taxation*, chap. vii. p. 72, M’Culloch’s ed.; A. L. Perry, *Political Economy*, 18th ed., New York, Scribner, 1883, chap. xii. pp. 461 *et seq.*; Cairnes, *op. cit.* part i. chap. iii. § 7, p. 87; part iii. chap. i. pp. 297-319; J. S. Mill, *op. cit.* book iii. chap. xvii. pp. 347-351 and Essay I.

comparative cost of both commodities is greater for the Second country. If the two countries were not close markets, the labour and capital of the Second might with most advantage migrate to the First, where industry is more *remunerative*, *i.e.* where labour is more efficient. As this is not possible, it is evidently to the interest of *both* to exchange those commodities in the production of which the labour of each is comparatively more efficient.

For, if the First country, by parting with as much silk as it can produce at a cost of 80, obtains in exchange as much cotton as it can produce at home, only at a cost of 96, it saves 16 units of cost, *i.e.* 16·6 per cent of the labour, or pain, it would have to submit to, if it did not exchange; if the Second, by parting with as much cotton as it can produce at a cost of 100, obtains a quantity of silk that it could not produce at home, except by the sacrifice of 120 units of cost, it also saves 16·6 per cent of the labour it would submit to, were the exchange not effected.

Therefore a difference in the comparative cost is a sufficient condition to make an exchange advantageous as between two close markets, whether these be individuals, or groups of individuals; and this, even if the absolute cost of production in all its branches, in one of these markets, is greater than in the other. On the other hand, without a difference in the comparative cost, no exchange presents any advantage, for it saves no cost.

2nd. "It is more advantageous to exchange at any ratio between the maximum and minimum limits of the comparative degrees of final utility, than to forgo the interchange."

This theorem is translated in terms of cost in the following manner:—

"It is more advantageous to exchange at any ratio between the maximum and minimum limits of the comparative costs than to forgo the exchange." In fact, the maximum and minimum limits of the price of the Second country's cotton, expressed in terms of the First country's silk, are 96 and 80; and the maximum and minimum limits of the price of the First country's silk, expressed in terms of the Second country's cotton, are 120 and 100. For if the Second were to ask for the quantity of cotton it produces at a cost of 100, and which the

other could produce at a cost of 96, a higher price than 96 in silk, *i.e.* if it were to exact, as an equivalent for the above quantity of cotton, such a quantity of silk as would take the First nation 96 or more units of cost to produce, it is obvious that the latter will prefer to forgo the exchange, and to produce itself the cotton it requires. But if the Second country does not demand a quantity of silk requiring 96 units of cost, but any *smaller quantity*, costing, say, 86, 87, 88 up to 95 units, it is clear that the First will prefer an exchange to the direct production of the cotton it requires, thereby saving a larger or smaller cost. The cotton it requires however, can never cost it less than 80 units of cost, because that is the cost of the minimum quantity of silk that, on the most favourable assumption, is required to procure the cotton, *i.e.* that is to pay for the latter. The same reasoning applies to the Second nation. If it obtains the silk by giving the cotton which costs it 100, it saves 20 units of cost; if it has to give as much cotton as it can produce at a cost of 110, it will still save 10 units; if it has to give as much cotton as it can produce at a cost of 119, it will still save one unit of cost. But if it had to pay for the silk 121 units of cost measured in quantities of cotton, it would be more advantageous for it to produce the silk at home. Therefore within the limits of the comparative costs, it is to the advantage of both countries to barter, whatever may be the rate of interchange. One may gain more than the other, but each gains something, whatever the rate of interchange may be within these limits.

3rd. "The final degree of utility of the commodity that either party gives to the other, is the price of the quantum of commodity that either receives from the other."

This theorem is translated thus:—

"The cost of production of the commodity that either party gives to the other is the price of the quantum of commodity that either receives from the other."

Suffice it to observe that the cost is always the cost of the last portion of the amount given in exchange. The demonstration of the last theorem applies equally to this one; the eighty units of cost of the silk are for the First country the price of the quantum of cotton it receives in exchange.

4th. "The profits of each party to an exchange are the

greater, the greater the difference for each between the final degrees of utility of the commodities he respectively gives, and receives in exchange."

This theorem is formulated as follows:—

"The profit accruing from international trade (*i.e.* trade between close markets) is the greater, the greater the difference for either nation between the cost of the wares it gives and that of the wares it receives in exchange."

In fact, let us suppose that the First country, for which a determinate quantity of its own silk cost 80 units, can now produce the same quantity at a cost of 50 units, the cost of direct production of cotton remaining in its case 96, whilst the cost of silk remains in the case of the Second country 120, and that of cotton 100.

The rate of interchange was, before the supposed reduction in the cost of silk, in the case of the First country, 80 in silk as against 96 in cotton, affording a profit of 16·6 per cent; and for the Second, 100 in cotton as against 120 in silk, yielding a profit of 16·6 per cent.

By the reduction of the cost of production of silk from 80 to 50, the profit the First nation obtains by exchanging becomes enormous.<sup>1</sup> It still gives the same quantity of silk in exchange for the same quantity of cotton as before. But this quantity of silk now costs it 50 instead of 80; so that at a cost of 50 it procures a commodity which would cost it 96, if it were to produce it directly. The saving of cost is therefore 46 units. The Second nation continues to earn the same profit as before. Even were the First nation now to offer for the same quantity as before of the Second nation's cotton, such a quantity of silk, as before the fall in the cost of production, would have cost it 96 units to produce, it will only submit to an effective cost of 60 units; for the former 80 units of cost stand to the present 50 units of cost as 96 to 60.

If instead of the cost of production of silk being diminished, in the case of the First country, the cost of the direct production

<sup>1</sup> The rates of interchange will vary as the effect of a force we have still to discuss: suffice it to remind those who are not new to economics, that *within the limits of comparative costs, the reciprocal demand determines the rate of interchange.*

of cotton had increased, say from 96 to 98, the difference between the comparative cost would be still greater than before, having risen from 16 to 18, and the profit arising from the exchange would also have increased. Hence it is evident that international trade, or trade carried on between isolated individuals or isolated groups of individuals, may become more profitable, not only as the result of some industrial progress whereby the cost of production is reduced, but also as the result of some misfortune, such as the exhaustion of the soil, technical retrogression, or racial degeneracy, whereby the maximum comparative cost is increased. In any case it is proved that the gain is the greater, the greater is the difference in the comparative cost.

5th. "If several purchasers compete for the commodity of a single vendor, it will be acquired by the purchaser for whom it has a maximum comparative final degree of utility." This theorem and the 6th: "If several vendors compete for a single purchaser, the vendor for whom the difference in the comparative degrees of final utility of the two commodities is greatest will succeed in selling his commodity," being correlative theorems, may be combined in the following one:—

"If several vendors (or purchasers) compete for a single purchaser (or vendor), that vendor (or purchaser) for whom the comparative cost is greatest will exclude his competitors from the market."

In fact, the First country, we have supposed, is willing to receive the cotton of the Second at a price of 80 in silk, *i.e.* to give in exchange for the cotton such a quantity of silk as costs it eighty units to produce, *ex. gr.* eighty days' work, or eighty shillings of expenditure, thus gaining 16·6 per cent in the shape of a saving of cost, or of sacrifice in the satisfaction of its wants; but it cannot offer a higher price to the Second than 96 in silk, at which its profit is nil. Now let a Third country also want cotton, and let it also produce silk at a lower comparative cost. It will then exclude the First from the market of the Second, if it can offer more than 96 in silk for the same quantity of cotton; for up to that price the First country is also disposed to go, if necessary. But the Third nation will not be able to offer more than 96 in silk for the cotton, unless it is either more efficient in the production

of silk,—so that, *e.g.*, it can produce, at a cost of 50, a quantity which costs the First nation 80,—or less efficient in the production of cotton, so that, *e.g.*, it could not produce the latter directly for less than 98 units of cost. Therefore it is essential that *the difference between its comparative costs should be greater than the difference between those of its rival*, so that it may have either a lesser minimum limit or a greater maximum limit than the other to its rates of interchange.<sup>1</sup>

These theorems, together with some others, constitute what is called Ricardo's theory of foreign trade,<sup>2</sup> or of comparative cost. It concerns us to recognise in them the restatement of theorems we have already ascertained in other ways, and to note that they are susceptible of independent demonstration in terms of cost; cost being substantially identical with final degree of utility.

### § 3. *Of an Erroneous Meaning attributed to Cost of Production, and of some consequent Erroneous Propositions*

The conception of the cost of production, which is perfectly simple, so long as it is considered in isolated or individual

<sup>1</sup> The mistake is commonly made of supposing that the lower rate of wages current in one country is the cause that enables it to export a commodity, say iron manufactures, to another country, and to exclude the latter from a neutral market. If the First country pays lower wages, and exports iron manufactures to the Second, where wages are higher, it is obvious that the rate of wages has nothing to do with the matter. For the Second country pays, say with cotton. Now, if in this country there were a fall of wages all round, the cost of production of iron and cotton would be reduced proportionately, and the difference in the comparative cost would remain the same; hence the First country would continue to export iron to the Second, taking cotton in exchange. This argument assumes that wages are *part* of the cost of production, rather than its *remuneration*. But that is precisely what protectionists assume. See Cairnes, *op. cit.* pp. 325, 326; and Symes, p. 150, *Pol. Ec.* Of course wages affect various productions in very different measure. A change in wages will alter the demand for a great many elements of production, *ex gr.*, the use of machinery, and will have very complex effects.

<sup>2</sup> These theorems are said to refer to *international* exchanges, because it is considered that nations are, in the main, *close markets*, with respect to each other, *i.e.* that no considerable migration of capital or labour from one to the other is likely to occur. This is a *question of fact pertaining to applied economics*, which has no interest for us. The Ricardian theorems apply to close markets, wherever situated, and whatever they may be, *i.e.* whether they be nations or non-competing industrial groups, or individuals.

economics, has been frequently obscured by those who have attempted, at the outset, to analyse it in social economics, and under a *régime* of perfect division of labour. Suppose a society constituted as our most civilised contemporary communities, *i.e.* divided into capitalists, contractors, and labourers (the landlords being for the present left out of account), it may seem at first sight that the cost of production of any product consists in a determinate sum of wages and interest paid by the person who has undertaken to produce it. In fact, a capitalist pays workmen, *i.e.* spends a sum in wages, and purchases and provides the tools, the raw material, the workshops, and all else that is required for the manufacture of an article. But all the wealth he purchases, in addition to the wages he pays, has been produced before by the payment of other wages, and the supply of other tools, raw materials, workshops, etc., by other capitalists, whom he simply refunds, when he purchases their products to serve as instruments of his own production, or in other words, whose expenditure he simply takes over. Hence, if we retrace the scale of costs of a product, noting all the costs of the things that go to compose it, or that contribute to its production, we find ultimately the two above-mentioned most simple elements, *viz.* remuneration of the labour expended by generations of workmen, and remuneration of the capitalists' abstinence from immediate consumption; or in other words, a determinate sum of wages and interest.

But if we adopt this definition of the cost of production, these two propositions must follow, *viz.*: 1st, That the value of all products is always determined by their cost of production; and 2nd, That the cost of production is the cause of the value of commodities.

In fact, as regards the first proposition, it is mere tautology, for it is given by the definition of the cost of production of a product, that it is equal to the sum of the wages and profits paid for its manufacture. But it is obvious that the price at which the product is sold, if it be produced repeatedly, and therefore not at a loss, is the sum that is divided into wages and profits. Hence, whatever be the price, the sum of the wages and profits, and the cost of production, will be the same; in other words value, considered, not as ratio of exchange, but



as price, or as purchasing power, is equal to the cost of production understood in the same sense.<sup>1</sup>

As regards the second proposition, it is given by the genesis of the definition, according to which the cost of production consists of the sum of the labourers' wages and capitalists' profits, and the person who wants a product must refund to its makers the whole expenditure they incurred in the shape of wages and profits; in other words, the price or value of the product is what it is, because the product has cost so much. And our daily experience, considered superficially, seems to bear out this thesis.

§ 4. *That the Value of Commodities consumed in the Production of another Commodity cannot be the cause of its Value. Wieser's Law.*

Pausing first to examine the doctrine according to which valuable things are such, because they have been produced by means of other valuable things, it is evident, at first sight, that it cannot pretend to indicate the cause of value in general, but at most, only the cause why a determinate thing possesses value. For if the things that have served for the production of the one whose value it is desired to explain, are themselves valuable, it is clear that it is further necessary to explain how it is that these productive commodities came to be valuable; and if the same reason applies to them, viz. that they are derived from other valuable commodities, the question is only removed further back, since it will remain to be explained how these remoter productive commodities came to be invested with value.

Bearing in mind some things mentioned before (part i. chap. iv. § 5), we shall suppose a direct commodity to be capable of being produced by means of a single instrumental commodity. In that case, as we already know, the instrumental commodity has a purely reflex final degree of utility, derived from the final degree of utility of the immediate, or direct, commodity which can be produced by its means. If the process of production requires a certain duration, the degree of utility of the instrumental commodity will correspond to

<sup>1</sup> Cairnes, *op. cit.* chap. iii. §§ 2, 3, pp. 45-51.

the final prospective degree of utility of the direct commodity derived from it. Hence there is no doubt that, so far, we have a condition of things that is precisely the reverse of a determination of the economic properties of the direct commodity, by means of those of the instrumental commodity from which it is derived. But let us now suppose that from one instrumental commodity several direct commodities are derived. These will constitute a so-called genetic group (part i. chap. iv. § 7). For instance, from iron a number of products are derived, forming together with it, one genetic group. We shall also make abstraction of the fact, that in reality there is probably no example as simple as our hypotheses predicate, since there is possibly no instrumental commodity that is not, at the same time, a complementary commodity. Let the immediate commodities belonging to this genetic group have various final degrees of utility.<sup>1</sup> For instance, let I be the instrumental commodity, and B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>, the immediate commodities derived from it, having final degrees of utility respectively equal to 5, 7, 9. By this supposed difference in the final degrees of utility we mean to signify that the commodities B<sup>1</sup>, B<sup>2</sup>, B<sup>3</sup>, taken separately, would have those final degrees of utility.

Now it is asked in the first place, which of these various final degrees of utility will determine that of the instrumental commodity, I? Evidently it must be the lowest degree among those of the genetic group; for if a part of I, *i.e.* of the available quantity of the instrumental commodity, comes to be lost or destroyed, the remaining portion will, in the first instance, be applied to the production of the immediate commodities belonging to the group which have the highest final degrees of utility (Gossen's theorem, part i. chap. ii. § 6), and it is only so far as the stock suffices, that its employment will be extended to the production of commodities having lower degrees of final utility, *i.e.* corresponding to less urgent wants. If, *e.g.*, the quantity of money at our disposal is inadequate—and money

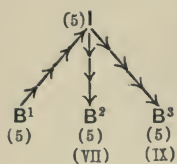
<sup>1</sup> A condition not possible in perfect equilibrium, because a maximum of utility is obtained, if the instrumental wealth is applied to the production of the several direct commodities in such a manner that these have equal final degrees of utility, or rather, final degrees which are proportional to cost in the same ratios (part i. chap. iii. § 2). In practice the scale supposed by Wieser is possible.

is the instrumental commodity *par excellence*—we shall procure, or produce, with what we have, first those things that are most indispensable, and only so far as the sum at our disposal admits of, shall we proceed to procure things corresponding to less painful wants. Thus the diminution of the supply of an instrumental commodity curtails the availability of those commodities which have the lowest degree of final utility, and thus it only occasions us a pain equivalent to the one caused by the absence of the means of supplying the last wants that we formerly satisfied. But that is equivalent to saying, that the final degree of utility of the instrumental commodity, I, is equal to the final degree of utility of that member of the genetic group of commodities which has the lowest degree of utility for each individual.

Hence, in our example, I will have the final degree of utility derived from  $B^1$ , viz. 5.

But this knowledge aids us in the solution of a further question which presents itself, viz. what influence can the final degree of utility of the instrumental commodity exercise on the final degrees of utility of the immediate commodities composing the genetic group. For it is obvious that if the commodities  $B^2$ ,  $B^3$ , etc., can be produced *ad libitum* by means of the instrumental commodity I, their final degrees of utility cannot be greater than that of I. In fact the loss of the commodity  $B^2$ , whose final degree of utility is 7, only imposes on us the pain of forgoing a part of I, in order to reproduce  $B^2$ , or in other words, of suffering a non-satisfaction already known as equivalent to 5. The same reasoning applies to  $B^3$ , and to successive commodities. Hence we find that the final degree of utility of the instrumental commodity, being less than that of some of the commodities constituting the genetic group, will by its reflex action determine their final degree of utility; and ultimately we find that the final degree of utility of that member of the genetic group, which ranks lowest, determines the equivalence to itself of the final degree of utility of the instrumental commodity; and this in turn determines the equivalence to itself (and consequently also to the degree of the immediate commodity that ranks lowest) of the final degrees of utility of the other immediate commodities belonging to the genetic group. In the accompanying diagram this

process is indicated by means of arrow-heads. The final degree of utility of  $B^1$ , *i.e.* (5), determines that of I (5), and this in turn suppresses the final degrees of utility originally pertaining to  $B^2$  (vii.) and  $B^3$  (ix.), and substitutes its own index (5).



This law should be called after Wieser,<sup>1</sup> who was the first to expound it, and to investigate it in its minutest details.

It is evident that if, owing to any circumstance whatsoever, the power of reproducing  $B^2$  or  $B^3$  by means of I is interrupted or suspended, or if the nexus between I and  $B^1$  is dissolved, each of these commodities resumes *its own* final degree of utility. This occurs in a certain form of economic crisis.

The nexus we have shown to exist between instrumental and immediate commodities, not only corrects the current theory, but explains moreover why it is a mistake to believe that the value of the commodities consumed in a process of production is the cause of the value of the products; for in so far as the final degree of utility is the *price* of commodities in an exchange, and in a genetic group of commodities all, with the exception of the lowest in order of utility, substitute for their own final degree of utility, that of the instrumental commodity from which they are derived, it is clear that the above doctrine is also partially true, being based on an incomplete observation of facts.

The law we have expounded may now be complicated at pleasure. Thus we may suppose the instrumental commodity to be at the same time supplemental to other commodities; to have a final degree of utility of its own as an immediate commodity; to be of a very remote degree, etc. All these variations, however useful they may be, necessitate the introduction of no element that has not been already considered.

We therefore pass on to expound the scientific meaning of cost, and the forms which it may assume.

<sup>1</sup> F. v. Wieser, *Ueber den Ursprung und die Hauptgesetze des w. Werthes*, Wien, Hölder, 1884, part iv. § 2, pp. 139-180; *Der natürliche Werth*, 1889, part v. pp. 164-204.

§ 5. *That Cost and its Remuneration are Antithetical Conceptions*

From the considerations already set forth (part i. chap. ii. § 4) it must be clear, that the conceptions, *cost* and *remuneration* of cost, constitute the most profound antithesis in economic science. Senior and Cairnes treat this as a fundamental theorem.<sup>1</sup> In fact, industrial progress, *i.e.* the realisation of hedonic maxima, consists in altering the proportion between cost and remuneration, diminishing the first and increasing the second. This antithesis, as Cairnes observes, is so real, that a small cost, or a large remuneration, are convertible terms. Now, the wages of labourers are for them the remuneration of the cost, or pain, they submit to in working; whilst profits are the remuneration of the cost incurred by the capitalist. If the opposite thesis were true, then the cost of production, however great the industrial progress or retrogression might be, would always be constant. In fact, suppose some industrial progress to have been realised, in consequence of which capitalists and labourers receive, in return for the same amount of expenditure and toil, a larger quantity of products, so that the produce to be divided between wages and profits comes to be more than it was previously, we should nevertheless have to say that the cost of production is unchanged, because the aggregate wages and profits would have increased in proportion to the progress realised. It is of course perfectly legitimate to consider the wages paid as a part of the *capitalist's* cost of production; but the sacrifice involved in the production of a commodity is not limited to *the capitalist*. If this were so, high wages should be regarded as an obstacle to production, whereas they are the *effect of the productiveness of labour*, just as much as large profits, which from the labourer's point of view, should be considered in the same light as large wages are from the point of view of the capitalist.

<sup>1</sup> Cairnes, *op. cit.* p. 49; Senior, *op. cit.* pp. 589, 590; Cliffe Leslie, *Essays*, ed. 1879, London, Longmans, n. xii. p. 180; ed. 1888, n. iv. p. 41.

### § 6. *Of the Law of Variation in the Productiveness of Cost*

The ratio in which cost is to remuneration may vary considerably, owing to a number of conditions subject to which we may suppose the production to have been effected, or under which it actually has been effected. The variations in the efficiency or productiveness of labour, or cost, may nevertheless be regarded as subject to only two groups of forces. Of these the first group is comprised under a law known as the law of *decreasing productiveness*, whilst the other is comprised under a law known as that of *increasing productiveness*.<sup>1</sup>

The term law of decreasing productiveness has however a twofold meaning, according as it is used in a wider, or a more restricted sense. In the latter acceptance,<sup>c</sup> the law affirms that, after a determinate limit has been reached in the ratio between the amount of labour employed and each unit of the natural forces available, the productiveness of each unit of effort or cost tends to decrease in the agricultural and extractive industries.

In other words, the productiveness of labour, on the above hypotheses, would present, if expressed graphically, the same curve as the degrees of utility (part i. chap. iv. § 3); *i.e.* it would be positive up to a certain point, and after that negative. The demonstration of this so-called law, which in reality is simply a premiss of economic laws (part i. chap. i.), must either be obtained from the examination of facts, or be replaced by the transformation of the law into a postulate or hypothesis.<sup>2</sup>

In any case, the truth of the proposition is obvious. It is a matter of everyday experience that one cannot, by doubling the capital or labour expended on a piece of land, continuously double its produce; and this alike whether the land be used for farming, for building, for mining, or in any other way whatsoever.

The limit at which the law of the decrease of productive-

<sup>1</sup> The publication of the treatises of Marshall and Pareto necessitate these laws being restated in a very different way and in a different connection. See *post*, a short addition on Rent.

<sup>2</sup> For the graphic expression of the cost curve see *post*, § 7.

ness comes into operation, depends on the stage of civilisation attained, and recedes with every advance in the technical arts and in the organisation of labour. Before the limit is reached, the opposite law prevails, viz. the law of *increasing productiveness*, which affirms, that up to a certain limit, every increase in cost, or in the amount of labour expended, yields *in every industry* a more than proportionately increased product, and that in *manufacturing industries* this increase is *continuous*. This law likewise is purely empirical; division of labour,<sup>1</sup> the facilities of communication, improved organisation, are all means of increasing productiveness, and are rendered possible by the growth of population and the abundance of capital.

The law of decreasing productiveness has however a wider meaning, inasmuch as it affirms that, despite the continuously increasing productiveness of labour in manufacturing industries, such productiveness beyond a certain limit, more remote indeed than is the case in agricultural and extractive industries, decreases also in the above-mentioned industries, owing to the increased cost of the raw materials that are used in them, and which are ultimately due to agricultural or extractive industries. In other words, in the latter industries the law of decreasing productiveness preponderates directly; whilst in manufacturing and commercial industries the influence of the law of increasing productiveness preponderates directly; but in the productive system in general the law of decreasing productiveness preponderates indirectly, but universally.

Having regard to these two laws, we may, at a given moment, and with respect to a given market, divide all products into various classes. The first class will be made up of those commodities of which a larger quantity than that available at a given moment, in a given market, may be obtained *by a simply proportionate increase of cost*; the second class will comprise those products which can be increased at *a less than proportionate cost*. And finally the third class will consist of such products as cannot be increased, at a given time and place, except *at a more than proportionately increased cost*. How important the distinction is between these various progressions

<sup>1</sup> How a saving of cost is effected by the division of labour, or rather by co-operation, is a question of practical economics, or rather of pure *technology*, just as much as the comparative merits of two machines.

of cost, or between the various forms that may be assumed by the curve of costs, is already evident from the fact that only *the final degree of cost* coincides with the final degree of utility, or in other words, with *the cost of the last portion still in demand of a particular commodity*. But further it will be seen presently how cost contributes in varying measure, according to its progressiveness, to the determination of the point of equivalence of reciprocal demands, *i.e.* of demand and supply.

§ 7. *Of the Influence of Cost on the Rate of Interchange under Conditions of Free Competition. Theorems of Ricardo and Marshall. Stable and Unstable Equilibrium of the Quantitative Index.*

If we suppose a number of perfect hedonists, and the absence of any obstacle to their acting in conformity with their several interests, under an economy of divided labour, in which each one works only for a common market, we deduce from the conception of the cost of production, understood as a sacrifice or pain annexed by nature to the attainment of the largest amount of commodities, a theorem, which may be formulated as follows: *the value of the products of each producer must be in proportion to the cost incurred in order to obtain them.*

For each one will devote himself to the particular branch of industry in which the ratio of remuneration to cost is greatest; and according to the supposition he can do so. But, equally according to the supposition, the remuneration consists not of the direct utility of the commodity produced, but of its instrumental utility, *i.e.* its purchasing power. Hence the production of articles whose value commands a more ample remuneration, will be increased, whilst the production of wares which command a less remuneration, will be diminished. But the increased availability of the more remunerative products will lower their price, as expressed in quantities of other products, until *an uniform proportion has been established between cost and remuneration in every branch of industry*, in other words, until value is everywhere *proportioned* to cost. This theorem is easily translated into terms of degrees of utility;



for on the hypotheses we have framed, viz. that each individual produces only such commodities as possess for him a special instrumental utility, viz. the capacity of being exchanged, in given ratios, for such commodities as are endowed for him with direct utility (part i. chap. iv. § 5), and that each individual can change his employment, it is clear that each will prefer the production of that instrumental commodity which, at the prevalent rate of interchange, yields him the largest supply of direct commodities; and this must, by modifying the proportions in which the instrumental commodities are available, modify in such wise their rates of interchange, that the differences between the comparative degrees of utility of the respective commodities placed on, and withdrawn from, the market by each individual become equal for all.

This theorem, which we attribute to Ricardo or Cairnes, is so important, that it is worth while showing that it is simply a corollary of another with which we are already acquainted (part i. chap. iv. § 10). In fact, supposing two isolated individuals, each of whom has to provide for his own wants, we already know from the theorem of Gossen or Jevons, that each will so distribute his energies as to obtain the maximum quantum of utility, and that this distribution will depend, on the one hand, on the comparative degrees of utility of the several products, and on the other hand, on the comparative degrees of efficiency of his labour in the several channels. But the comparative degrees of efficiency of his work are the reciprocals of the costs. Simplifying the data of the problem, we may suppose that in each branch of industry, or of productive activity, the efficiency of their labour is the same, so that each one will distribute his energies with regard solely to the final degrees of utility of the products. Now let us suppose that these individuals wish to divide their labour amongst themselves, perceiving that by this means the absolute efficiency of the labour of each is increased to an equal extent, or in other words, that the absolute costs are reduced for each of them to an equal extent; and this in consequence, say, of the increased proficiency attained by each, through his pursuing one employment, instead of two or more. In this case it is evident that the division of labour cannot entail on either of the two supposed individuals a comparative loss, *i.e.* that the ratio of exchange must

correspond to the respective efficiency of their labour; for the quantities produced by each, or the reciprocal offers, will be in this ratio; and moreover the party prejudiced may always, by threatening a return to the former condition of undivided labour, obtain a division in accordance with this ratio. It is further evident that, instead of considering a nation as composed of many individuals, each having a special aptitude to produce a determinate commodity, or being specially efficient in his own department of industry, or, in terms that are still substantially the same, each realising in his own department of industry a specially advantageous ratio between cost and remuneration,—we may consider the nation as a single

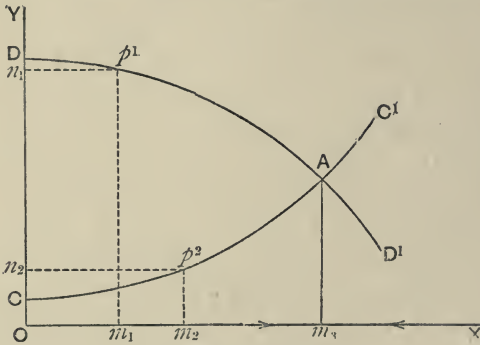


DIAGRAM XXXVIII.

individual distributing his power of labour among many branches of production; and it is clear that the results of the division of labour among many individuals, and the distribution of commodities consequent on exchanges, must be the same as are obtained, in the case of a single individual, by the distribution of the quantity of available labour among many employments.

Ricardo's theorem, according to which, under conditions of perfectly free competition, commodities susceptible of reproduction are exchanged in accordance with the ratio of the costs, necessitates our considering the cost of production as the index of the available amount of every commodity. This doctrine is summed up in the following elegant theorems of Professor Marshall.<sup>1</sup>

<sup>1</sup> A. Marshall, *Pure Theory of Domestic Values*. The original English text

Let the quantities of a given commodity be measured along OX in the diagram XXXVIII., and along OY the prices, whether in money, or in some other commodity, of a metrical unit of the first commodity. From what has been said before (part ii. chap. ii. § 1), we know already that if a determinate quantity of commodity can be sold at a given price, a larger quantity can only be sold at a lower price, and that consequently the series of prices per unit corresponding to increasing portions of a given commodity, sold in a market in a given period, presents the form of a *negative curve*.<sup>1</sup> This curve is therefore traced in the following manner:—

Let  $m^1$  be any point on OX, and let the price at which it is possible to dispose of  $Om^1$  commodity in a given period, be estimated and found to be equal to  $On^1$  on OY. Draw  $m_1p_1$  and  $n_1p_1$  at right angles to OX and OY respectively, to meet in  $p_1$ . Then  $p_1$  is a point on the curve. By causing  $m_1$  to move continuously from O along OX we shall obtain a continuous series of positions for  $p_1$ , which will be such that each increase of  $Om_1$  will involve a diminution of  $p^1m^1$ . Let the curve which is the locus of  $p^1$  be called the Demand Curve. Its definition will be, that *DD<sup>1</sup> is such that if any point  $p^1$  be taken on it, and  $p^1m^1$  be drawn perpendicular to OX,  $p^1m^1$  represents the price per unit at which an amount of the commodity represented by  $Om^1$  is capable of being sold in a given time and place.*

On similar principles we may draw the Supply Curve CC<sup>1</sup>. Every increase in the quantity of a commodity produced and offered may involve an increased, or a diminished, or a proportionately equal cost. The form of the supply curve will vary according as it is adapted to one or other of these several hypotheses, *i.e.* it will be either positive or negative. Let us first suppose the law of increased productiveness to prevail, *i.e.* that the cost of production increases more than in proportion to every increase in amount supplied.

Let  $m^2$  therefore be any point on OX (diagram XXXVIII.); let  $On^2$  on OY be equal to the cost of production of a metric of Prof. Marshall's theorems is of course slightly different from the text here given, as this text is a re-translation from the Italian.

<sup>1</sup> XVII. Theorem of Professor Marshall. It is equivalent to saying that DD<sup>1</sup> cannot cut more than once any perpendicular to OX or OY. With reference to the curve of supply, see *post*.

unit of  $Om^2$  amount of commodity. Draw  $m_2p_2$  and  $n_2p_2$  at right angles to OX and OY respectively to meet in  $p_2$ . Then  $p_2$  is a point on the curve. By causing  $m_2$  to move continuously from O along OX, and finding the position of  $p_2$  corresponding to each position of  $m_2$ , we can obtain a continuous series of positions for  $p_2$ , which is such that for each increase of  $Om_2$  we have an increase of  $p^2m^2$ .

We may then define the supply curve thus:  $CC^1$  is such that if any point  $p_2$  be taken on it, and  $p^2m^2$  drawn perpendicular to OX,  $p^2m^2$  represents the cost per metrical unit involved in the production of an  $Om^2$  amount of commodity in a given market and period.<sup>1</sup>

<sup>1</sup> The correct method of considering a supply curve is still the subject of controversy. In Prof. Marshall's diagrams the supply curve is a curve of expenses per unit in function of quantity produced. It may seem doubtful whether it is convenient to consider the intersection of such a curve with the demand curve. To make matters clear, I give in the following table (1) successive quantities of produce, (2) the total cost of each quantity, (3) the cost of every unit in function of the several quantities:—

| Quantities produced. | Total expenses. | Cost per unit. |
|----------------------|-----------------|----------------|
| 100 units            | 150 sh.         | 1½ sh.         |
| 200 "                | 200 "           | 1 "            |
| 300 "                | 450 "           | 1½ "           |
| 400 "                | 800 "           | 2 "            |
| 500 "                | 1250 "          | 2½ "           |

Such a curve may be useful for other purposes. For the uses to which it is put by Prof. Marshall, a curve of marginal expenses, or marginal cost in money, might be preferable. I suppose this question will be definitely settled by Prof. Marshall when he publishes his second volume. Here I shall only explain what is meant by a curve of marginal cost in terms of money. Suppose we have a table of quantities produced, as above, or even more complete, like the following one; suppose we know the total expense of each quantity produced, again as above, or as follows; then subtract each column of total cost from the one which follows and call this the marginal expense:—

| Quantities produced. | Total expenses. | Marginal expense. |
|----------------------|-----------------|-------------------|
| 10 units             | 15              | 15                |
| 12 "                 | 15½             | ½                 |
| 14 "                 | 16              | ½                 |
| 16 "                 | 17              | 1                 |
| 18 "                 | 18              | 1                 |
| 20 "                 | 20              | 2                 |
| 22 "                 | 22              | 2                 |
| 24 "                 | 25              | 3                 |
| 26 "                 | 29              | 4                 |
| 28 "                 | 35              | 6                 |
| 30 "                 | 45              | 10                |

It is easy to draw such a curve. Measure on OX ten units. Construct over

But the supply curve, *i.e.*, the curve of the expenses of production, may also be decreasing, or partly decreasing and partly increasing, since it may happen that an increase of the quantity produced is, within certain limits, accompanied by a diminution of cost, but that beyond those limits, it involves increased cost. Hence it is obvious that the supply curve, or cost curve, may assume the most various forms, as *e.g.* the  $CC^1$  in diagram XXXIX. If the cost of production is independent

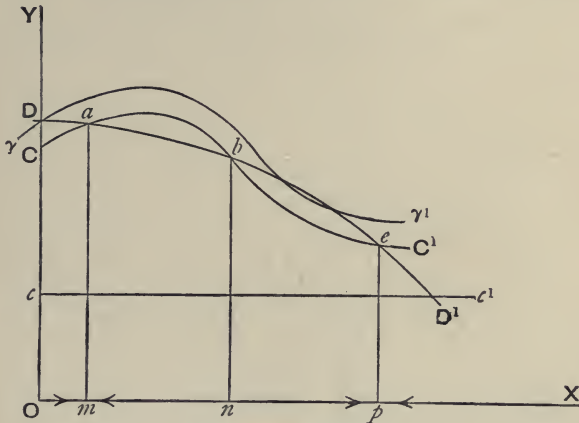


DIAGRAM XXXIX.

of the quantity of commodity produced, *i.e.*, if it remains the same per metric unit of commodity, as happens, for instance, in the case of a tax levied on each metric unit produced in a uniform manner, the cost is expressed by a straight line like  $cc^1$  in diagram XXXIX. If the original cost per unit of a commodity is increased by the addition of a specific tax, the curve of cost becomes a parallel to  $CC^1$ , like  $\gamma\gamma^1$  in the above diagram. If the tax is *ad valorem*, *i.e.* dependent on the price of the commodity, every point of  $\gamma\gamma^1$  will be in a constant ratio to the distance of the corresponding point of  $CC^1$

them an area = 15 sh. Then take on OX two more units and construct over them an area =  $\frac{1}{2}$  sh. Then take two more units on OX and construct an area = another  $\frac{1}{2}$  sh. Go on taking two units on OX and construct over every two units areas equal to: 1, 1, 2, 2, 3, 4, 6, 10 shillings. Every increment of produce on OX will then have over it an area equal to the increment of cost, *i.e.* to its marginal cost in money. If the increments of produce are very small, the increments of cost will form a curve. See E. Barone, *Giornale degli ec.* Feb. 1896, "Studi sulla distribuzione."

from the axis OX. Indeed there is only one law to which the supply curve must in all cases conform (diagram XL.), viz. that *the same amount Om cannot have two different costs,  $p^2m$  and  $qm$* . This is formulated in the theorem that *the supply curve cannot cut twice any straight line perpendicular to OX, i.e.* it cannot have the twisted form of  $CC^1$  in diagram XL.; for if it were to take this form, we should have to read the diagram thus: that the amount  $Om$  of any given commodity represents, in the same place and period, a cost denoted by the two unequal lengths  $p^2m$  and  $qm$ . Now let us designate

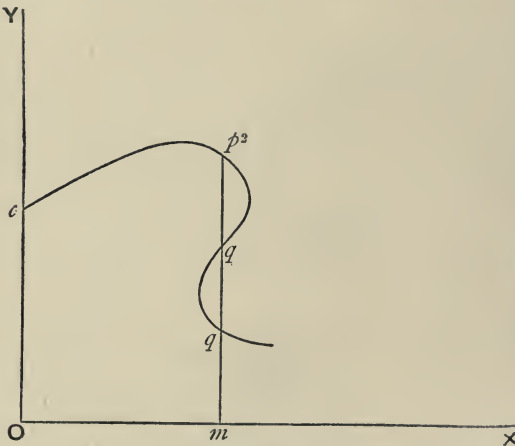


DIAGRAM XL.

as the *index of the available amount of a commodity*, the quantity that would be produced if the quantity actually produced at a given moment increased according to a continuous or constant scale, and graphically (diagram XLI.),  $r$  being a point on OX, let  $Or$  measure the amount of commodity that would be produced in a year, if the scale on which the production is carried on at a given time were continued uniformly. We then have a first fundamental theorem by Professor Marshall, respecting the movement of the amount-index, which runs thus: *Let a vertical straight line drawn through the amount-index cut the demand curve in  $d$  and the supply curve in  $c$ . If  $d$  is above  $c$  the amount-index will tend to move to the right. If  $d$  is below  $c$ , the amount-index will tend to move to the left. If  $d$  coincides with  $c$ , as at  $a$ , the*

amount-index will be in equilibrium, tending to move neither to the right nor to the left<sup>1</sup> (diagram XLI.) In fact the amount  $Or$  of commodity can be produced at a cost  $rc$ , and a price  $rd$  is therefore remunerative. This appears from the fact that the point  $c$  is on the supply curve  $CC^1$ . But for  $Or$  we obtain a remuneration  $rd$ . Now if  $rd$  is greater than  $rc$ , the producers' profits are the larger, the greater is the difference between price and cost; hence they will increase their production, or other producers will join them in order to share their profits. Thus the quantity produced

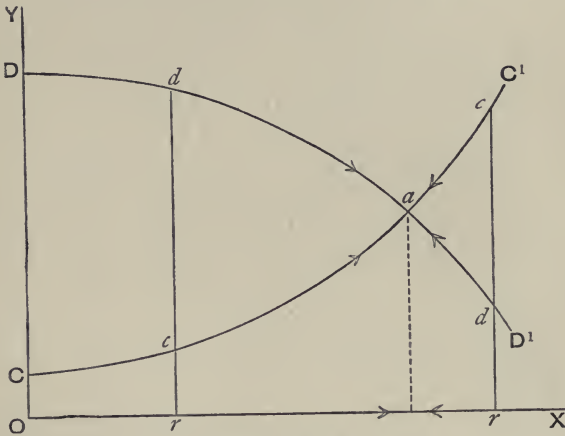


DIAGRAM XLI.

will be greater, i.e. the amount-index will move to the right, as is indicated by the arrow-heads in diagram XLI. On the contrary, if the price  $rd$ , at which the amount  $Or$  can be sold, is less than the cost  $rc$ , some of the producers will withdraw from this branch of industry, either voluntarily or under stress of insolvency, and the amount produced must diminish, i.e. the amount-index must be shifted towards the left. But if  $rd$  coincides with  $rc$ , then industry is normally remunerative, that is, the price  $rd$  paid by the consumers just covers the producers' expenses,  $rc$ , and the amount-index will incline neither to the right nor to the left. This equality of  $rd$  and  $rc$  is realised whenever the curves of demand and supply cut one another; so that the amount-index is in equilibrium

<sup>1</sup> Prop. XIX. in Professor Marshall's *Pure Theory of Domestic Values*.

whenever it is vertically below an intersection of the curves of demand and supply.<sup>1</sup>

In accordance with the above theorem on the movement of the amount-index, we may say, that if in diagram XXXVIII. the index is between  $O$  and  $m^3$ , it must move to the right; if it is beyond  $m^3$ , to the left; or in other words, that if it is moved away from the point  $m^3$ , it tends to return, and the direction of the movement is denoted by the arrow-heads on the abscissa. So too we may say, that if in diagram XXXIX. the amount-index is between  $O$  and  $m$ , it will tend to move towards  $m$ , that is to the right; if it is beyond  $m$ , between  $m$  and  $n$ , it will tend to move towards  $m$ , that is to the left. Hence if the index were at  $m$ , and happened to be displaced by any fortuitous circumstance, it would return to that point; on the contrary if the index were at  $n$ , and happened to be displaced, it would not return; but would, if displaced towards the left, be attracted to  $m$ , and if displaced towards the right, be attracted to  $p$ ; for also in  $p$  there is a point of equilibrium to which the amount-index must, if displaced, return. Hence we may say, that *the equilibrium is sometimes stable and sometimes unstable, and this according as the Demand curve is above, or below, the Supply curve when it reaches the point of intersection.*<sup>2</sup>

The points of stable and unstable equilibrium alternate if the curves cut one another more than once; and *the last intersection must necessarily be stable.* The first may be unstable, but in that case *the production of the commodity is unremunerative for quantities below a certain limit, and their production will be attended by loss, which may however be compensated, e.g. by a protective bounty, i.e. by an anti-economic element.*<sup>3</sup>

<sup>1</sup> Wicksteed, *op. cit.* p. 116.

<sup>2</sup> Prop. XXI. in Professor Marshall's *Pure Theory of Domestic Values.*

<sup>3</sup> I omit Professor Marshall's interesting observations on the permanent modifications every economic event produces of *the conditions under which the subsequent event will be developed.* Such questions exceed the limits of this manual.



§ 8. *Of the Reciprocal Demand between Close Markets. Professor Marshall's Proposition respecting the Forms of Reciprocal Demand Curves and the Stable and Unstable Equilibria they constitute.*

Having shown in the last paragraph how the cost of production in markets between which industrial and commercial competition<sup>1</sup> is fully operative, creates a *normal value*, to which *current values* tend to approximate; and how the normal value may be *stable* or *unstable*, it remains for us to see whether there do not likewise exist *normal rates of interchange* between close markets, towards which current rates must tend, and *stable and unstable equilibria of normal rates*.

The problems presented by interchange between close markets are incapable of being solved without the aid of graphic or analytical methods.<sup>2</sup> Our investigation must therefore be directed first to the shapes that may be assumed by the curves of reciprocal demand. Given the curves, we shall see which intersections express *stable*, and which *unstable* rates of interchange; we shall also see *how many*, and what, rates of interchange satisfy the *equation of reciprocal demands*.

#### A. *Laws of the Curves of Reciprocal Demand*

Let us suppose two non-competing groups, or close markets, trading with each other, but only with each other, and] let the value of all the wares exchanged by them be expressed in terms of only two commodities, just as if only these two were produced or exchanged; and farther let the

<sup>1</sup> Economists distinguish between commercial and industrial competition. The latter is the competition that takes place *between producers of different products, and has the effect of rendering remuneration universally proportionate to costs; the former takes place between vendors of the same product, and has the effect of levelling prices*. Close markets are markets between which there is *no industrial competition*. It would be wrong to speak, with reference to them, of the existence or non-existence of commercial competition, for they are supposed to carry on their exchanges with different products, namely, each with those commodities which it produces at the smallest comparative cost. (See *ante*, § 2.)

<sup>2</sup> This is shown by the fact that Ricardo, Mill, and Cairnes have not solved, and in many cases have not even adverted to, the problems solved by Cournot, Walras, Jevons, Marshall, and Auspitz.

law of the cost of production expounded in the last paragraph, be operative in both markets.

Three several conditions under which this trade may be carried on must then be distinguished, and the properties of the resulting curves of reciprocal demand be defined.

The *normal* condition will be that in which an increase of exports from the one market to the other depresses the price of the exported product (*i.e.* alters the rate of interchange to the exporter's disadvantage), but not to so great an extent as to cause the aggregate mass of imports to diminish. In other words: an increase of exports determines an increase of imports, but at a rate of interchange less favourable to the market in question. *Vice versa*, a decrease in the exports improves the rate of interchange, but not in such measure as to prevent a decrease in the amount of imports.<sup>1</sup>

Next, let a first *exceptional* case be that of a decrease in the exportation of a given commodity, raising its price to such an extent on the foreign market as to increase the total amount of the corresponding imports;<sup>2</sup> which may be the case if there is an urgent demand for this commodity in the foreign market. Further, let a second exceptional case be that in which an increase in the amount of wares which a country produces for exportation, effects such a diminution in the expenses at which it can produce them that the consequent fall in value is greater on the home than on the foreign market, and a proportionately smaller amount of imports is obtained in exchange.

Now let these conditions be expressed in the language of diagrams. Let the quantities of a given commodity, say cotton,

<sup>1</sup> Professor Marshall's *Pure Theory of Foreign Trade*, § 2, p. 4. *E.g.* suppose ten million yards of cotton to exchange for fifteen of linen, the rate of interchange being thus one yard of cotton to one and a half yards of linen. Suppose the exportation of cotton to increase to fifteen million yards, and to procure in exchange eighteen million yards of linen. The rate of interchange will then have risen to 1·5 yards of cotton to 1·8 yards of linen, but the total amount of linen imported will be greater than before. Or let the cotton exports be reduced to eight million yards, and the corresponding imports of linen amount to fourteen millions. The rate of interchange will then have fallen to 0·8 yards of cotton to 1·4 yards of linen, but the total amount of linen imports will have diminished.

<sup>2</sup> *E.g.* the exportation falls as before to eight million yards of cotton, but sixteen million yards of linen are obtained in exchange, so that the rate of interchange will come to be 0·8 yards of cotton to 1·6 yards of linen.

be measured along OX (diagram XLII.), and the quantities of another commodity, say linen, be measured along OY; and accordingly let OM on OX be a quantity of cotton, and let ON equal to MP be such a quantity of linen that its sale in the market where OM cotton is produced just covers the expense of producing the latter. In other words, let ON or MP be the quantity of linen that expresses the measure of the cost of producing OM cotton in the cotton-producing market; or let ON be the minimum price in linen at which OM cotton can be sold without loss. Now by moving N through every

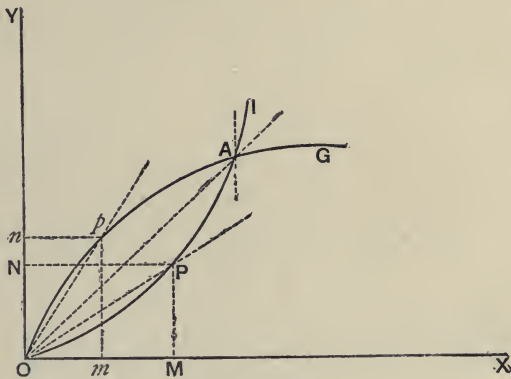


DIAGRAM XLII.

possible position along OY, we shall obtain a series of MP, or a curve OI, which will be the locus of P.

Let the curve OI be the demand of a market, and let it be defined by this peculiar property, *that every abscissa, OM, expresses the quantity of cotton that market is disposed to give for the quantity of linen expressed by the corresponding ordinate PM.*

Similarly we shall have the curve OG of the demand of the other market, in which *every pm will express the maximum quantity of linen that market is disposed to give for the quantity of cotton expressed by Om.*

Every statement as to the shape which it is possible for one of these curves to assume, has corresponding to it a similar statement as to the shape which it is possible for the other to assume; but whenever reference is made to the abscissa in the

former, reference must be made in the latter to the ordinate, and *vice versa*.<sup>1</sup>

The forms of the curves for the normal case and for the first exceptional case are determined by the following common propositions (diagram XLII.):—

1st. *The initial part of the curve OI lies below the initial part of the curve OG.* If that were not the case, the fundamental condition for the possibility of interchange would be wanting (part ii. chap. i. § 3), viz., that the minimum price demanded by the vendor for an OM portion, *i.e.* the perpendicular PM, should be less than the maximum price the purchaser is disposed to give for the same portion, *i.e.* less than the perpendicular *pm* if drawn from the same point on OX.<sup>2</sup>

2nd. According to the definition, if PM of the curve OI increases, the ratio of PM to OM increases likewise; in other words, the greater the amount of linen sold in the OI market, the less must be its purchasing power; or again, the more must the quantity of cotton, given for each unit of linen, decrease.<sup>3</sup> If we draw the straight line OP,  $\frac{PM}{OM}$  being equal

to the trigonometric tangent of the angle POM, we may say that as N rises along OY, the angle POM must increase, or again we may say that *every point of the curve OI, contained between O and P, must lie below the points of the straight line OP, whilst every point of the curve OI, beyond P, must lie above OP produced.*

Similarly as regards the curve OG, given any point in it *p*, if we draw the straight line Op, *every point of OG between O*

<sup>1</sup> Prop. I. in Professor Marshall's *Pure Theory of Foreign Trade*.

<sup>2</sup> Prop. V. in Professor Marshall's *Pure Theory of Foreign Trade*.

<sup>3</sup> On the other hand, in the curves of the second exceptional case (diagram XLVI.), an increase in the demand for cotton, *i.e.* in the supply of linen, may reduce the cost of producing cotton to such an extent, that although the value of linen falls, owing to its increased supply, the value of cotton falls still lower, and the new rate of interchange of cotton and linen proves less favourable than the old one to the cotton manufacturers; that is, in diagram XLVI., let *tan* BOX be less than *tan* AOX, and *tan* COX be less than *tan* BOX, and *a fortiori* than *tan* AOX. Then we have that notwithstanding an increase of the production for exportation, *i.e.* of cotton, there takes place a proportionately smaller importation of linen, because the fall in the value of cotton is more rapid and extensive than the fall in the value of linen.—Professor Marshall's *Pure Theory of Foreign Trade*, p. 13.

and  $p$  must lie above  $Op$ , and every point of the curve beyond  $p$  must lie below  $Op$  produced.

3rd. This may, as regards both curves, be expressed as follows: *neither  $OI$  nor  $OG$  can cut more than once any straight line drawn through  $O$  in any direction.*<sup>1</sup> In fact, every intersection expresses the rate at which a determinate quantity of linen exchanges for a determinate quantity of cotton, as, *e.g.*, in point  $P$ , the ratio  $PM$  to  $OM$ . But for every point on the straight line  $OP$  the ratio is constant (part ii. chap. i. § 1); and as with any increase in the imports or exports, the rate of interchange must vary, there cannot be a second

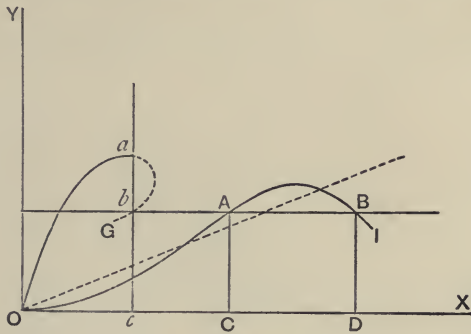


DIAGRAM XLIII.

intersection of the same curve  $OI$  with the same straight line  $OP$ .

Whilst these theorems define properties common to curves of the *normal* case and of the *first exceptional* case, one other theorem applies equally to all the three kinds of curves, viz. that  $OI$  cannot cut more than once any horizontal straight line, nor  $OG$  any vertical straight line. In other words, the forms of diagram XLIII. cannot be realised, nor any we should obtain by deflecting the curve  $OAB$  to the left, or by turning  $Oab$  downwards.

In fact, in the normal case and in the first exceptional case, a conformation like that of  $OI$  and  $OG$  in diagram XLIII. is already excluded by the theorem which negatives *two intersections with a straight line from  $O$  produced in any direction*. But also in the second exceptional case, in which the production

<sup>1</sup> Props. II. III. and IV. in the above.

of cotton on a large scale involves a very considerable reduction in its cost, the saving thus effected cannot be such that the absolute total cost of production of a larger quantity of cotton will be less than the absolute total cost of a smaller quantity. Now if a curve were to have the form of OI in diagram XLIII., it would mean that OC cotton is produced at an expense that is just covered by the sale of AC linen, and that OD cotton,

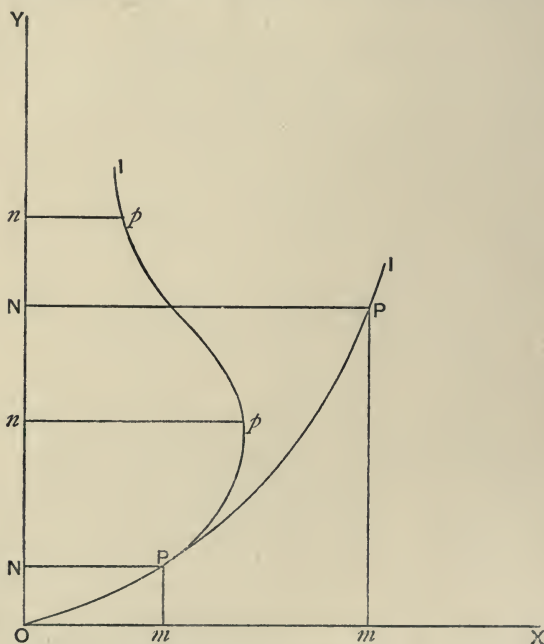


DIAGRAM XLIV.

which is more than OC, is produced at a cost that is just covered by the BD quantity of linen sold; and as AC is equal to BD, the cost of a larger and of a smaller quantity of cotton would be absolutely identical. The same reasoning applies to OG, as regards the Oc quantity of cotton and the two, ac and bc, quantities of linen.<sup>1</sup>

As regards the difference between the curves belonging to the normal case, and those belonging to the first exceptional case, two theorems suffice to determine it.

1st. In the normal case every increase in the amount of

<sup>1</sup> Prop. VI. in Professor Marshall's *Pure Theory of Foreign Trade*.

linen offered for sale increases the amount of cotton that is exported in exchange for it. That is to say: if from  $N$  any point in  $OY$ ,  $NP$  be drawn at right angles to  $OY$  to meet the curve  $OI$  in  $P$ , then the greater be  $ON$ , the greater also is  $NP$ , or in other words, every increase of  $Pm$  is accompanied by an increase of the corresponding  $Om$ . On the other hand, in the first exceptional class of cases, the increase in  $On$  is at first accompanied by an increase in  $np$ , but afterwards by a *diminution*, that is,  $OI$ , which had a positive direction, and retains it in the normal case, becomes negative in the first exceptional case (diagram XLIV.).

These properties are summed up in the proposition, that the curves  $OI$  of the normal case cannot cut the same vertical

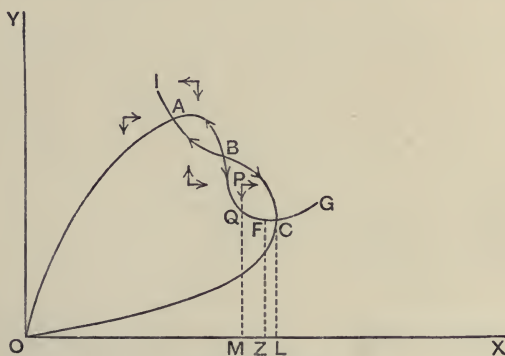


DIAGRAM XLV.

line more than once, nor the curves  $OG$  the same horizontal line; but the curves  $OI$  belonging to the first exceptional case may cut the same vertical line, and the curves  $OG$  may cut the same horizontal line more than once.<sup>1</sup> The typical form of the curves belonging to the first exceptional case is that given in diagram XLV., whilst the typical form of the curve of the normal case is that shown in diagram XLII.

2nd. In the normal case the curves  $OI$  and  $OG$  cannot cut one another in more than one point; in the first exceptional case they may cut one another several (but always an odd number of) times.<sup>2</sup>

These theorems are corroborated by the following con-

<sup>1</sup> Prop. VII. in Professor Marshall's *Pure Theory of Foreign Trade*.

<sup>2</sup> Prop. VIII. in Professor Marshall's *Pure Theory of Foreign Trade*.

siderations: Let A be a point of intersection of the two normal curves OI and OG (see diagram XLII.); then AI must lie entirely above the straight line OA produced, and AG must lie entirely below OA produced: consequently AI and AG cannot cut one another again. Nor can AI cut the portion of OG which lies between O and A. For the portion of OG between O and A must lie entirely to the left of a vertical straight line through A, whilst AI must lie entirely to the right of this straight line. Similarly AG cannot cut the portion of OI which lies between O and A. Therefore OI and OG cannot cut one another except in A.

Now, every point in which the two curves cut one another corresponds to an equilibrium of the rates of interchange.<sup>1</sup> In

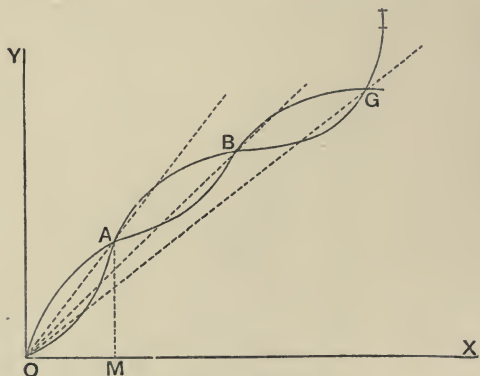


DIAGRAM XLVI.

diagram XLV. let A, B, C be points in which the curves belonging to the first exceptional class cut one another, and let *e.g.* the ordinate corresponding to the point of intersection C, be drawn and called CL. Then since C is a point on OI, CL linen can be sold in the cotton-producing market for a price that will just cover the expenses of producing OL cotton; and since C is at the same time a point on OG, OL cotton can be sold in the linen-producing market for a price which will just cover the expenses of producing CL linen. That is, when OL cotton is exchanged for CL linen, there is no force present in either of the two markets to increase or diminish the supply or demand. The same reasoning applies to the intersections of

<sup>1</sup> Prop. IX. in Professor Marshall's *Pure Theory of Foreign Trade*.



the curves in A and B. Therefore every intersection is a point of equilibrium for the rates of interchange.

Proceeding to discuss the curves of the second exceptional case, it must be observed that only two of the theorems set forth above apply to this group, viz. the one according to which OI cannot cut the same vertical line, nor OG the same horizontal line, more than once; and the one which defines every intersection as a point of equilibrium of the rates of interchange.<sup>1</sup> The typical form of the curves belonging to the second exceptional class is given in diagram XLVI.

B. *Theory of the Stable and Unstable Equilibria of the Rates of Interchange*

Given the curves OI and OG of whatever class (diagram XLVII.) and whatever rate of interchange, PM to OM, at a given

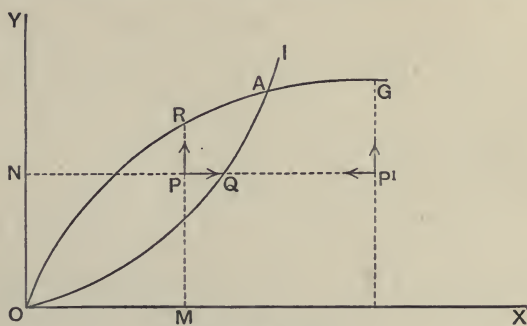


DIAGRAM XLVII.

moment, the point P is called the exchange-index. Since OI cannot cut a horizontal straight line through P more than once, and OG cannot cut a vertical straight line through P more than once, we may therefore have the following definition: A point P is said to be to the right or to the left of OI, according as it is to the right or the left of the point in which OI is cut by the horizontal straight line through P: and the point P is said

<sup>1</sup> In the curves of the second exceptional case OI and OG may therefore change places. This means that in that case no transactions can take place for quantities inferior to OM, unless anti-economic factors, e.g. bounties on exports, indemnify the exporters of cotton (OI) for the losses they incur until the trade has attained the dimensions necessary to make it profitable to both parties.

to be above or below OG, according as it lies above or below the point in which OG is cut by a vertical line through P. This being premised, we have the fundamental theorem according to which: *if the exchange-index be at any time to the right of OI, it will tend to move to the left; if it be to the left of OI it will tend to move to the right. Similarly if the exchange-index be at any time above OG it will tend to move downwards; if it be below OG it will tend to move upwards.*<sup>1</sup>

In fact let the index be to the left of OI (diagram XLVII.), and let NP produced cut OI in Q.

Then since Q is a point on OI, ON linen can be sold in the cotton-producing market for NQ cotton. But so long as the exchange-index is at P, ON linen is being imported in exchange for NP cotton. Hence the exchange of cotton for linen is at that moment abnormally profitable for the cotton producers; *consequently the exportation of cotton will increase and the exchange-index will tend to move to the right.* So if the exchange-index lay at P<sup>1</sup>, it would show that whilst ON linen covered the expenses of producing NQ cotton, NP<sup>1</sup> cotton was at that moment being given in exchange for it, *i.e.* that the trade was extremely unfavourable to the cotton producers; *consequently the production of cotton would tend to diminish, and the exchange-index would tend to move to the left.*

Similarly it is demonstrated that P, being below OG, must tend to move upwards. Let the vertical straight line through P cut OG in R, and OX in M. The exporters of linen are disposed to give RM linen for OM cotton; for in their market OM cotton can be sold for a sum that covers the cost of producing RM linen. At that moment however they are only obliged to give PM linen for OM cotton; hence they make large profits, and the exportation of linen must increase, so that P will tend to move upwards. Had P been in any other position, the same argument would have held good.

Now, P being subject to two forces, one vertical, the other horizontal, it will follow a direction that is the resultant of both. As no determinate quantitative ratio of these two forces is given, though it always exists, all we can do is to infer a movement of P *in any direction comprised between a horizontal and a vertical arrow head*, such as PR and PQ. As it moves,

<sup>1</sup> Prop. XI. in Professor Marshall's *Pure Theory of Foreign Trade*.

the index must strike either OI or OG, but we cannot predict which of the two curves it will strike first. In any case, as soon as one of the curves is struck, the force that impelled the index up to it, whether it be the vertical or the horizontal, will no longer act on the index, and P will oscillate along the curve that has been struck, subject to the remaining force, up to A. At A the action of both forces is extinguished, *i.e.* a point of equilibrium is reached.<sup>1</sup>

Now, let us, as before, designate as a *stable equilibrium* an intersection of OI and OG to which P must return if it were at any time deflected from it; and let us designate, as *unstable equilibrium*, an intersection to which P does not return when deflected from it.

This being so, we have the theorem,<sup>2</sup> that: The equilibrium is stable at every point of intersection of OI and OG, excepting those at which both curves are inclined positively, but OG is more nearly vertical than OI, and excepting those at which both curves are inclined negatively, but OG is more nearly vertical than OI.

Let D be any point of intersection of OI and OG (diagram XLVIII.) Through it draw a vertical straight line Rm and a horizontal NQ. (Suppose this to be done *e.g.* at A in diagram XLII. or at A, B, and C in diagram XLV.)

Now let us suppose OI to be inclined positively, *i.e.* like *iDI* in diagram XLVIII., and OG also to be inclined positively, but less vertically than OI, *i.e.* like *gDG*. In this case we say, that the equilibrium must be stable. In fact, wherever the index may be, it will be subject to a vertical, and to a horizontal force. If it is within the quadrant NDm, and below *iD* in P<sup>1</sup>, under the influence of the horizontal force, it will strike first *iDI*, and will then be attracted upwards towards D. If the index is in P<sup>2</sup> above *gD*, it will first be drawn downwards until it strikes *gD*, and then it will be compelled to move with the horizontal force to the right, oscillating along *gD* towards D. Similarly if the index is at P<sup>3</sup>, it will have to move towards D, whether it strikes DG or DI first.

By means of the same reasoning it is proved, that the equilibrium is also stable if OI is positive and OG negative,

<sup>1</sup> Prop. XI. in Professor Marshall's *Pure Theory of Foreign Trade*.

<sup>2</sup> Prop. XII. in Professor Marshall's *Pure Theory of Foreign Trade*.

that is, if the latter enters through the quadrant NDR, and passes out through the quadrant  $mDQ$ .

So too, it cannot be doubted that if  $OI$  and  $OG$  are both positive, but  $OG$  is more vertical than  $OI$ , the equilibrium is unstable. In fact, let us suppose that  $iDI$  now signifies the curve  $OG$ , and  $gDG$  the curve  $OI$ ; then if  $P$  strikes first  $iDI$ , it

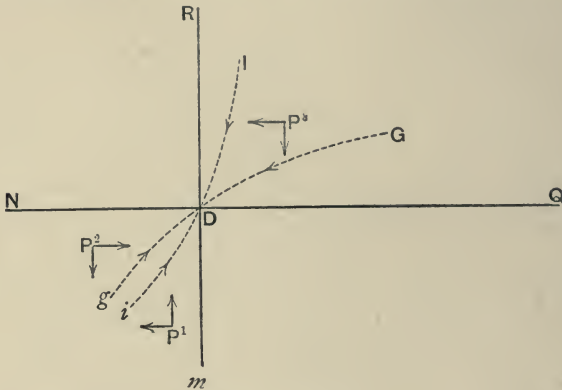


DIAGRAM XLVIII.

is only acted on by a horizontal force to which it yields the more readily, the further it is removed from point  $D$ , oscillating downwards along  $iDI$ ; and if  $P$  strikes first  $gDG$ , it is only acted on by a vertical force to which it yields by moving away from  $D$ , and oscillating downwards along  $gDG$ .<sup>1</sup>

The last of Professor Marshall's theorems on this subject which we shall quote is that: *If from a point of intersection of  $OI$  and  $OG$ , at which the equilibrium is stable, we proceed along either of the curves in either direction until we arrive at*

<sup>1</sup> Supposing, *e.g.*, the exchange index  $P$  has been jerked by some disturbance such as war, a crisis, over-speculation, from  $C$  in diagram XLV. to a point within the loop formed by  $OI$  and  $OG$  between  $C$  and  $B$ . This will mean that cotton is exported on the scale of  $OM$  instead of  $OL$ . Now the  $OM$  amount would not, under normal circumstances, be paid for on the scale of more than  $QM$  linen, because in the cotton-producing market,  $OM$  cotton can only be disposed of on terms which just cover the expenses of producing  $QM$  linen. But owing to the supposed fortuitous cause, the current price of  $OM$  cotton comes to be equivalent to  $PM$  linen. When the disturbing cause ceases to operate, the producers of linen will not pay for  $OM$  cotton more than  $QM$  linen; in other words the exports of linen will decline, or  $P$  is attracted downwards. But  $QM$  is such an amount of linen as, if sold in the cotton-producing market, must be abnormally remunerative, because  $QM$  cuts  $OI$  at a very low point of the section  $OC$ , and  $FZ$  linen covers

*another point of intersection, this second point must be one of unstable equilibrium, and vice versâ.*<sup>1</sup>

This proposition is obviously true. For if we proceed from a point of intersection along that portion of OI which lies above OG, the traction takes place in a vertical direction towards the axis OX, until we reach the next point of intersection; therefore that point of intersection is unstable. From this to the next point of intersection the traction of OG must take place in a vertical, but upward direction.

the expenses of OZ cotton, *i.e.* of a quantity greater than OM. Hence the exports of cotton will increase, and P will oscillate along OG from Q, through F, towards C. At C there will be no inducement for either to increase or diminish the production of their wares.

<sup>1</sup> Prop. XIII. in Professor Marshall's *Pure Theory of Foreign Trade*.



## PART III

APPLICATION OF THE GENERAL THEORY  
OF VALUE TO DETERMINATE CATEGORIES OF  
COMMODITIES





## CHAPTER I

### OF THE UTILITY AND VALUE OF INSTRUMENTAL COMMODITIES IN GENERAL, AND OF THE GENERAL PRINCIPLES OF THE DISTRIBUTION OF WEALTH.

THE general theory of value, when applied to determinate categories of commodities having more numerous and more specific properties than belong to commodities in general, gives rise to a series of theorems having a more limited *sphere* than those constituting the theory itself, but a correspondingly richer *content*. Such applications of the theory of value may be made with whatever degree of minuteness, by subdividing the categories into species, and these again into subspecies, so as to obtain an increasingly rich content for the definition of the commodity whose value is to be determined.

For practical, rather than theoretical, reasons, the attention of economists has been more particularly directed to the special law of value of certain instrumental, and of certain immediate, commodities. Chief amongst such special studies ranks that which has for its subject that purely instrumental commodity, money; and next in order come those dealing with three great categories of commodities considered only in their instrumental function, viz. land, capital, and human labour, together with the direct commodities generated by that function, viz. rent (and profit which is a kind of rent), interest, and wages.

Before discussing these subjects in detail, it may be well to premise some general observations on the value and utility of instrumental commodities, in order to amplify what has been said on this point in part i. chap. iv. § 5.

There it was shown that the utility of an instrumental

commodity, or of an aggregate of instrumental commodities contributing to the production of one effect, is determined by the prospective utility of the direct commodity it is expected to derive from them. This was, briefly, the law of Gossen; now we have to expand it in conformity with, and within the limits of, the canons formulated by him. Accordingly, various hypotheses must be successively formed respecting the nature of the instrumental commodity of which it is desired to determine, first the degrees of utility, and then the value.

The most simple hypothesis is that of an instrumental commodity fitted to produce BY ITSELF only ONE direct (or less remote instrumental) commodity, and *not being at the same time itself a direct commodity*. Next we may suppose an instrumental commodity fitted to produce *by itself, several direct commodities, without being itself a direct commodity*; and after this, an instrumental commodity producing only one direct commodity,—*not however by itself*, but by the aid of other instrumental commodities, which are therefore termed *complementary commodities*—and not being at the same time itself a direct commodity. Finally we may suppose an instrumental commodity producing *several direct commodities*, under conditions in every respect similar to the foregoing. Subsequently we must consider the four cases arising on the hypothesis of the instrumental commodity being itself *also a direct commodity*, or having several uses as a direct commodity, when that hypothesis is combined with other conditions.

Nor do the combinations that may be made of conditions determining the nature of an instrumental commodity end here; for the latter may be either *independent* of, or subject to, a *vicarious* relationship with some other instrumental commodity. Moreover every *complementary* instrumental commodity that contributes with another to the production of a direct commodity, may, or may not, be *vicarious*. Lastly, the direct commodity produced by the instrumental commodity may be subject to *vicariousness*.

Now, *in each of these combinations the instrumental commodity in question has a DIFFERENT final degree of utility, and consequently also a DIFFERENT value*. The principles exhibited above suffice however to master all the cases arising from the combination of the above-mentioned hypotheses, and of others

that might be added. All that is necessary, as we have said, is to elaborate them carefully in accordance with the following principles:<sup>1</sup>—

1st. If a direct commodity may be used *alternatively* in various ways (*i.e.* if it is susceptible of being applied to various uses, but yet its available quantity and the nature of the uses are such as to *necessitate only one of them being selected*) in which it presents various final degrees of utility, it will be put to that use in which its final degree of utility is highest. In fact every other use would be anti-hedonic, because it would leave in existence a greater pain than the one extinguished by the use of the commodity. The final degree of utility of a commodity susceptible of various uses is therefore given by the predominant use.<sup>2</sup>

2nd. If an instrumental commodity serves *alternatively* for the production of various direct commodities having different final degrees of utility, it will be applied to the production of the one having the highest degree.

3rd. If a direct commodity *cumulatively* subserves several uses, it will be divided among them in such proportions as to equate the final degrees of utility of the several uses (law of Jevons); but if any portion of the available quantity of commodity is retrenched, and no redistribution is possible, that use will be dispensed with, the loss of which causes us least pain, in order that we may continue to enjoy the rest (corollary of Jevons's law). Thus the final degree of utility of a commodity susceptible of several uses is given by the least of these.

4th. If an instrumental commodity subserves several uses cumulatively, we have the same law, which is already known to us as Wieser's law of the cost of production.

<sup>1</sup> For fuller details see the subtle analyses of Wieser, *Ursprung*, etc., p. 170, and *Natürliche Werth*, p. 67.

<sup>2</sup> As in societies where labour is divided every commodity may be utilised, either as an article of direct consumption by the owner, or as an instrumental commodity for procuring other commodities in exchange for it, every commodity may be said to be susceptible of TWO ALTERNATIVE uses, and therefore of two final degrees of utility. Now these are generally different, and vary with the tastes of the owner of the article; whence it follows that at certain times the utility of a commodity to its owner will be greater as an *article of consumption*, at certain others as an *article of sale*. In this phenomenon Menger recognises a law of the *displacement of the barycentrum of value*, or of the *final degree of utility*.—Menger, *op. cit.* p. 219.

5th. If two or more instrumental commodities are complementary to each other in such a way that each is an indispensable condition of the production of a direct commodity, their joint utility is equal to that of the direct commodity. But if we lose one of them, then inasmuch as the utility of the remaining one is reduced to zero with respect to the purpose we intended it for, the utility of the other is equal to that of the direct commodity that could be produced by its concurrence.

6th. If an instrumental commodity requiring complementary commodities in order to the production of a direct commodity is not combined with them as required, its utility is zero, unless it can be applied to other uses, either as an instrumental, or as a direct commodity; for in this case it retains the final degree of utility due to these ulterior conditions of utility which it presents.

7th. Hence it follows that if one of several commodities, —all of which are mutually complementary with reference to the production of a direct commodity, and each of which has its own degree of utility in respect of certain other purposes it subserves,—ceases to be in combination with the others, each of the latter resumes its own degree of utility; but the commodity so severed from the rest will have the *final degree of utility that would be ascribed to the combination, were it still subsisting*, MINUS the sum of the separate degrees of utility of the other complementary commodities. In fact, taking an example supplied by Böhm-Bawerk,<sup>1</sup> if the complementary commodities A + B + C produce in combination a direct commodity the final degree of utility of which is 100; whilst, singly, B has a final degree of utility of 20, C of 30, and A of 10, then taken singly, they have a final utility given by  $20 + 30 + 10$ , though taken cumulatively their utility was equal to 100. Accordingly the owner of A + B + C must estimate the loss of any one of these elements as equivalent to a loss of  $100 - (10 + 20)$  in the case of C, of  $100 - (20 + 30)$  in the case of A, and  $100 - (10 + 30)$  in the case of B.

8th. If two or more commodities are mutually *vicarious*, i.e. if they produce the same *hedonic or economic* effect, though they are *distinct causes*, the final degree of utility of the

<sup>1</sup> Böhm-Bawerk, *op. cit.* p. 57.

commodity which has the least degree determines the degrees of the others. Thus, for instance, vicariousness exists, if a commodity is susceptible of reproduction, between its final degree of utility and its cost of reproduction, as also between a commodity and its substitute, etc. Now, when many complementary commodities concur in the production of a direct commodity, some are vicarious with respect to commodities subsisting apart from the combination, whilst others are not. Hence the vicarious commodities pertaining to the combination will have the final degree of utility which this condition attributes to them, whilst the rest will have a final degree equal to that of the product obtained by the combination, less the final degrees of utility of the vicarious commodities.

The influence of vicariousness in determining the final degrees of utility is only an aspect of *Jevons's law of indifference*. One labourer will be paid no more than another who can do the same work; one commodity will not fetch a higher price than another which is in a vicarious relation to it. From the above observations respecting the cases to which the doctrine of degrees of utility,—and consequently also the doctrine of value, which is based on the former,—may give rise, it is evident that these cases may be extremely complicated, when instead of relating to comprehensive categories of commodities having few special properties, it extends to the analysis of the degrees of utility and value of comparatively limited kinds of commodities abounding in special properties, such as money, land, capital, and human labour. These commodities possess, in practice, the greatest importance as instrumental commodities; but considering them only under this aspect, they have such an abundance of special properties, that the first task which confronts the economist, and complicates every other, consists in collecting and ordering all these special properties, *i.e.* in endeavouring to find definitions for these commodities. Fortunately a large harvest has already been reaped in this field by numerous economic writers, so much so that the problems relating specifically to these commodities are in certain respects more advanced than the generality of problems; and by means of slight corrections, frequently rather of form than of substance, the solutions found for these specific problems can be assimilated to those of more general problems.

Under the title of questions relating to the *distribution of wealth*, solutions have been found for the questions dealing with the value of land, of capital, of labour, and for those dealing with the value of the use of those respective commodities. For in endeavouring to reply to the question: *in what proportions is the product of a mass of the instrumental commodities, land, capital, labour, distributed among the owners (supposed to be different persons) of these several commodities? economists have always solved the question of the degree (measured hedonically) in which each of these factors contributes to the useful result produced, and the question of the value of each of the complementary commodities that contribute to such result.*

We have therefore only to follow those writers in their researches, by presenting the so-called theory of the distribution of wealth, as a problem of value.<sup>1</sup>

The problem, how to distribute an economic effect, produced by the concurrence or co-operation of several complementary commodities, among its various causes, in other words, how to proceed to the *apportionment of the effect among its various causes*, has not yet been fully solved, for two different solutions are propounded, each of which possesses great plausibility, so that it would as yet be premature finally to reject either. The first is that of Gossen (part i. chap. iv. § 5) adopted, but analysed more minutely, by Menger; the second is that of Wieser.<sup>2</sup>

Supposing several complementary commodities, say labourers, instruments, and means of sustenance,<sup>3</sup> yielding a product of a given value, what portion of the latter is due to each of these factors, *i.e.* what portion is due to the labourers, and what to each of the other complementary commodities?

Gossen measures the value of the complementary commodity that is eliminated, by the *damage* we suffer in consequence, *i.e.* by the *consequent diminution in value of the sum of the complementary commodities that are left*. Let A, B, and C be three complementary commodities which, *employed cumulatively in the most efficient manner*, yield a value denoted by the

<sup>1</sup> This, as I have already observed, is by no means a new matter. It was taught by Ferrara and others over thirty years ago.

<sup>2</sup> V. Wieser, *Der natürliche Werth*, p. 80, § 22; p. 87, § 24.

<sup>3</sup> *Viz.* labourers, auxiliary capital, and remunerative capital, as the latter are called in terms introduced, I believe, by Bagehot.

index 10 ; and let each of them, considered singly, or as a direct commodity, have a final degree of utility denoted by 3, or be susceptible, as a complementary commodity *in other less remunerative combinations*, of contributing to raise the value of the latter by 3.

Now, as A, B, C, in combination are worth 10, whilst taken singly each is worth 3, it follows that if, for instance, C falls out of the combination, the value of the two remaining elements is reduced to 6. Therefore *for any one who already has A and B, C is worth four*. Thus too, for any one who already has A and C, the element B is worth *four*, for by obtaining it he would come to have a value of 10 due to A + B + C, whilst the possession of A + C does not yield more than *six*.

This solution is deemed fallacious by Wieser, for as each of the three elements has contingently a value denoted by the index 4, namely for any one who already possesses the other two, he considers that the aggregate should be worth *twelve*, which is contrary to the hypothesis. And this contradiction, which he considers to be real, is due, in his opinion, to the fact that the value of the several complementary commodities has been erroneously estimated, owing to its having been determined in accordance with the *loss accruing from the absence* of one or other of them from the combination. He holds that, supposing one element to be withdrawn from a combination, not only is the effect *due to it* withdrawn, but the remaining elements are likewise deprived of some portion of their effect, *properly so-called*. He therefore propounds this other solution:—

*As many equations of value should be made as the number of combinations into which the complementary commodities in question can enter*. Let these be two,  $x$  and  $y$ , and let their aggregate value be expressed by the index 100, so that we have  $x + y = 100$ . Moreover let  $x$  form in combination with another complementary commodity called  $z$  another equation, say  $2x + 3z = 290$ ; and let  $y$  yield the equation,  $4y + 5z = 590$ . These equations give us 40, 60, and 70, as the respective values of  $x$ ,  $y$ ,  $z$ , taken singly. Adding up the three equations, we obtain the sum of 980 units of value, which are divided into three parts for  $x$ , eight for  $z$ , and five for  $y$ , because  $3 \times 40 + 8 \times 70 + 5 \times 60 = 980$ .

Wieser's solution does not seem to us to be called for by

any *ἀπορία*, for it appears to us quite conformable with the nature of complementary commodities that they should have a *different value according as they enter into the composition of different combinations*; so that if A is worth 4 to any one who already has B and C, and B is also worth 4 to any one who already has A and C, it does not follow that in the combination A + B or in that of A + B + C, A and B will each be worth 4. If we suppose both of them to be removed simultaneously, only C being left, they have an aggregate value of 7. If we suppose each of them to be replaced, one after the other, the first is worth 3 and the second 4, and not each of them  $3\frac{1}{2}$ , and still less 4. Moreover Wieser's solution seems to us to run counter to the principle, that the final degree of utility of a commodity is measured *indifferently* by the degree of pain occasioned by its loss, or by the degree of pleasure afforded by its acquisition.



## CHAPTER II

### OF THE VALUE OF MONEY

#### § 1. *Money an Instrument of Exchanges*

MONEY is an instrumental commodity *in a paramount degree*, and is *exclusively instrumental*. Anything that serves as a *medium of interchange* is money.<sup>1</sup> It may be absolutely destitute of all direct utility, incapable of affecting pleasurable any of our senses, whether common or special, and incapable of relieving us of any painful sensation. The more the particular thing we use as money is destitute of direct utility, the more essentially is it money; thus among gamblers counters are money.

Money is only endowed with an indirect utility consisting in its power of obtaining for us, *solely by means of exchange*, some direct commodity; it is *an instrument which procures for us direct riches, solely by way of exchange*. This is what money is supposed absolutely to be in theory, and what it often *nearly* is in practice. And money is in a paramount degree an instrumental commodity, not only because its function is *solely and exclusively instrumental*, but further because it discharges that function *without the aid of any complementary commodity*.

There is no intrinsic reason why there should not be many instrumental commodities capable of serving as instruments for the production of direct commodities, without the aid of other instrumental, and therefore complementary, commodities, *but such is the fact*. Hence money is the most typical instrumental commodity. This, its distinctive pro-

<sup>1</sup> Gossen, *op. cit.* p. 158.

perty, has been generally expressed in the statement that money has no value in use, but only a value in exchange, or that it has only that kind of value in use which consists in value of exchange; in which case we may say with Ferrara that the value of exchange is a species of the genus termed "value in use."<sup>1</sup>

The need for money arises from the fact that, if exchanges were to be made without it, the difficulty of effecting them would be much greater. An exchange assumes that Primus will find a Secundus who wants a commodity corresponding in kind, quantity, and quality, to what Primus has to offer, at the very moment when the latter wishes to dispose of it; and that Secundus has, and is disposed to deliver, either then, or at some other determinate time, the kind, quantity, and quality of commodity wanted by Primus.

If, on the other hand, there exists a thing called "money," which every one is ready to accept always, everywhere, and to any amount, each exchange may be resolved into two exchanges which are much easier to effect than the former, not only if taken singly, but even cumulatively. In fact Primus will still have to look for a Secundus who wants a commodity of the same quality as his, at the moment when he is prepared to part with it; but he need not concern himself about the quantity required by Secundus, leaving it to others to supply the deficiency, if any, in his offer, or selling the excess, if any, to other purchasers. Still less need he trouble himself as to whether Secundus can supply him with the commodity which he ultimately wants. Having received money, he can obtain what he wants from others.

Money is thus a purely instrumental commodity, facilitating barter, dividing them up into two or more purchases and sales, or barter of wares against money, and *vice versa*. It meets a want which arises when there already exists a *régime* of divided labour,<sup>2</sup> namely the need of trucking, *which is not*

<sup>1</sup> A. Messedaglia, *La Moneta*: "In the case of money, not the material mass, but the mass of *value* counts, and this alone."

<sup>2</sup> Money presupposes a desire to exchange, and this in turn, a desire for a division of labour, *already recognised* as an efficient means of reducing the cost of commodities. This order of succession does not prevent money from *rendering the division of labour possible on a much larger scale than would otherwise be the case*.—Gossen, pp. 92, 93.

*an end in itself*, i.e. not an *immediate* desire, but yet fully as real<sup>1</sup> as any other desire for instrumental commodities. Besides the need of bartering, it presupposes a condition of fact, viz. that all desire and accept money, being confident that they can dispose of it whenever they want to. What the grounds of this confidence may be, is immaterial: one thing will serve the purpose of money equally as well as any other, provided that an equal degree of confidence be placed in it. The causes that may determine such confidence are all those which, in a general way, enable us to foresee and to count upon the actions of others, and they may be classed in the following order:— We may be certain that the medium or instrument of exchange will be accepted by every one, if it be something which satisfies a want experienced by all; for we can then count on the self-interest or positive hedonism of the first comer, who will be ready and willing to accept money.<sup>2</sup> We may however also rely on a custom of accepting a given thing as money; in which case we reckon on the existence of reflex acts, having their origin probably in a process of selection, and from the influence of which only an insignificant, but intelligent, minority will be exempt.<sup>3</sup> An agreement may subsist to accept a given thing as money.<sup>4</sup> Lastly, a political superior may compel his political inferiors to accept something as money; in which case compliance with the order is hedonic, the motive being to shun pains.<sup>5</sup> It is clear that some or all of these circumstances may concur in a particular case so as to render a thing acceptable as a medium of exchange.<sup>6</sup>

<sup>1</sup> Absurd questions have been raised as to whether if money consisted of something possessing only an *instrumental* value, it would correspond to a *real* or *imaginary* want. But is there any imaginary want that is not real, and *vice versa*?

<sup>2</sup> Money, both in a primitive and in the most advanced stages of civilisation, has usually been and is a commodity endowed with direct utility, i.e. with instrumental utility other than its monetary utility.

<sup>3</sup> Amongst semi-barbarous peoples money is regulated only by custom.

<sup>4</sup> This is almost always the practice among gamblers.

<sup>5</sup> This occurs in the case of a forced paper currency.

<sup>6</sup> That money must necessarily be a commodity endowed with direct utility, or with some other instrumental utility than that of being a medium of exchange, is maintained by many economists. See e.g. M. Chevalier, *Cours*, vol. iii. chap. i. p. 6, Paris, Capelle, 1886, 2nd ed.; and Carl Kines, *Geld und Credit*, Abth. I. 3, § 1, p. 140, Berlin, Weidmann, 1873.

## § 2. Money a Common Denominator of Values

We have defined money, with reference to its primordial and essential function, as a *medium of exchanges*. Ultimately, money procures for us no commodity, and the quantity an individual acquires in a year is not his income. It is only the *nominal price* of things; and the person who gives it in payment acquired it previously by forgoing some direct or some other indirect utility, and resells it for *commodities having some direct or some other indirect utility*.<sup>1</sup> It is a machine for doing quickly and commodiously what would be done, though less quickly and commodiously, without it.

From the function of money as a medium of exchanges a further function follows, as a corollary, viz. that of serving as the *common denominator of the rates of interchange of all commodities*. If no money existed, but only a perfect system of divided labour, each commodity would present a determinate rate of exchange for every other; in other words, we should have as many different ratios of exchange as are the *binary combinations* that can be made with as many factors as the several commodities amount to.<sup>2</sup> Hence if the commodities were at all numerous, the different ratios of exchange that would have to be taken into account in every transaction would be extraordinarily numerous. But if each of these direct barterings of commodity against commodity is resolved into a twofold exchange of commodities against some determinate thing (which therefore serves as a medium), the exchange power of every commodity will be expressed in terms of one thing only, or in other words, this thing will have become the *common denominator of all values*. This function of money is thus implied in its above-mentioned function of a medium of exchanges. Nor is any special property essential to the serviceableness of money as a common denominator of all prices, save its fitness to be resold by the purchaser; that is, it must have a power of exchange *whatever the specific cause of that*

<sup>1</sup> J. S. Mill, *Principles of Political Economy*, p. 296.

<sup>2</sup> Taking  $m$  as the number of the commodities, the binary combinations are given by  $\frac{m(m-1)}{1 \cdot 2}$ . E.g. for 100 commodities we have 4950 distinct ratios of exchange.—Jevons, *Money and the Mechanism of Exchange*, 7th ed., p. 5.

*property may be.* Money may consist of mere counters, such as those used by players, or of pieces of paper destitute of any direct, or of any other instrumental, utility.<sup>1</sup>

### § 3. *Of other Contingent Functions of Money*

The choice of one determinate thing, in preference to many other possible things, as a medium of exchange is effected,—like the choice of any other direct commodity, among many possible ones, for the satisfaction of a direct want,—by *natural selection*; consequently at various epochs in the history of humanity the most diverse objects have appeared most suitable to men, according to the extent of their knowledge and the range of articles at their disposal; and it is obvious that this process of selection still continues.<sup>2</sup>

But, according as money consists of one commodity or another, it discharges, by virtue of the *merceological* nature of the substance it is composed of, a series of *ulterior functions*, which must therefore be regarded as *contingent*, and not necessary. Where money consists of sheep, cattle, or other animals, it will serve the purpose of transferring values from one place to another better than if it consisted, say, of some species of fresh fruit; but worse than if it consisted of precious stones, or of metals possessing a high *specific value*. Money consisting of animals which require to be fed, would also be less adapted for the transfer of values in point of time, *e.g.* from one year to another, than any ponderal money, composed of common metals or stone, besides being less easily divisible.

As a general proposition, we need only remark, that a commodity will serve the better as an instrument of exchange, the more its merceological properties render it acceptable to all. These however must be estimated, not only in respect of their *number*, but also in respect of the *importance of the needs to which they correspond*, as is done in estimating a

<sup>1</sup> F. A. Walker, *Money*, Macmillan, 1884, pp. 8, 9.

<sup>2</sup> Gold monometallism is now driving out gold and silver bimetalism, and Ferrara's opinion seems to be well founded, that other metals would stand us in better stead than gold or silver. Whether this be so, will be proved by the result of selection. Fr. Ferrara's *Introduction to Martello's Work on Money*.

ponderal mean. The weightiest of these merceological properties—which indeed would render all others superfluous—may of course attach to any object, if the law of a particular State makes it *legal tender*, for a political superior can visit any breach of the law by a political inferior with the severest penalties. The following is a brief summary of the merceological properties a commodity must possess in order to be serviceable as money:—

1st. Money must facilitate the transaction of exchanges *in all possible ratios*, and must therefore consist of something that is divisible indefinitely, and so that the sum of the parts shall be equal in value to the whole;

2nd. Money must facilitate the transaction of exchanges *at all times and places*, and must therefore consist of a homogeneous matter, everywhere and always equal to itself, easily discernible, endowed with universal<sup>1</sup> and constant direct utility, relatively, and for the longest time possible;

3rd. Money must facilitate payment at times and places far apart from those when and where the obligations were contracted; and it must accordingly consist, if possible, of something endowed with a high *specific value*, not perishable, but durable,<sup>2</sup> and again universally and always useful, subject to the least possible fluctuations in value, so far as these are due to its own conditions of supply;

4th. Money must be a means of *legally extinguishing obligations* with the least possible detriment to either party, which again calls for each of the above-mentioned qualities.

As regards each of these several functions, some determinate commodity has probably superior qualifications to any other; and the preference given amongst all civilised and semi-civilised nations to metallic money, and more particularly to two precious metals, realises mediately the law of the minimum of action.

<sup>1</sup> When a thing possesses direct utility, and its amount is less than the demand, its acceptance by all, everywhere and always, is guaranteed by the strongest of human motives, self-interest.

<sup>2</sup> The durability of the precious metals is the principal factor of their constancy in value, for the quantity that is annually added to, or subtracted from, the existing amount, comes to be irrelevant with respect to the latter. But this very durability is in the long run a cause of increased fluctuation, that is, it causes metallic money to be for long periods, a worse standard of value than *e.g.* corn.

### § 4. *Of the Value of Money*

The value of money may be understood in two senses: 1st. In a strict sense, the value of money is its power of exchange expressed in a quantity of whatever commodities; in other words, it is the rate of interchange of money against wares. Hence if the prices of wares in money are low, money has a comparatively high purchasing power, *i.e.* a high value. If, on the contrary, the prices of commodities rule high, since a given amount of money will purchase comparatively little, its purchasing power will be said to be small; that is, its value is low. The value of money is thus expressed inversely as the prices of commodities in money; that is, it falls when these rise, and rises as they fall. If *e.g.* prices rise from 100 to 150, the quantity of commodity the same sum of money can purchase falls from 100 to 66·66.<sup>1</sup>

2nd. The term, value of money, is used, though improperly, to designate the payment made for its temporary use, that is, for a loan of money. This payment represents the value of the use of money, and is termed discount.<sup>2</sup>

Now what are the factors of the value of money, *i.e.* of its power of exchange? If money consists of a substance which, besides its purely instrumental function as a medium of exchange, answers one or more other purposes, either as a direct, or as an instrumental commodity, it will be subject to a two-fold law of demand (part ii. chap. ii. § 1, and chap. iii. § 1), viz.: 1st, to a law of demand, in so far as there is a demand for instruments of exchange; and 2nd, to another law of

<sup>1</sup> It must be observed that to the *arithmetical average of prices* corresponds, not the *arithmetical*, but the *harmonical* average of the quantities of wares purchased by a given amount of money. If prices rise from 100 to 150, the quantities of wares fall from 100 to 66·66. If the arithmetical average of prices is 125, the corresponding quantity of wares is 80, not 83·33, which would be the arithmetical average. See Messedaglia, *Il calcolo dei valori medii*, p. 37.

<sup>2</sup> We must therefore avoid confusing the *Value of Money*, or its power of exchange, with the *Value of the Use of Money*, or rate of discount. But still more must we guard against confusing the value of money and discount with *interest*, *i.e.* the *Value of the Use of Capital*. It is the more necessary to note this, inasmuch as even J. S. Mill does not deal with this subject as clearly as might be wished. *Principles of Political Economy*, p. 297. Prof. Sidgwick's exposition is accurate, *Principles of Political Economy*, book ii. pp. 248, 260, 271.

demand, in so far as there is a demand for the commodity (whether direct, or instrumental otherwise than as money) of which it consists. These two scales of the degrees of utility (curves of demand) of money will vary independently of each other, and will determine, as they rise, rises in value, and as they fall, falls in value of the total mass of which, in the particular case, the money consists. The two laws of demand may vary in the same direction, each corroborating the other, or in an opposite direction, each partially or wholly neutralising the other; and the occurrence of variations of either law of demand, in one or other direction, has a degree of probability of its own. Moreover, given a variation in one only of the two laws of demand, and consequently a change in the value of the total mass of which, in the particular case, the money consists, this must in turn modify the *quantity* of the total mass which will be demanded in conformity with the law of demand that has remained unvaried.<sup>1</sup>

But if we suppose a commodity which is exclusively a medium of exchange, we are confronted by the fact that the utility of the entire mass of the commodity set apart for such

<sup>1</sup> Let us suppose two laws regulating the demand for gold, the first in respect of its use as money; the second in respect of its industrial consumption. Let the two laws of demand, expressed by indices denoting the degrees of utility of successive portions of gold, assume originally the following form for a series of groups of individuals:—

| <i>First Law of Demand</i>   | <i>Second Law of Demand</i>  |
|--|--|
| Degrees of Utility of successive Increments for each Group of Persons— | Degrees of Utility of successive Increments for each Group of Persons— |
| Group of Persons—  | 1st, 2nd, 3rd, 4th, 5th, 6th, 7th Increment                            |
|  | 15   |
|  | 14 14  |
|  | 13 13 13   |
| 1st, 2nd, 3rd Increment  | 12 12 12 12  |
|  | 11 11 11 11 11   |
| 10   | 10 10 10 10 10 10  |
| 9 9  | 8 8 8 8 8 8 8  |
| 6 6 6  |  |

Let the available quantity be 31 increments. These increments will be so distributed that 28 will be apportioned to the groups constituting the second law of demand, and 3 to the groups constituting the first law of demand. The final degree of utility of the mass will be 8, and this will also be the price of each increment. The value of the entire mass will be  $8 \times 31 = 248$ .

Let us now suppose that whilst the second law of demand remains unvaried,



use, be it great or little, never varies. In fact, supposing a *régime* of divided labour, so perfect that each person produces only with a view to the market, that is, to exchanges, and supposing that no barter be effected, *all the wares will exchange against all the money*, be it much or little. The total value of the mass of money, that is the integral value of the mass, or yet again the value of the aggregate amount of money, will therefore be constant.<sup>1</sup>

Now, divesting the theory of some of its hypotheses, and admitting that only a portion of the wares are put on the market, and that moreover a portion of these are bartered directly against one another, the demand for money, instead of being determined by the whole amount of wares produced, will be given by that portion which, within a given time, is exchanged against money, *i.e.* by the *requirements of circulation*, and the available quantity of money,—owing to a portion thereof having been possibly accumulated and reserved for future payments,<sup>2</sup> will be given by the quantity actually used as a medium of exchange, during the period considered, *i.e.* it will be given by the *quantity in circulation*. It will still be true that, since the work which money must do within a certain time is a given quantity, the value of the total mass of money that actually serves as an instrument of exchanges

the first is modified in conformity with the Roman numerals above the Arabic figures :—

| <i>First Law of Demand</i> |     |     |         | <i>Second Law of Demand</i> |    |    |    |    |    |   |  |  |  |
|----------------------------|-----|-----|---------|-----------------------------|----|----|----|----|----|---|--|--|--|
|                            |     |     |         | 15                          |    |    |    |    |    |   |  |  |  |
|                            |     |     |         | 14                          | 14 |    |    |    |    |   |  |  |  |
|                            |     |     |         | 13                          | 13 | 13 |    |    |    |   |  |  |  |
| xii.                       |     |     |         | 12                          | 12 | 12 | 12 |    |    |   |  |  |  |
| xi.                        | xi. |     |         | 11                          | 11 | 11 | 11 | 11 |    |   |  |  |  |
| 10                         | x.  | x.  |         | 10                          | 10 | 10 | 10 | 10 | 10 |   |  |  |  |
| 9                          | 9   | ix. | ix.     | 8                           | 8  | 8  | 8  | 8  | 8  | 8 |  |  |  |
| 6                          | 6   | 6   | vi. vi. |                             |    |    |    |    |    |   |  |  |  |

Let the available mass of 31 increments remain unaltered ; these will then be distributed so that the persons composing the second law of demand will receive 21, and those composing the second law, 10 ; and the final degree of utility of the mass will be 9, which will also be the price of each increment. The entire mass will be equal to  $9 \times 31 = 279$ . With respect to the first group the law of demand will have risen, whilst with respect to the second it will have remained unaltered ; but for that reason the quantity demanded will have decreased, *i.e.* the demand will be reduced or restricted.

<sup>1</sup> A. Messedaglia, *Moneta*, p. 27.

<sup>2</sup> J. S. Mill's *Principles*, iii. 8, § 3, p. 300.

during that time, will be independent of its quantity. Nor can the work that money must do vary by reason of any variation in its quantity; that is, no such variation in the amount of money can cause an increase or diminution of production, or an extension or restriction of immediate barter;<sup>1</sup> in brief, it cannot affect the factors of the requirements of circulation.<sup>2</sup>

But if the integral value of money is constant, the value of each piece of money, that is the unitary value of money, must necessarily vary inversely as its quantity. Supposing the volume of business transactions to remain the same, and the quantity of available money to be doubled or halved, then since the whole amount of money will be exchanged against the whole amount of commodities, *prices will be doubled or halved*, that is, *the unitary values will be halved or doubled*.<sup>3</sup>

The unitary values of money are thus determined directly as the *demand for money*, and inversely as the *supply*.<sup>4</sup> The *requirements of circulation* however, or the volume of business transactions, which is the demand for money, resolves itself into two elements, viz. the *quantity of commodities offered for sale*, and the *number of times that the same commodity is bought and sold for money*. Supposing the money prices of all commodities in a market to be given, the quantity of money required to maintain those prices is determined by the quantity of the commodities, multiplied by the average number of times that each is bought or sold before being withdrawn from the market. Similarly the quantity of money disposable, or offered, is not the same as the quantity in circulation, for each piece of money passes through many

<sup>1</sup> Or an extension or restriction of the amount of fiduciary paper, the value of which, owing to its convertibility into money, must vary in accordance with the value of money. Sidgwick, *op. cit.* pp. 251, 252.

<sup>2</sup> On the effects of an increase or diminution of the quantity of money in the multifarious and complicated conditions of actual life, see Walker, part i. chap. iv.

<sup>3</sup> Galiani, *Della moneta*, iv. 2, 165, vol. iv. Custodi; J. S. Mill's *Principles*, p. 299. There may therefore be a *general rise or fall of prices in money*, as there might be a general rise of prices in any other commodity, but not a *general rise or fall of values*.

<sup>4</sup> It is to be observed that the level of prices determined by the relation between demand and supply of money serves also for the making up of the ratios of exchange of products that are bartered, and are consequently not offered in the money market.

hands, and must be counted for as many pieces of money as the number of times it has done duty as money. The available amount of money thus comes to be likewise the product of its quantity and of the *rapidity of its circulation*. The value of the monetary unit will therefore be expressed by the formula  $v = \frac{m}{qr}$ ; in which the *volume of business trans-*

*actions*, i.e. the demand for money, is denoted by  $m$ , and the supply of money by the product of its quantity  $q$  multiplied by the rapidity of its circulation  $r$ .<sup>1</sup>

The doctrine we have been expounding of the dependence of the unitary value of money on its quantity, is very old, since it is found in Hume and Locke, as also in several of our old economists; but like almost all other fundamental monetary theorems, it was developed in its minutest details, and demonstrated, by Ricardo, and constitutes one of his many splendid contributions to the science of economics. It is commonly known as the *quantitative theory of money*, or the *quantitative principle*.<sup>2</sup>

§ 5. *That Money may be a Commodity destitute of all direct Utility*

Supposing the currency of a country to consist of a substance which is at the same time a direct commodity, for instance, gold, which possesses industrial utility, it may be deprived of all directly useful properties,—that is, in the case of a gold currency, the coinage may be debased,—without its in any way affecting prices.

This is demonstrated by Ricardo in the following manner: Suppose that for the circulation of a close market one million coins are required, each containing one hundred grains of pure gold. In that case, 100,000,000 grains of pure gold are in circulation as money; and prices will rule at a determinate level, according to the demand there is for

<sup>1</sup> S. Piperno, *Elementi di scienza economica*, p. 194, Rome, Paravia, 1878.

<sup>2</sup> Ricardo's *Principles*, chap. xiii. p. 107, M'Culloch's edition. The best recent work on the subject is A. de Viti de Marco's *Moneta e prezzi, ossia il principio quantitativo in rapporto alla questione monetaria*, Lapi, Città di Castello, 1885.

money and the need that exists for exchanges in specie. Now, let the sovereign abstract one grain of gold from each coin, withdrawing it from the market; there will then be in circulation 1,000,000 coins, each containing ninety-nine grains of gold, that is, 99,000,000 grains of gold. But the demand for currency, and the quantity of money in circulation being the same as before, the unitary value of the coinage will remain unaltered. But this process may be carried further, ten grains of gold being deducted from each coin and withdrawn from the market, the total number of coins remaining the same; in which case the unitary value of the coinage will remain unaltered, its factors not being altered. If, on the other hand, the ten grains of gold taken from each coin, that is, the 10,000,000 grains of gold, are coined and put on the market, there will be a fall in value.

Hence Ricardo's theorem, that *however debased a coinage may become, it will preserve its mint value, provided it be not in too great abundance*.<sup>1</sup> Hence too the principle, that *if the State alone can coin, there can be no limit to the debasing of the coinage, i.e. to the charge for seigniorage, which it may impose, provided it limit the quantity of the coinage*.<sup>2</sup> Paper money affords an instance of a currency the intrinsic value of which is reduced to zero.<sup>3</sup>

<sup>1</sup> Ricardo's *Reply to Mr. Bosanquet's Practical Observations on the Report of the Bullion Committee*, chap. vi. p. 347 of M'Culloch's ed. of Ricardo's Works.

<sup>2</sup> Ricardo's *Principles*, chap. xxvii. p. 213 in M'Culloch's edition.

<sup>3</sup> *Eod. loco*. Walker, *Money*, part i. chap. ix. p. 164; part ii. chap. xiv. p. 275; chap. xvii. p. 376. In order to have a system of paper money, or even a monetary system without money, that is, consisting solely in the registration of credits and debts in a central bank, the intervention of the State is unnecessary. The State has only been introduced in order to facilitate the comprehension of the theory, by postulating a power which will ensure the paper being known and accepted by all. How the State may be dispensed with, appears from the following reflections of Spencer: "The monetary arrangements of any community are ultimately dependent, like most of its other arrangements, on the morality of its members. Amongst a people altogether dishonest, every mercantile transaction must be effected in coin or goods; for promises to pay cannot circulate at all, where, by the hypothesis, there is no probability that they will be redeemed. Conversely amongst perfectly honest people paper alone will form the circulating medium, seeing that as no one of such will promise to pay more than his assets will cover, there can exist no hesitation to receive promises to pay in all cases," etc.—*Social Statics*, 1841, Chapman, chap. xxix. § 1, p. 396, 397.

### § 6. *Of Gresham's Law*

Supposing money to be made of a metal, such as gold or silver, which is endowed with direct usefulness, and supposing that there are in circulation coins of *lower standard* along with coins of *superior fineness*, it follows from what has been stated, that both these varieties can circulate concurrently, *provided that the quantity of the coinage be so limited as to preserve its mint value.* But if the coinage is at all in excess of the demand, *the bad money drives out the good money*; for the latter will be hoarded up rather than the former, and will moreover be used exclusively in international payments, in which foreign money is only accepted in respect of its fineness; in addition to which it will be sold as bullion, whenever its value as such is in excess of its mint value. This phenomenon, which goes by the name of Sir Thomas Gresham's Law, is singular, inasmuch as it exhibits the reverse of what happens in the case of other commodities, the best of which drive inferior ones out of the market. Gresham's law applies also: 1st, in the case of a metallic currency existing together with an excessive paper currency; and 2nd, under a double standard system, when the relative legal values of the two metals do not correspond with their relative market values, and the mint is open to all comers.<sup>1</sup>

### § 7. *Of the International Distribution of Money*

Supposing two absolutely close markets, both however using the same currency, prices will have a determinate level in either market, dependent, as we are aware, on the volume of business which it is found convenient to transact in money, and on the quantity, and rapidity of circulation, of the money available. Supposing now, that these markets are placed in communication, and that prices rule much higher in the one than in the other, owing to the existence there of a larger disposable quantity of money, or of a greater rapidity of circulation, or of a less demand for money. On this hypothesis, a given quantity of commodity will have a greater power of

<sup>1</sup> Jevons, *Money*, pp. 80-85.

exchange in money, in the country where prices are high, than in that where they are low; and it will be profitable to bring goods from the latter to the former, and money from the former to the latter. In other words, the export of commodities from the low-priced market will increase,—for consumers in the high-priced market will direct their demand to that quarter, offering money in payment,—and, on the other hand, the imports will diminish, for the consumers in the low-priced market, who possibly found it profitable before to purchase abroad, will now be disposed to buy at home. And *vice versa*, the export of commodities from the high-priced market will cease, because foreign consumers will withdraw from it, and the imports will increase, because consumers in that market who previously purchased at home, will now find it more advantageous to buy abroad. There will therefore be an influx of money into the market where prices are low from the one where they are high, which will continue until the increased amount of money in the first, by causing a rise of prices, and the diminished amount of money in the second, by causing a fall of prices, have brought about a uniform level of prices in both markets.<sup>1</sup> This phenomenon is expressed in another Ricardian theorem, viz. that *the amount of the currency is regulated in each country by its value*.<sup>2</sup> This implies that free trade between two markets—or countries—cannot deprive either of its stock of money,<sup>3</sup> or in other words, that there cannot be a constant flow of money from one market to another.<sup>4</sup>

<sup>1</sup> If this process assumes large dimensions, it produces a form of commercial crisis, which however no artificial means can obviate.

<sup>2</sup> Ricardo's *Reply*, etc., chap. iii. § 2, p. 326; J. S. Mill's *Principles*, pp. 306, 307.

<sup>3</sup> This effect can only be produced by the law of Gresham.

<sup>4</sup> A constant flow presupposes that money is the *commodity* which the exporting country produces at the least comparative cost. This may be the case: (a) if a country has mines of the metal used as currency, and (b) if it obtains the metallic money from other countries by means of exchanges at a less comparative cost than the countries which import it. In a country which imports continuously, there must be a constant industrial consumption of the metallic money.

### § 8. *Of Discount in Relation to the Value of Money*

Of money, as of any other commodity, the mere *use* may be purchased for a determinate time, in other words, money may be obtained on *loan*, just as a house or farm may be taken on *lease*, or a labourer's services may be *hired*. The price payable for the use of a sum of money for a certain time, is called *usury* or *discount*. The purchaser of the use of a sum of money must, since he decides to purchase, *attribute a certain final degree of utility to the sum he demands*, and this will mark the maximum price he is willing to pay. The vendor of the use of money will compare the final degree of utility that the power to dispose of the money has for him at present, with the smaller final degree of utility he attributes, also at present (see part i. chap. iv. § 6), to an equal amount of money which will only be available in future, with a certain degree of probability.<sup>1</sup>

This holds good in the supposed case of only two individuals; if however there are many lenders and borrowers, the problem is complicated in accordance with the laws and sub-laws already expounded.

Discount and value of money are thus different species of the same genus, for the second represents the price of the use of money for an indefinite period, and the first represents the price of the use of money for a definite period; so that the one might, by an indefinite series of gradations, pass into the other.

The affinity between discount and value of money is exhibited likewise in *their tendency to vary concurrently in the*

<sup>1</sup> *e.g.* a purchaser of the use of money gives a banker a promise to pay £100 at the end of the year, and receives £95 in cash. The discount in this case is said to be five per cent, such being the established custom in commerce; but the price actually paid *by the debtor at maturity*, i.e. *on the day when he pays his bill*, is £5 on £95, or 5·263263 per cent. The debtor who asked for the money was willing to pay a maximum of, say, ten per cent, as he presently needed an instrument of exchange, and the sum he was willing to pay the lender, viz. ten per cent on the loan, is the measure of the final degree of utility the money possessed for him. The creditor substitutes for the £100 present in his hands, £100 promised him a year hence, and he estimates the difference between the respective final degrees of utility of these two values as equal to the final degree of utility of at least, say, two per cent on the sum lent. Hence the requisite conditions for an exchange.

same direction in four exceptional cases, and to vary concurrently in an opposite direction in all other cases.

The following are the cases in which discount and value of money vary in the same direction:—

1st. Let us call *price of the bill* the sum of money paid for it by the purchaser (the banker), *amount of the bill* the sum expressed on the face of it as due from the party who sells it, and *discount the difference between price and amount*. Then, *the higher the price, the greater the discount*, and the higher the price of a bill, the smaller is the discount. But *the lower the price, the higher is the value of money, i.e. its purchasing power in respect of bills.*<sup>1</sup> Therefore: the value of money varies inversely as the variations in the price of bills, and directly as the variations of discount (M'Leod's theorem).

2nd. As money is employed not merely in purchasing direct commodities of single productiveness, but is also frequently borrowed for the express purpose of purchasing direct commodities of manifold productiveness, as also instrumental commodities (such as houses, lands, etc.), and above all, shares, bonds, and stocks, it happens that in the largest money markets, which are also the largest markets for such securities, a *fall in the rate of discount*, by increasing the amount of disposable money, *is concurrent with a rise in price both of these commodities of manifold productiveness and of instrumental commodities*, for it gives rise to a greater demand for them. Hence *a fall in the rate of discount is accompanied by a rise in price of certain commodities, i.e. by a fall in the value of money with respect to such commodities*. And *vice versa*, if the rate of discount rises, the holders of shares, bonds, stock, and other interest-bearing securities will find it profitable to employ their money in discounting bills rather than in holding the former. Hence sales will take place, with the result of sending down the prices of securities and increasing the purchasing power (value) of money with respect to them.<sup>2</sup>

3rd. If, owing to whatever cause, there be a large and sudden demand for money, those who need money will be obliged to sell *any kind of commodities* they possess, thereby *sending down the prices of direct and instrumental com-*

<sup>1</sup> Macleod, *op. cit.* p. 214.

<sup>2</sup> Clément Juglar, *Du change*, etc., Guillaumin, Paris, 1868, vii. p. 232.



*modities.* At the same time the rate of discount will rise, owing to the increased demand and diminished supply of money.<sup>1</sup> Therefore again: *the rate of discount varies directly as the value of money, and inversely as price.*

4th. A sudden influx of money will provisionally and temporarily *facilitate discounts*, and the increased amount of these *will gradually send up prices*, i.e. *will diminish the purchasing power of money*, bringing it down to a new level. The opposite effect will result from the *efflux of money* in any considerable quantity.<sup>2</sup>

But that these four cases are exceptional, and that, as a general rule, the rate of discount and the value of money vary inversely, is shown by the fact, that, as a rule, bills are chiefly discounted by contractors for the purpose of paying for the materials and labour employed in industrial undertakings, and that consequently an increase in the demand for discounts arises from an increase of purchases made or projected. Hence *a rise in the rate of discount is concurrent with a rise in price of large classes of goods*, i.e. *with a fall in the value of money.* *Vice versâ*, when the demand for discounts is weak, and the discount rate is consequently low, this is ordinarily due to the scarcity of business, and coincides with low prices, i.e. with a comparatively high value of money. This theorem is thus formulated by De Viti de Marco: The curve of the fluctuations of the rate of discount does not coincide with the curve of the fluctuations of this or that commodity, but with the curve of the *general mean* of the fluctuations that occur in the prices of the principal articles of commerce;<sup>3</sup> which means that it is the converse of the curve of the mean value of money.

<sup>1</sup> This phenomenon, when it assumes large proportions, constitutes a form of monetary crisis. Clément Juglar, *Enquêtes sur les principes et les faits généraux qui régissent la circulation monétaire et fiduciaire*, Question 15<sup>e</sup>, pp. 20-24, Paris, Impr. Imp. 1867.

<sup>2</sup> For theorems 2 to 4 see Sidgwick, *op. cit.* ii. 5, § 5, p. 264. The first might be comprised in one formula with the second, and the third with the fourth. Thus we should have, as the general rule, the varying of the rate of discount inversely as the value of money, and two exceptional cases. See *ante*, part i. chap. ii. § 2.

<sup>3</sup> De Viti de Marco, *op. cit.* p. 97, in which a minute inductive demonstration of this theorem is given.

### § 9. *Of the Cost of Metallic Money*

When the substance of which money is made is a direct commodity, or an instrumental commodity productive of direct commodities,—such as precious metals, grain, etc.—money involves a certain cost. This cost is a dead loss for the nation using such currency, and the loss can only be minimised by using the least possible amount of money and increasing to the utmost extent the rapidity of its circulation. The law which determines the cost of money was first propounded by Senior and again by Cairnes.<sup>1</sup>

If a country contains mines of the precious metal used for its currency, the cost of the latter is determined by the productiveness of the mines and the efficiency of the labour expended on them. If, on the other hand, it does not possess such mines, the cost of its money is determined by the efficiency of its labour in producing those wares which exchange in the most favourable ratio against the metal in the countries which yield it, *i.e.* those wares which bear the highest value there; or by the efficiency of its labour in producing those wares which exchange, in the most favourable ratio, against the precious metal, in countries which have themselves purchased it from those where it is produced. Hence this important proposition with reference to the theory of wages, that where the cost of obtaining money is low, *nominal* salaries are high, and *vice versa*.

Metallic money, however, costs, not only to obtain, but also to keep and transport it. The safe custody of money has not yet been made the subject of an economic law, but its transport has, as we shall see in the next paragraph.

<sup>1</sup> Senior, *Three Lectures on the Cost of obtaining Money*; Cairnes, *Essays in Political Economy, Theoretical and Applied*, 1873, p. 92: "Where a country does not itself yield gold or silver, every increase of its metallic circulation must be obtained—can only be obtained—by parting with certain elements of real wealth—elements which, but for this necessity, might be made conducive to its wellbeing. It is in enabling a nation to reduce within the narrowest limits this unproductive portion of its stock, that the chief advantage of a good banking system consists; and if the augmentation of the metallic currency of a country be not an evil, then it is difficult to see in what way the institution of banks is a good."

§ 10. *Of the Value of Instruments of Credit functioning as Money*

A variety of instruments of credit supply the place of money, inasmuch as they perform the functions of a medium of exchange: those namely which certify that the holder is entitled to receive a certain amount of whatever thing is money in a given market, from a certain person, at a specified time. Amongst such instruments must be ranked in the first place a bank note, *i.e.* a promise in writing by a bank to pay on demand a certain sum of money to the bearer of the promissory instrument, *i.e.* of the note. Such too is a cheque, *i.e.* an order in writing addressed by a creditor to a bank, requiring the latter to pay a certain sum of money to, or to the order of, a specified person; as also a promissory note, or promise in writing to pay a certain sum of money at a given time and place, to a person specified expressly or implicitly; and a bill of exchange or order in writing addressed by one person to another, requiring the person to whom it is addressed to do the like.

These instruments of credit are not money, though they are used as a medium of exchange, which is the characteristic function of money; for they only perform that function *in so far as something else exists which is accepted as money*, *i.e.* they presuppose the existence of a recognised medium of exchange, to which they refer. Hence the question of their value calls for separate treatment. The difference between them and money does not by any means consist in the fact that the latter, in civilised communities, is made of a substance (such as a precious metal) which is a direct commodity as well as an instrumental commodity for other than monetary purposes;—for that might even not be the case, and the currency might be a legal paper currency, or a purely fiduciary paper currency issued by a bank or a private person,—but in the fact that those instruments are not intended by the parties to be given or taken save as *promises to give or accept whatever medium of exchange is, for the time being, at a certain place, recognised as money, and is so designated.* The very wording

of the instrument recognises, and refers to, *something else* as money.

As regards the value of a promise to pay money, the first thing to be taken into account is the degree of certainty as to its being kept. This, though a most important element in the value of such instruments in practical life, is non-existent in pure economics, since it is assumed in that science that all men are perfectly enlightened (so that no one will promise to pay what he is not sure of being able to pay, and no one will allow himself to be deceived by an unsubstantial promise), and perfectly honest through egoism (so that no one will make illusory promises). But if we can abstract from the question of the *goodness* of an instrument of credit and, *a fortiori*, from that of its genuineness, we must nevertheless distinguish between such as contain promises of immediate payment and such as contain promises of deferred payment, *i.e.* payment at a future date; for these must, *cæteris paribus*, be affected by a coefficient of deterioration (part i. chap. iv. § 6). Supposing this difference to have been taken into account, and that accordingly we have only to do with promises to pay at sight, or promises to pay at a future date reduced to an equality of comparison with those at sight, it is clear that the value of an instrument of credit cannot be less than that of the money it replaces; for were that the case, the holder would present it for payment. Nor on the other hand, save for its greater convenience in comparison with money, as regards safe custody, and still more as regards transport, in cases where money consists of some heavy or perishable substance, can an instrument of credit be worth more than the sum promised, or required, to be paid by it. But, as a matter of fact, the value of money itself comes to be affected by the use, on a large scale, of instruments of credit as a circulating medium, because the *demand for money*, *i.e.* the amount of business transacted in money, is thereby reduced. Hence the law of the value of instruments of credit comes to be: that *every such instrument is worth as much as the money for which it is substituted, and whose value it has reduced below the level it would attain, if no instruments of credit were in circulation as a medium of exchange.*

Where money consists of a cumbrous substance, as is the case in all civilised countries that have a metallic currency, instru-

ments of credit payable in another market<sup>1</sup> than the one where they are drawn, i.e. *drafts*, may be worth more or less than their face value, and the difference is termed the *exchange*. The following are the cause and limits of this difference. A draft is an acknowledgment of the debt due to the drawer, who lives in one place, by the acceptor, who lives in another; and the consideration for the debt usually consists of goods sent by the drawer. Supposing that, in a given market, there is a merchant A, to whom a certain sum is due from another merchant B, residing in another market; and that there is, at the same time, in this second market, a merchant C, to whom the same amount is due from another merchant, D, residing in the first market, B would then have to send money from the second market to A, in the first, and D would have to send an equal sum of money from the first market to the second. This would entail expense on both B and D, in the shape of freight of a heavy commodity and insurance; which may be obviated if D purchases in the first market A's draft on B, thus extinguishing B's debt to A, and transmits it to C in the second market, in satisfaction of his own debt, since C can there obtain payment from B. It is evident therefore that, in the first market, persons owing money in the second will find it advantageous to purchase bills on the latter, paying even more for them than the sum they transfer, which is called the *par of exchange*, up to a limit at which it would be equally to their interest to submit to the cost of transporting money; and the same applies to the debtors in the second market. Hence the maximum limit, in this respect, of the exchange on a bill is given by the cost of transmitting an equal sum in specie, and is termed the *maximum gold point* of the bill. On the other hand, it is to the interest of creditors in every market to get rid of their bills, for if they failed to find purchasers for them,—i.e. the said remitters or drawees,—they would have to wait until their debtors sent them their money, in which case they would be subject to a discount in proportion to the time required for this operation. Hence the minimum limit, in this respect, of the exchange on a bill is again given by the cost of receiving an equal sum in specie, which is called the *minimum*

<sup>1</sup> Owing to this fact alone and to other causes not contemplated in our hypotheses.

*gold point* of the bill. This theorem is probably due first and foremost to Macleod.<sup>1</sup> It must be observed that these two limits are not identical, as the expenses the debtor is liable to are not necessarily equal to the discount submitted to by the creditor. Within these limits—abstracting from other causes which may overrule them—the rate of exchange is determined by the demand and supply of bills.

<sup>1</sup> Macleod, *The Principles of Economic Philosophy*, p. 298; *Theory and Practice of Banking*, chap. vii. § 6; Goshen, *The Theory of the Foreign Exchanges*, chap. iv. p. 45.

## CHAPTER III

### OF THE VALUE OF CAPITAL

#### § 1. *Definition of Capital and Interest*

IT is a fundamental fact for various economic doctrines, that *an aggregate of direct or immediate commodities must always precede the existence of men*; and that this aggregate which is required for the sustenance of the population can only be obtained as the gift of nature, *i.e.* as a condition of fact of the environment, or as the result of the savings of men belonging to an earlier generation; so that ultimately the existence of men presupposes the *antecedent existence of direct commodities as constituent elements of the environment*.<sup>1</sup> Now the direct

<sup>1</sup> This theorem, which appears to be absolutely axiomatic, is far from being known and recognised by many recent economists; and for this and other reasons it seems expedient to quote the demonstration of it given by Ortes: "As the substance of which man is formed precedes the fashioning of his frame, so the goods that preserve it must precede its preservation. A man is not conceived and shaped in his mother's womb before the goods exist which, by yielding sustenance to his parents, impart it, through them, to him. He does not issue to the light of day until the milk that is to nourish him fills the maternal breasts, nor until the clothes that are to enwrap him and the cradle he is to lie in are somehow provided. In a word, everything that ministers to his subsistence precedes the use he makes of it in order to subsist amongst his fellow-men. And what is predicated of the earliest age and of an individual, applies equally to all ages and to all men; so that no man exists before the commodities that support his existence, just as no building is erected before there are materials for its construction. These commodities, which in the solitary and savage state, would be herbs and fruits, or at most milk and the spoils of the chase, in the social and national state are food, clothes, and dwellings, varying with the different circumstances of individuals; that is to say, they are products qualified for use by selection and modification, distribution and management, in conformity with

commodities which supply the immediate wants of men whilst they are engaged in the preparation of other commodities, whether direct or instrumental, are termed Capital, in accordance with the definition given by Ortes;<sup>1</sup> and this equally in isolated and social economics. In other words, all human labour presupposes the availability of a fund of direct commodities, *i.e.* of capital, supplied sometimes by the conditions of the environment, sometimes by savings of the fruits of previous labour intended for the satisfaction of the direct wants of the worker during his labour.

Capital is not therefore a species *per se* of direct com-

the requirements of this state, and prior to them it will consequently be impossible for even a single member of the nation to exist. If in the island already referred to (book i. chap. ii.) the first inhabitants had not found ready to hand products supplied spontaneously by the soil; if the second generation had not found such products gathered by the first; if the third generation had not found such products gathered and modified by the first and second generations; and if the fourth generation had not found such products gathered and modified by the three former ones, no one would have migrated to the island, and it would not have become the seat of a nation."—Ortes, *Della economia nazionale*, book i. chap. xx. p. 118, Ediz. Custodi, vol. xxi. Confer Thorold Rogers, *Manual of Political Economy*, 3rd ed. pp. 74, 156: "The supply of food is a *condition precedent*, as lawyers say, to the growth of population itself." J. L. Shadwell, *A System of Political Economy*, book i. p. 47, book ii. p. 196; Macleod, *op. cit.* vol. i. p. 231; Giddings, *The Theory of Interest*, Quarterly Journal of Economics, January 1880.

<sup>1</sup> "For this reason, what we have repeatedly stated must be borne in mind, viz. that commodities must precede population, and that no one can engage in any employment, save in reliance on commodities possessed by some one else, and to which he becomes entitled in consideration of his labour (i. 17). And since it is certainly impossible to engage in any employment without consuming commodities whilst so engaged, and *as these commodities cannot be the ones that are being brought into existence* by the employment, there must necessarily be other and pre-existent commodities which can be consumed by the persons occupied whilst they are gathering and qualifying the former. . . . Now these commodities, which precede present employments, but which are the result of employments carried on during all past time, I call NATIONAL CAPITAL; so that supposing all present employments to cease, all the commodities gathered, modified and distributed, as the result of past employments, and possessed more or less by all individuals throughout the nation, must be considered as capital belonging to them and on which the nation is then subsisting. Moreover, since this capital is being steadily consumed day by day by the population and by the wasting effects of time, in order that its amount may be kept up, it must, all other conditions being the same, be made good by the produce of daily labour to the same extent to which it is being wasted and consumed; otherwise, being diminished little by little, it would altogether disappear, and no commodities would remain on which



modities, but merely these commodities employed in a certain manner, *i.e.* with a certain object; and under a monetary system, or better still under a perfect system of divided labour, and consequently of exchange, every aggregate of riches, being exchangeable against direct commodities (to be employed in the maintenance of labourers), may be deemed the equivalent of a capital, the amount of which will be determined by the then rate of interchange between direct and instrumental commodities. Thus money, land, bonds, and anything else having an exchange value may be expressed in terms of the quantity of capital that may be bought with them.<sup>1</sup>

the nation could subsist, or in reliance on which any one could engage in any employment. That portion of this capital which is thus being consumed and replaced by the present every-day employments, I call the national rent of commodities, which considered with reference to any definite period, say one year, will be called annual rent." Ortes's definition of capital is *incidentally* the same as Adam Smith's, tome ii. book iv. chap. ii. p. 32, and the characteristics he attributes to it have passed into classical economics under the names of J. S. Mill's *fundamental proposition respecting capital*, viz. that "industry is limited by capital," *Principles of Political Economy*, pp. 1-3 and 39-43; and also into a theorem formulated by J. S. Mill, viz. that "demand for commodities is not demand for labour," *eod. loco*, pp. 49-55. Jevons, *op. cit.* p. 243, defines capital precisely as Ortes does: "The current means of sustenance constitute capital in its free or uninvested form."

<sup>1</sup> Capital, in its genuine form of means for satisfying the primary wants of labourers, whose work will only produce at a future date a commodity of immediate utility, is of a comparatively perishable nature, even through the mere effect of time. This circumstance is a matter of fact, which from an economic point of view, is not a necessity, or rather which is occasioned by the fact of our direct wants being what they are, and the things that satisfy them being endowed with physico-chemical properties that cause them to decompose rapidly. In primitive civilisations the only existing method of accumulation is material, that is, it consists of hoards of food and of other immediate commodities such as are gathered by many species of animals (S. Cògnetti de Martiis, *Le forme primitive nella evoluzione economica*, Torino, Loescher, 1881, *passim*, spec. p. 74). Soon however the hoards of immediate commodities are replaced by hoards of instrumental commodities endowed with more *durable* physico-chemical properties; thus *e.g.* flour is substituted for bread. At length, in the highest economy of exchange, capital is accumulated in *the most durable form* of instrumental commodities, viz. money, and better still of debts pure and simple owed by private individuals or collective bodies of individuals (companies, etc.), or the State; and for the purpose of preservation, those instrumental commodities are chosen which are least perishable, and the sale of which can always be counted on at not unfavourable ratios of exchange. Under both these aspects, in civilised communities, debts must appear incomparably superior to all other instrumental commodities, because their material substance consists of a complex of things not easily affected by physico-chemical forces (paper bearing certain marks, both renewable at pleasure), and of habits and acts on which our knowledge of the character of the members

Since capital consists of direct commodities employed in the sustenance of labourers whose work can only fructify after a certain lapse of time, and who yet experience wants *whilst they are working*, it is evident that the direct commodities which can be capital are those only which are regarded as such by the workmen. In fact, in defining commodities in general, we saw that we must only rank things as such, *with respect to a certain consumer having certain wants* (part i. ch. iv. § 2 D). And in this case, the consumers of the commodities being those who perform some work, we shall find that, according to their nature and their wants, *certain things will to them be direct commodities, and others not, and of such direct commodities, only such portion will be CAPITAL as is, or may be, placed at their disposal*. This portion may increase or diminish, according as the amount drawn from the fund of direct commodities existing at a given moment, and placed at the workers' disposal, is larger or smaller, and according as the workers' opinion as to what is a direct commodity varies from time to time and place to place;<sup>1</sup> and also according as the quantity

of the community enables us to count with certainty; as, for instance, the honesty of debtors, the honesty of the public which would punish a failure, the integrity of judges, the intention of members of the community to uphold the laws that protect property, etc. However we must never forget that those things are only instrumental commodities, and not capital in the true sense; things that in certain environments are susceptible of being transformed into capital, and which are therefore used as accumulators of capital in those environments, but which are incapable of accomplishing any productive labour for isolated individuals in an island, or on a ship, or in a besieged city; in a word, in whatever condition of natural economy in which the true and simplest relations of things to our wants are revealed.

<sup>1</sup> Suppose for instance a close market, one half composed of Italian workmen of the present day, the other half of Mahometan Arabs. The first will regard as direct commodities what, *according to their notions of comfort*, is suitable for the purpose of eating, drinking, and sleeping; whilst the second will equally judge of such matters in accordance with their notions, and consequently otherwise. Thus for instance supplies of wine, however excellent in quality, will not be direct commodities, and still less capital, for the Mahometans, whilst they will be for the Italians. Moreover both, *however variously*, will regard as capital a number of imaginary positive and negative commodities. Thus for instance, for the Mahometan, several even primary commodities (according to Jennings's classification) will lose the character of direct commodities, should they be contaminated by the touch or proximity of a Christian. On the other hand, for both groups, a quantity of things which perhaps two centuries hence will be direct commodities, and which possibly abound in the supposed market, are not direct commodities.

of direct commodities that are produced and saved,<sup>1</sup> or of those spontaneously afforded by the environment, may happen to vary.

The term, interest on capital, is applied equally to the rent paid by a person who borrows capital to the lender, and to the net profit derived from capital by the owner who employs it himself; it is *the value of the use of a capital for a determinate period*, and will therefore vary directly *as the amount of the capital lent*, if the period for which the loan is made is fixed (or as the amount of capital employed, if the period during which it is so employed is fixed); or directly as the period for which the loan is made, if the amount of the capital is fixed. The idea of a *rate of interest* always implies a *given period*, usually a year; so that if we say that the rate of interest is 5 per cent, we mean that the interest which a borrower pays *in one YEAR* for the capital lent to him, is to the capital as 5 to 100. If the capital lent is 100 and the rent 20, the annual rate of interest is 20 per cent, but it would amount to 240 if 20 were payable monthly, and to 1040 per cent if that rent were payable weekly.<sup>2</sup>

<sup>1</sup> In our civilised communities, and for a long time past, *saving*, i.e. *abstinence* from the immediate consumption of riches found or produced, together with the subsequent productive employment of savings, has been in such a marked degree the *prevalent* cause of the formation of capital, *that it may be regarded as the only cause of practical importance*. But it is neither *theoretically* nor *historically* the only origin of capital. See Bagehot, *Economic Studies* (The Growth of Capital), pp. 161-181. Moreover the desire of possessing capital is not *psychologically* the primordial cause of saving. To put it briefly, people save: (a) in order to insure against future pains they foresee (old age, illness, etc.), and the fund thus created is not capital; (b) from tribal egoism, i.e. to insure those belonging to them against future ills they foresee (e.g. to provide for their children), and the fund thus constituted is not capital; (c) to reduce the cost of production, or to gain the interest, and the fund thus constituted, and used for this purpose, is real capital. This is the genetic order of the motives that induce people to save, and the relative weight of the motives is also indicated by it.

<sup>2</sup> Macleod, *op. cit.* vol. ii. p. 35.

Saving is a form of labour. "En réalité, l'épargne est le travail intellectuel et moral qui conserve les capitaux sous toutes les formes et dans tous les détails de l'industrie, aussi bien ceux qui vont être consommés dans le plus prochain repas, que ceux qui doivent être conservés pendant le plus long temps. . . . Avec le système d'exposition employé jusqu'ici, on ne peut guère se dispenser de prendre la propriété comme un postulat, ainsi que l'a fait franchement J. B. Say. . . . Dans notre système d'exposition, cette difficulté n'existe pas. Il suffit, pour l'écartier, d'une simple hypothèse, celle de la suppression de la propriété. Plus de propriétaires, ou plutôt un seul propriétaire, l'idole État, le

It follows from these considerations, that the amount of investment of capital is the product of the quantity of capital invested, of its remuneration per unit of time, and of the number of units of time for which it is invested. A sum invested for two years is equivalent to twice that sum invested for one year only. But ordinarily a quantity of capital is invested progressively, *i.e.* the various portions thereof remain invested for decreasing periods. If, for instance, a workman has to be maintained for a year, in order that a piece of work may be done, a first portion of capital paid to him the first day remains invested for 364 days, a second portion, paid to him the day following, remains invested for 363 days, and so on, until the last portion, which will only be paid the last day and thus be invested for one day.<sup>1</sup> It must further be observed that the portions of capital paid, from time to time, as wages, are usually invested beforehand in some other productive shape, such as stocks, deposit receipts, etc. So that they are only transferred from one investment to another.

### § 2. Capital—A Complementary-Instrumental Commodity

Capital is, as we have said, an aggregate of direct commodities employed in the maintenance of workers. Now, what is the service it renders? It is at once obvious that the direct commodities which are employed as capital, belong to that large class which have at least *two distinct final degrees of utility*, *viz.* a first degree due to the fact that they are commodities

communisme. Que vont devenir les approvisionnements qui remplissent les magasins actuels, le pain, le vin, les comestibles de toutes sortes, les vêtements, les tissus, les chaussures? Les laissera-t-on au premier occupant, au pillage? Non, sans doute. On les remettra aux soins de fonctionnaires publics chargés de les garder. Que feront ces gardes? Exactement ce que font actuellement les propriétaires: il faudra les payer, comme on paie les propriétaires, et ils ne fourniront pas plus de travail musculaire que n'en fournissent aujourd'hui les propriétaires. En faisant cette hypothèse, on ne peut plus méconnaître la fonction du propriétaire, et la grande discussion se réduit à savoir sous le quel des deux régimes elle sera le mieux remplie et coûtera moins." *Journal des Économistes*, 1890, Juin, pp. 358, 359. Courcelle Seneuil, *L'Épargne est un Travail*.

<sup>1</sup> Jevons, *op. cit.* p. 249. How such problems are worked out is explained in any manual of political arithmetic. See *e.g.* Paolini's *Arithmetica sociale*, Rome, Botta, 1880.

capable of affording to any one a given sum of immediate satisfactions ; in other words, *direct commodities* ; and a second degree due to the special use they are put to, as capital.

Now, for the reasons explained above (part. i. chap. iv. § 5), it is certain that a fund of immediate commodities will not be used as capital, unless, in the estimation of their owner, they possess in this form a higher final degree of utility than in the other. Supposing an isolated economy, it is obvious that a man who is obliged to work for his living will be guided, in determining the amount of work he is to undertake, by the theorem of Gossen, or Jennings, or Jevons of the *equivalence of positive or negative degrees of utility* (part i. chap. iv. § 10). Now so long as he is unaware of any other uses of direct commodities than such as satisfy immediately his primary and secondary wants, he will work just as long as is necessary, given the conditions of his environment, to realise this object. This does not exclude the possibility of his *saving*, and of his *abstaining* from the immediate consumption of his stock,<sup>1</sup> in consideration of his *future wants*, *i.e.* with a view to *insuring himself against future pains*, but it excludes the idea of this stock being capital. If however he becomes aware of the fact that *the cost of production of the fruits of his daily labour would be greatly reduced if his labour were combined with an instrumental and complementary commodity* (say a tool, a machine, raw material, etc.), and that this instrumental commodity, though not supplied by nature, may be produced by his labour, he will perceive that the condition *sine qua non* of his producing the desired instrument is the *possibility of diverting his labour*, for the time being, in whole or in part, from the employment in which he is engaged in order to apply it to a new occupation ; and he will also perceive that the condition precedent of this diversion is the existence of a fund of direct commodities available for consumption during the time when his labour will be wholly or partially diverted from procuring the satisfaction of his immediate wants. The requisite stock of commodities may be procured by him in various ways ; according to our hypothesis it is not supplied by nature, for otherwise his labour would be, *pro tanto*, an anti-hedonic act ; consequently to obtain it he may work more whilst consuming

<sup>1</sup> These are not merely accidental characteristics of the conception "capital."

just as much as formerly,<sup>1</sup> *i.e.* he may save the difference between his past and present production, which difference will depend on the *efficiency of his labour* and the *amount of his habitual consumption*, *i.e.* his mode of life. He may also work just as much as before, but reduce his consumption, and the differential product saved will have as the factors of its amount the same causes; or again he may work and consume as much as before, but change the destination of the provision made against future wants, the amount of which provision is always determined by the difference between the efficiency of the labour and the amount of the consumption.

The quantity of capital he requires is determined, both by the *length of time* for which he must divert his labour from the former employment to the new one, and by his *mode of life* during that time; but the duration of this diversion depends in turn on the *efficiency of his labour* and the *technical character* of the instrumental product he has in view.

The hedonic calculus on the strength of which an isolated individual will determine to create for himself a capital, or to use as capital a stock of direct commodities accumulated for some other purpose, commences therefore with the *determination of the final degree of utility OF THE DIRECT COMMODITIES which the instrumental commodity to be created by means of his labour and capital IS EXPECTED TO YIELD.* The instrumental commodity (with the concurrence of labour) will yield direct commodities *in larger quantity at the same cost, or in equal quantity at a smaller cost*, when they are such as could have been obtained even without it. In most cases, however, the commodities will be such as *cannot be obtained without the concurrence of the instrumental commodity.* Having determined the final degree of utility of the direct commodities that are due to the concurrence of the instrumental commodity, we can determine, in accordance with Wieser's law, the final degree of utility of the *instrumental* commodity itself. But the stock of direct commodities termed capital was a condition *sine qua non* of the production of the instrumental commodity, *i.e.* a

<sup>1</sup> If he also consumes more he will never have any capital. For this reason, and in this sense, Smith says that "saving, more than the efficiency of labour, creates capital"; and J. S. Mill explains that, though it may not seem so at first sight, yet "there is here an increase of saving in the scientific sense."—J. S. Mill, *op. cit.* p. 44; A. Smith, vol. i. book ii. chap. iii. p. 422.

necessary factor of its cost of production, the other factor being the labour. Hence, still in accordance with Wieser's law, the final degree of utility of capital will depend on that of the instrumental commodity which capital, as a complementary commodity, concurs in producing, and this final degree of utility must be greater than that of the stock, considered as a means of immediate enjoyment. This stock, however, itself involves a cost, for in no case can a stock exist without its being the result of extra labour, or of abstinence, or of a diversion of the fund set apart for insurance against future pains; and in order that it may be created and employed as capital, it is necessary that the *homo economicus* should find this to be to his advantage, *i.e.* that he should consider the profit to be derived from the employment of this stock as capital (notwithstanding the inferior value of future as compared with present commodities) to be greater than the cost of its creation, or than the return it would yield if employed in any other manner.<sup>1</sup> Hence is derived Jevons's formula, according to which the function of capital ultimately consists in enabling us to tide over the interval between the beginning and end of the production of an instrumental commodity, or in enabling us to diminish the cost of production of direct commodities by employing a quantity of labour, not immediately remunerated, in the preparation of instrumental commodities, *i.e.* to spend the instrumental commodity produced in advance.<sup>2</sup> The instrumental commodities, whose production is the proximate purpose for which capital is accumulated, cannot be the product of capital alone. The latter can only remain what it is—an aggregate of direct commodities—and be consumed; but by combining it with labour and using it as a fund for consumption, or as a provision whilst labouring for some remoter object, we may by means of it obtain the desired instrumental commodities. Hence capital and labour act reciprocally as complementary instrumental commodities, and their respective degrees of final utility are determined in

<sup>1</sup> The measure of the cost will be given by the most useful employment to which it could be applied, and from which it is diverted in order that it may be used as capital. We must guard against considering as the cost, the cost of production of the fund plus the use that might otherwise have been made of it. This error is exposed by Böhm-Bawerk, *op. cit.* vol. i. p. 324.

<sup>2</sup> Jevons, *op. cit.* pp. 243-248.

conformity with Gossen's general laws (part i. chap. iv. § 5, and part iii. chap. i. § 1). The instrumental commodities which are the proximate result of the combination must not themselves be regarded as capital, but simply as *objects the preparation of which has cost capital, or in which capital has been invested.*<sup>1</sup>

§ 3. *That the Origin of Interest is not the Difference between the Value of Present and Prospective Commodities*

One is apt to explain the price paid by the person who borrows capital to the person who lends it, or in other words, the value of the use of capital, as due exclusively to a difference between the *final degree of utility of present and that of prospective commodities.* The reasoning on this subject is somewhat on these lines: It is, or can be, demonstrated that present commodities have, *cæteris paribus*, a greater final degree of utility than prospective commodities (see part i. chap. iv. § 6); but the person who lends present capital to another, *i.e.* who sells the use of it to him for a certain time,<sup>2</sup>—or according to others, he who sells a present commodity on condition of receiving in return, at a future date, another commodity,—parts with a present commodity in consideration of his receiving, at a later date, another commodity whose final degree of utility is affected, *cæteris paribus*, by a coefficient of depreciation. Hence he would not be acting hedonically, if he did not claim a *further compensation over and above mere restitution*, and this compensation is termed interest on capital.

As against this doctrine we have to consider: 1st, That it assumes as proved the theory,<sup>3</sup> that prospective commodities,

<sup>1</sup> Jevons, *op. cit.* p. 264; *contra* Böhm-Bawerk, who denies that direct commodities can be both instrumental and capital, *op. cit.* vol. ii. p. 281.

<sup>2</sup> That a loan of £100 in consideration of the promise of repayment at a future date is in reality a sale of a present in consideration of a prospective commodity was demonstrated by Macleod more than twenty-five years ago, and is admitted by all leading writers on economics, *e.g.* Sidgwick, book ii. ch. v. § 4, note 2, p. 260. I do not, however, know what degree of importance attaches to the question, and still less what discoveries Böhm-Bawerk lays claim to in connection with this doctrine and in his controversy on the subject with Kines (*Kapitalzins*, vol. ii. p. 301).

<sup>3</sup> This is precisely Böhm-Bawerk's theory (*Kapitalzins*, vol. ii. p. 258),



abstracting from their lesser certainty, and other conditions being equal, are affected by a coefficient of depreciation as compared with present commodities. This, even if it were the case,—and for reasons already stated we think it is not,<sup>1</sup>—would not explain: 2nd, How it is that the debtor *can* pay the interest agreed on, in view of this coefficient of depreciation; nor 3rd, What hedonic *motive* can induce the lender to assent to the futile transaction of transforming *present commodities* into *remote commodities plus their interest*. In fact, pausing to consider here only the last two difficulties, it is obvious that the borrower who receives a present commodity and undertakes to return a greater one at a future date, must know of some method which will enable him to meet his engagement at maturity, and he must also know that he cannot avail himself of this method otherwise than by *utilising the present commodity he has borrowed*. For if he did not know of any such method, then it would be impossible to understand why he *incurred the liability*. But if it be true that these conditions

“Die Unsicherheit . . . ein Element, das mit der Zinerscheinung *keinen* Zusammenhang hat.” *Contra*, see Walras, *Éléments d'écon. pure*, 2nd ed. p. xxi. Böhm-Bawerk, *ubi supra*, declares that *the uncertainty of a future event, as compared with present commodities, is not the cause of depreciation which furnishes the explanation of interest*. (Incidentally, p. 261, he shows that he is unable to distinguish between a contingency *before* and *after* the event.) The causes to which the difference in value between present and prospective commodities is due, are, according to this author, as follows:

1. Difference, as between the present and the future, in the relation between demand and supply, p. 262.
  - (a) In the case of persons less well provided now than in the future, p. 262.
  - (b) In the case of persons better provided now than in the future, p. 263. (Present commodities are often serviceable also in the future; future commodities are only useful in the future), p. 264.
2. Future pains are estimated more lightly than present pains, p. 266.
  - (a) Owing to our inability to realise them, p. 268.
  - (b) Owing to the weakness of our will, p. 268.
  - (c) Owing to the uncertainty of our life, p. 269.
  - (d) Owing to the uncertainty of our continued capacity for enjoyment, p. 269.
3. Owing to technical reasons, present commodities are usually a more effectual means of production than future commodities, p. 274.

Böhm-Bawerk charges Jevons and Sax (whom he accuses of being wanting in independence, and of having adopted Jevons's propositions without having verified them) with not having understood the function of prospective commodities. *Confer* Jevons, *The Theory of Political Economy*, 2nd ed. p. 37; Sax, *Grundlegung*, pp. 178, 314.

<sup>1</sup> *Ante*, part i. chap. iv. § 6.

are necessary to induce a hedonic borrower to contract a loan, then we must recognise in them the *generative cause of interest*, i.e. in the *productiveness of capital as a complementary commodity in a profitable technical process* requiring a certain time for its completion, but not in the mere *lapse of time*, which would leave things as they were. In other words: THE FUNCTION OF CAPITAL CONSISTS IN AUGMENTING THE NET PRODUCT OF A TECHNICAL PROCESS WHICH REQUIRES AN EXTENDED PERIOD FOR ITS REALISATION, by making it possible to wait during this period. As regards the lender, if it is true that a present commodity has, *cæteris paribus*, a greater final degree of utility than a remote commodity, it is impossible that he can be satisfied to receive *mere compensation for the coefficient of depreciation*; for such modesty would leave him only in the same condition as before, which would be anti-hedonic, this transaction being, from his point of view, *without consideration*. On the other hand, if his present commodity can be, either for him or for another person, a *complementary commodity for the production of other commodities*, it is clear that whether he keeps his capital in order to employ it himself, or whether he lends it, his remuneration will accrue from his participation, *by means of his capital, in a profitable technical process*; and his capital will have a final degree of present utility equal to the final degree of prospective utility—as at present estimated—*of the direct commodities ultimately due to it*. What must not be lost sight of is, that to the interest thus produced is added a coefficient of compensation for the depreciation of prospective commodities, whether such depreciation be attributed to their uncertainty or to any other cause. But this surplus has nothing to do with interest properly so called, the two phenomena being essentially different, as regards their causes, their amount and the laws of variation to which they are subject; for, to put it briefly, interest cannot vary, *cæteris paribus*, save in proportion to the *productiveness of investments of capital, and particularly of the last or most recent*.<sup>1</sup> This we now proceed to investigate in detail.

<sup>1</sup> In other words, those who allege that present commodities, *cæteris paribus*, are worth more than remote commodities, either give a reason for this phenomenon, by declaring that the former may serve as complementary or instrumental commodities in production,—and in that case the reason given contains the cause and origin of interest, or else they enunciate what for us is an ultimate

#### § 4. *Of the Factors that Determine the Rate of Interest*

Capital, as appears from what has been stated as to its nature and functions, is only useful in combination with labour; consequently the interest it bears can but be equivalent to the degree of utility the last portion of capital still available at a given moment possesses for that one of the borrowers, among whom the entire mass is distributed (and who intend to use direct commodities in combination with labour for the purpose of production), for whom its degree is highest. It is necessary therefore to indicate what are, at any given moment, the determining factors of the demand for direct commodities in combination with labour for the purpose of production, and what are the factors that determine the supply. In fact it will be remembered that, given the supply of a commodity and the law of its demand, *i.e.* the curves denoting the degree of utility of each portion of the mass of commodity for each purchaser, the price is a necessary result; as, *vice versa*, if price and mass be given, the law of demand is

fact, and in that case we do not know how the debtor can afford to pay anything more than the coefficient of equivalence of present and future commodities, nor what advantage either party can derive from this change of their reciprocal positions. Bastiat, who is so roughly handled by Böhm-Bawerk, says: "Saving implies a service performed, and time allowed for an equivalent service to be rendered in return; or to put it more generally, it means placing an interval of time between the service performed and the service received. . . . The lapse of time that separates the two services exchanged, is itself a matter of arrangement and exchange, for it too has a value. This is the origin and explanation of interest."—Bastiat, *Harmonies Économiques*. Böhm-Bawerk says: "Creditor A gives debtor B a sum of present commodities, say a sum of present money in full ownership, and debtor B transfers to creditor A an exactly equivalent, but future, sum of commodities, *e.g.* a sum of money payable next year, also in full ownership. A reciprocal transfer is thus effected of amounts of commodities which, other conditions being equal, are only distinguishable in this respect: that one belongs to the present, the other to the future. . . . Now, since, as has been shown above, the subjective estimate of value which determines the price of present and future commodities is always favourable to present commodities, the debtor will always purchase the present sum of money he receives with a larger sum of money to be paid by him, *i.e.* he will have to pay an *agio*, or additional amount; and this additional amount is interest."—Böhm-Bawerk, *op. cit.* vol. ii. p. 300. But wherein do the two doctrines differ, save perhaps in this, that Bastiat considered that there was a reason for the fact that the lapse of time has a value? See in the same sense, W. Launhardt, part i. § 15, pp. 67-75.

determined; and if the price and the law of demand be given, the mass is determined which suffices to meet these conditions (part ii. chap. ii.). It will likewise be remembered that the final degree of utility of complementary commodities is determined in accordance with a subtle law of Gossen respecting the distribution of an economic effect among the causes that produce it (part iii. chap. i.).

Now, as regards capital, the demand for it, in the case of the *homo æconomicus*, can have no other cause than the actual or reputed existence of opportunities for its lucrative investment,<sup>1</sup> and hence, apart from error as to the existence of such opportunities (which cannot occur in the case of an enlightened *homo æconomicus*, and which, even if it does occur, disappears in the long run, *i.e.* in the normal course of any economic phenomenon), we must hold that, at a given moment, the demand for capital is equivalent to the opportunities for lucrative investment.

But what causes determine the demand thus understood? Evidently it resolves itself into: (*a*) the number of opportunities of investment the productiveness of which is prospective, and (*b*) into the quantity of capital that each requires in order to be developed in the most profitable manner that the state of the technical arts admits of. But the number of opportunities for investment depends in turn: (*a*) on the natural conditions of the environment, *i.e.* on the natural resources in so far as they have not been already exhausted by previous investments at the moment under consideration; (*β*) on the quantity and quality of the labour available for combination with capital; (*γ*) on the condition, at that time, of technical knowledge, and (*δ*) on the quantity of disposable capital.

For, passing over the conditions of the environment, whose influence is obvious, there is no doubt that variations in the quality and quantity of available labour cause variations in the opportunities for investment. This is a simple corollary of the law of *definite proportions* (part i. chap. iv. § 5), for only a determinate number of workers, given the quality of their work, can be combined with a determinate quantity

<sup>1</sup> Loans for other than industrial objects, equally with the consumption of direct commodities for the satisfaction of wants, are neither loans of capital, nor consumption of capital.

of capital to produce the *maximum degree of efficiency*; and if their number be given, their quality, which depends principally on the division and organisation of their labour,—leaving out of account their physical and psychological qualities, which are more properly comprised in the conditions of the environment—has the effect of enhancing or diminishing their efficiency. Similarly it is obvious, that the inventive faculty increases the opportunities for investment, whilst the disposable quantity of capital, at a given moment, is the maximum limit to the possibility of utilising them, and this, in turn, is an effect of the law of the definite proportions of all combinations of complementary commodities.<sup>1</sup>

But if the demand for capital consists in the opportunities of investment thus determined, it is their prospective productiveness that determines the maximum price that can be paid for the use of successive increments of capital by a purchaser, or in other words, the degrees of utility of the several increments, or the law of demand at a given time and place. And since for the several portions of a quantity of capital, as for those of whatever quantity of a homogeneous commodity, there can only be one price, at a given time and place, the diverse productiveness of the several portions of available capital does not determine a diversity in price,<sup>2</sup> the uniform price being that determined by the productiveness of the last portion of capital that is still employed, *i.e.* the one corresponding to the final degree of utility of the available mass. This is equivalent to saying, that the remuneration yielded by the latest investments serves to determine the price of capital in all.<sup>3</sup>

<sup>1</sup> W. E. Hearn, *Plutology*, London, Macmillan, 1864, chaps. viii.-xi. pp. 134-199.

<sup>2</sup> A lender of capital cannot say to a borrower who wants £3000: "I know that £1000 is indispensable to your business, and therefore will charge you 100 per cent interest upon it; for the second £1000, which is less necessary, I will charge 20 per cent; and as upon the third £1000 you can only earn the common profit, I will only ask 5 per cent." The answer would be, that there are many people only earning 5 per cent on their capital who would be glad to lend enough at a small advance of interest; and it is a matter of indifference who is the lender.—Jevons, p. 278. See part ii. chap. ii. for a general solution.

<sup>3</sup> Jevons, pp. 264-267. P. Leroy-Beaulieu, *Essai sur la répartition des richesses*, etc., Guillaumin, Paris, 1881, chap. viii. pp. 242, 243: "Les capitaux ne sont pas également productifs dans toutes les sociétés et dans tous les âges d'une

Passing on now to indicate the chief factors of the disposable amount of capital, we may say briefly that, as capital forms only a portion of the direct commodities possessed by a nation at a given moment, so every factor that increases their production or availability must, *cæteris paribus*, increase the availability of capital, and *vice versa*; and moreover that the factors which influence the apportionment of the supply of direct commodities, as between the provision for present and that for prospective wants, must, *cæteris paribus*, influence in the same direction the availability of capital; and finally that the factors which determine the distribution of direct commodities between the fund constituting merely an insurance against apprehended future pains (*i.e.* hoards and every species of guarantee funds), and the fund intended for reproductive investment, mark the limits of the amount of disposable capital.<sup>1</sup>

même société. Ainsi dans une société naissante, dans une colonie, un pays neuf, quand tout est encore à créer, les capitaux, indépendamment de toute offre et de toute demande, sont infiniment plus productifs que dans une vieille société où la plupart des œuvres d'une utilité de premier ordre sont achevées. De même encore dans certaines périodes de la vie sociale, alors qu'on vient de faire et qu'on applique une grande découverte transformant les moyens de production et de communication, les capitaux sont infiniment plus productifs qu'ils n'étaient avant cette découverte et qu'ils ne le seront quelques années après. . . . Dire que le taux de l'intérêt dépend de la productivité moyenne des nouveaux capitaux créés dans le pays ou survenant dans le pays, c'est émettre une proposition à la fois scientifique et d'une grande importance pratique. . . . Nous disons : *la productivité moyenne des nouveaux capitaux*; en effet, la productivité moyenne des anciens capitaux qui sont pour la plupart incorporés en terres, en maisons, en fabriques, n'exerce plus aucune influence sur le taux de l'intérêt : elle contribue seulement à augmenter ou à diminuer la valeur vénale de ces capitaux. C'est l'abondance ou la rareté des seuls capitaux circulants qui influe sur le taux de l'intérêt; l'abondance ou la rareté des capitaux fixes n'a pas la même action." Sidgwick, *op. cit.* pp. 283-289, § 4, book ii. chap. vi. "L'intérêt pour chaque unité de capital est limité par son utilité effective, et celle-ci dans chaque cas est déterminée par l'importance absolue du capital sous celle de ses formes qui est la moins nécessaire."—J. B. Clark, *Revue d'écon. pol.*, 4<sup>e</sup> année, No. 3, p. 263.

<sup>1</sup> Cairnes thus describes the successive limitations that are necessary to ascertain the amount of disposable capital: "In other words, we find the amount of AB's investment determined by the following circumstances: First, the amount of his total means; secondly, his character and disposition as affected by the temptation to immediate enjoyment on the one hand, and by the prospect of future aggrandisement on the other; thirdly, the opportunities of making profit."—Cairnes, *Leading Principles*, p. 169, part ii. chap. i. § 8. See also Ricca-Salerno, *Saggio sulla teoria del capitale*, 1877, Milan, Hoepli.

§ 5. *Of the Capitalisation and Uniformity of the Rate of Interest among Open Markets*

Open markets are such as admit of produce and instruments of production passing from one to the other; in other words, markets in which producers of the same wares can compete with one another in prices, reducing them to a level with cost of production, and in which producers of different wares can compete with one another as regards profits, proportioning these, in every branch of trade, to the cost of production. Now it is self-evident that remuneration for the use of capital cannot but be equal in open markets; since capital is attracted wherever it fetches the highest remuneration, with the result that it lowers the rate of interest in the new investments, and raises it in those which are relinquished as being less remunerative. But the fact which deserves to be noted, and which the formula of the "uniformity of the rate of interest" is intended implicitly to emphasise, is that, with respect to capital, there are hardly any other than open markets,<sup>1</sup> which is not the case as regards labour; for capital is more or less the same throughout large areas, consisting as it does of commodities capable of supplying chiefly primary wants, which are more or less the same throughout a large part of the world. Moreover it is in the hands of men of business who realise almost perfectly the type of the *homo œconomicus*, and who therefore know, and take advantage, of every opportunity that presents itself of earning a profit.

Taken in this sense, the above formula is a law of fact for the community of civilised nations possessing means of easy communication and liberal laws.<sup>2</sup> It has however a subtler meaning, inasmuch as it signifies, that the *rate of interest is the same on all investments, estimating their capital value at what it actually is at the given moment*; in which case it is a corollary of the law, that the final degree of utility of direct commodities determines the final degree of utility of the instrumental commodities from which they are derived. In

<sup>1</sup> Cairnes, *Leading Principles*, pp. 60, 66, and 301; Bagehot, *Economic Studies*, ii. p. 41.

<sup>2</sup> See J. S. Mill's *Principles*, book ii. chap. xv. § 4, pp. 248-251.

this acceptation capital means more especially the instrumental commodities in which it is invested, particularly so-called productive commodities, such as land, shares, public stocks, etc. In fact, what the theorem affirms is, that the market value of these productive commodities is commensurate with the income they yield, capitalised at the current rate of interest. If, for instance, a farm yields a rent of 10, and the current rate of interest is 5 per cent, its capital value will be 200; if the rate of interest drops to 2 per cent, its capital value will rise to 500; whilst if it rises to 10 per cent, the capital value falls to 100. If the series of variations of interest were arranged in the form of an *arithmetical* series, the variations of capital value would present that of a *harmonic* series, and *vice versa*.<sup>1</sup> But if this is the law of the value of instrumental productive commodities,—and we already know that it is so, in accordance with Wieser's law (part ii. chap. iii. § 4),—it is clear that the rate of interest must be uniform, because it is a relation between income and capital value, whilst capital value varies continually, so as to be nothing but the income capitalised at the current rate of interest.<sup>2</sup>

This *law of capitalisation* presents a grave problem, both in bookkeeping and in economics, as has been observed by Professor Sidgwick.<sup>3</sup> Suppose a farm yielding a rent of 5, for which 100 was paid when the current rate of interest was 5 per cent, and that the current rate subsequently varies, decreasing, let us say, to  $2\frac{1}{2}$  per cent: in that case the capital value of the estate rises to 200. Is this an increase of wealth for the individual, and for the nation in whose favour such variations of capital value are realised? It may be said, on the one hand, that the individual in question can sell half his farm and yet remain possessed of the same capital value; and on the other

<sup>1</sup> This law was recognised independently by W. Scheibner, Jevons, and Messedaglia. *Vide* Drobisch, *Mittelgrößen*; Jevons, *Investigations*, p. 120; and Messedaglia, *Calcolo dei valori medii*, *Archivio di Statistica*, anno v. fasc. ii. and iv. p. 63 of the extract, Rome, Loescher, 1883. The phenomenon is one we have already touched on in discussing the value of money in relation to the quantity of commodities it purchases, p. 36 *cod. loco*, *vide* part iii. chap. ii. § 4.

<sup>2</sup> J. S. Mill, *Principles*, book iii. chap. xxiii. § 5, p. 393.

<sup>3</sup> Subsequently also by many others, *e.g.* Wieser, *Natürliche Werth*, p. 143. See Sidgwick, *op. cit.* ii. chap. vi. pp. 273, 274.



hand, it may be said, that his permanent command of direct commodities, as indicated by the rent of 5, is unchanged; so much so that, although the sale of half his farm leaves him as before in possession of a capital of 100 in land, it reduces his rent to  $2\frac{1}{2}$ , if he consumes the proceeds of the sale. It is clear that the problem thus presented resolves itself, if generalised, into this other one, viz.: should variations in the rate of interest be considered as merely nominal variations of the capital value of instrumental commodities, or as real variations in the purchasing power possessed by owners of productive commodities? <sup>1</sup> In the case of companies with a capital divided into shares, the question assumes special importance, for if we hold that an increase, or diminution, in the capital value of a company's productive property, in so far as it is due to variations in the current rate of interest, has a merely nominal importance, the dividends must be computed without taking such increase or diminution into account; whereas, if we regard this phenomenon as indicating a change in the amount of the company's assets, the dividends must be increased (or diminished) to the full extent of the difference between the former, and the present, capital value.

### § 6. *Of the Tendency of the Rate of Interest to Stability*

If we suppose the rate of interest to have attained a certain level, determined by the law of demand and the amount of disposable capital at a given time and place, the rate of interest will tend to remain at that level, notwithstanding slight changes in the conditions that determined it; and this because of a certain influence exercised by the rate itself which is described by Professor Sidgwick as *compensatory* or *equilibratory*. In fact, an upward variation in the current rate of interest,

<sup>1</sup> In mercantile practice the following distinction is drawn:—Partnerships and companies which use a considerable portion of their productive capital, such as public stocks, shares, bonds, lands, etc., merely as a guarantee for their engagements, do not take into account the fluctuations of this capital which result from variations in the current rate of interest, and accordingly enter in their accounts either the proceeds only of this capital, or the capital itself, but at cost price. The others, on the contrary, enter every variation in the value of capital to the benefit or detriment of the dividends, and mitigate the effect by means of general and special reserve funds, which are maintained at the expense of the dividends, but which help to keep up the prices of shares.

due to an increase in the demand, must tend to produce a subsequent fall, by furnishing an incentive to increase the supply of capital, and *vice versa*. At all events between a minimum limit (but above zero) and a maximum limit, it appears certain that variations in the rate of interest could not be realised and maintained without occasioning considerable displacements in the amount of disposable capital, in consequence of the reaction of the rate of interest on savings and on productive consumption.<sup>1</sup>

§ 7. *Of Interest in connection with the Value of Money and Discount*

The rate of interest bears no relation to the quantity of disposable money, the rapidity of its circulation, or the existing demand for it as a medium of exchanges, or in other words, to the value or purchasing power of money at a given time or place.

If a hundred pounds will buy a productive commodity, say a certificate of public stock or a house, yielding a return of four pounds per annum, any rise or fall in the value of money, causing the capital value of the productive commodity to vary, acts in the same sense, and in the same measure, on the value of the return. The greater or smaller number of counters which must be used to denote the prices of all commodities makes no difference in the demand and supply of capital.

It cannot however be denied that a variation in the amount of disposable money, and consequently in its value, may temporarily affect the rate of interest, inasmuch as the capital awaiting investment exists in the form of money. Suppose money to be depreciated: this fact will in no way diminish the amount of disposable capital, but as it is offered in the form of money, it will have a smaller purchasing power than before, that is, it will be a smaller quantity of real capital; or conversely, if we consider it with reference to the demand, owing to the rise in prices, the amount demanded will be larger. Hence the rate of interest will vary inversely as the value of money, rising as the latter falls, and *vice versa*. These propositions may be termed J. S. Mill's theorems.<sup>2</sup>

<sup>1</sup> Sidgwick, *op. cit.* p. 291.

<sup>2</sup> J. S. Mill, book iii. chap. xxiii. § 4, pp. 390, 391.

Moreover as regards the relations between discount and interest, the same author shows that their tendency is to vary along parallel lines and in the same direction; for money is *exchanged for every other economic commodity*, and it cannot therefore be supposed that a different price should be paid for the *use of money, i.e. as discount*, than is paid for *the use of any other commodity* whose value is expressed in money, *i.e. as interest*.<sup>1</sup> Nevertheless it is clear that, notwithstanding a necessary parallelism between the variations of discount and of interest under a system of pure economics, capital and money are essentially different, and the market for loans of capital is not the market for loans of money. For the person who wants to borrow capital, money is only a means for procuring it, and is in fact immediately exchanged for those commodities which alone are really efficient in rendering labour more productive.

<sup>1</sup> This does not prevent differences being observed in practice, the principal reason of which is that *interest* is always combined with other elements, especially with *profits*, a form of surplus rent.

## CHAPTER IV

### OF THE VALUE OF NATURAL AGENTS

#### § 1. *Of the Value of Land*

AMONGST instrumental commodities must be ranked many natural agents; most of which, however, exist in unlimited quantity, as compared with the demand, and consequently possess no value. This is no longer the case, in a considerable portion of the world, as regards the natural agent which ranks first with respect to human wants, viz. land; a term (it may be well to remark) which comprises, in economics, more things than are understood by it in its ordinary acceptation; so many, indeed, that it is perhaps impossible to enumerate them. Suffice it to say generally, that land signifies the soil which is essential to the processes of vegetation, all useful mineral substances found beneath the surface of the earth, all those useful forces of nature that are manifested in connection with the land, and even those complex conditions or states of things, by reason of which we are made aware of their reciprocal *position* or *situation* in space, *i.e.* of their respective distance from one another and from ourselves.

The value of land, like that of every other instrumental commodity, is computed by estimating the final degree of utility of the least valuable product derived from it, and by determining the extent to which this degree would be affected by the absence of the land from the combination with other complementary commodities to which the product is due. In a state of society where capital exists, the value of land is obtained by capitalising, at the current rate of interest, the

net rent of the land. A piece of land which yielded no rent, *i.e.* the use of which could not be sold, would be valueless.

Supposing on the contrary a stage of economic development anterior to the creation of capital, but in which nevertheless the extent of available land falls short of the demand, its value will be determined by multiplying the rent, in accordance with the rule of Ortes (part i. chap. iv. § 6), by the coefficient which denotes the value we attach to a permanent source of future income, of a given amount, as compared with present commodities. This coefficient will of course be very different in the respective cases of an individual and a tribal egoist (part i. chap. ii. § 3), for *the period during which either of them will wish to know that his future wants are provided for, will be very different.*

Besides being an instrumental and complementary commodity, land is in many cases a direct complementary commodity, and sometimes, too, simply a direct commodity. In these respects it naturally follows the common laws of value for direct commodities, *i.e.* it has an independent final degree of utility, which the parties concerned perceive or realise in individual cases.

As the value of land, as an instrumental commodity, depends on the rent it yields, that is the economic phenomenon which has always attracted the attention of economists.

## § 2. *The Statical Theory of Ricardo's Law of Rent*

The law of Rent, in the form given to it by Ricardo, consists of three distinct theories, *viz.*: an *historical theory* as to the origin of Rent, a *statical theory* as to the causes that, at any time and place, determine the nature and utility of Rent, and a *dynamical theory* of the causes which continually tend to increase Rent.<sup>1</sup>

Of these three theories, only the last two relate to questions of pure economics; nevertheless incidentally we shall give some account of the first as well.

*The statical theory of Rent* is adduced to explain the existence in certain branches of industry of a permanent

<sup>1</sup> Sidgwick, *op. cit.* book ii. chap. vii. p. 304.

surplus value in the produce.<sup>1</sup> Let the following conditions be assumed as premisses: 1st, That equal units of the same product, of uniform quality, fetch the same price, at the same moment, in the same market,—this premiss being nothing else than Jevons's well-known law of *indifference* (part ii. chap. iii. § 1). 2nd, That equal quantities of instrumental commodities, each combined with equal quantities of complementary commodities of the same quality, yield different quantities of the same product, if the quality be equal, or different qualities, if the quantity be equal. In other words, a different cost of production is postulated for equal portions of the same product; which premiss may be simply assumed, or may be taken to be a real condition due to the law of decreasing productivity (part ii. chap. iii. § 6). In fact, supposing an industry subject to this law, a first portion of capital invested in it will yield a determinate product, a second, a less product, and the third, one still smaller. We then have an instrumental commodity combined with three equal portions of a complementary commodity, which in each combination yields a quantitatively different product, the quality being the same. 3rd, That the quantity of produce derived from the most fertile or productive instrumental commodities (or the quantity of produce which may be obtained at the least cost) is inferior to the demand. This premiss means that the price of the produce must be at least such as to remunerate even those producers whose cost of production exceeds that of the rest; or that it must be equal to the maximum cost of production, in order that there may be a hedonic incentive to produce the required amount. This premiss is simply postulated, for there is no law from which it necessarily follows, that the demand for a commodity must be of such magnitude as to exceed the production of the instrumental commodities of first quality, and to render it necessary to have recourse to the produce derived, or obtainable, from instrumental commodities of second, or still lower, quality.

Given these three conditions, Rent is a necessary phenomenon, consisting in the difference between the profits earned

<sup>1</sup> Cairnes, *Logical Method*, lect. viii. p. 653. One of the best works on all questions relating to Rent is Loria's *La Rendita fondiaria e la sua elisione naturale*, Milano, Hoepli, 1880.

by the owners of the most productive instrumental commodities,<sup>1</sup> and those earned by the owners of the least productive instrumental commodities that are yet employed in production in order to meet the existing demand; or in the difference between remuneration and cost obtained by all those who produce at a less cost than the maximum yet covered by the price.

Ricardo has given the best possible illustration of this theory. Suppose lands similarly situated, but of various degrees of fertility, to be cultivated at the same time; and let them be of three qualities, so that, *at an equal cost*, the first quality will yield a produce of 100 quarters of corn, the second of 80, and the third of 60. Let us suppose also that the total produce of these three qualities of land, *i.e.* 240 quarters, is required by the only available market, *i.e.* that the price paid for corn by the consumers in this market makes it still just remunerative to cultivate the land which only yields sixty quarters, at the same cost as is required for the cultivation of the other two portions of land. Further, let us suppose that the cost of cultivating the worst land that is still cultivated amounts to £45, or fifteen shillings per quarter; and let this be at the same time the price of corn. As there can only be one market price, the produce of the three portions of land will be paid for at the same rate; thus the person who has grown 100 quarters will receive in return for his trouble a hundred times the price of the unit of measurement, *i.e.* £75; the person who, at the same cost, grows eighty quarters will obtain a return of eighty times the unit of measurement, *i.e.* £60; and the person who grows the sixty quarters will obtain sixty times the price, *i.e.* £45. But if the cost to which the three producers submit is the same in each case, and is sufficiently compensated, in their estimation, by a return of £45 for sixty quarters, it follows that the person who obtained £60, *i.e.* eighty times the unit of measurement, must consider his return as divisible into two parts, *viz.*: a first part of sixty times the price, which

<sup>1</sup> Those commodities are most productive which, owing to whatever condition, yield the largest mass of utility to their owner. Rent may therefore be due to the action of many forces. Bonamy Price, *Practical Political Economy*, 2nd ed. p. 351.

constitutes the remuneration strictly necessary to induce him to submit to the cost, and a second part of twenty times the price, constituting a *surplus profit*, called *rent*. And, *a fortiori*, the person who obtained a hundred times the price of the unit of measurement will divide the return into sixty times the price, which amount covers the cost, and into forty times the price, which sum constitutes rent. The total amount of rent yielded by the three lands will then be determined by multiplying the sum of the twenty and forty measures by the unit of price.

Even without working out the return in money, we may say that a hedonically constituted person, who cultivates three equally-sized portions of land, which yield, at an equal cost, 100, 80, and 60 quarters of corn,—240 quarters being the amount he needs,—will attribute to the sixty quarters derived from the least fertile soil, a final degree of utility equal to the final degree of negative utility of the cost; and consequently he will consider the extra twenty quarters obtained from the second portion of land, and the extra forty yielded by the third as a surplus produce, or rent.<sup>1</sup>

The difference in the productiveness of three lands such as those supposed, may be determined either by *differences of fertility*, or by *differences of accessibility*, i.e. of *proximity to the market*; so that the fertility being equal, the cost of production, including the placing of the goods on the market, will be graduated. But we may have the phenomenon of rent in the cultivation of a single piece of land, *in consequence of the law of decreasing productiveness*. This case, though not expressly mentioned by Ricardo, is quite obvious. In fact, suppose a single portion of land and a single producer; and let a first portion of capital invested in his land yield him a return equal to 100, a second portion,—in consequence of that law—only a return equal to eighty, a third a return equal to sixty, and let this last amount be the minimum remuneration he considers hedonically equivalent to the capital he has sacrificed (part i. chap. iv. § 10). Then

<sup>1</sup> If we suppose three persons to cultivate three portions of land, the natural fertility of which is graduated as 100, 80, and 60,—and that these three persons are constituted, hedonically, alike,—they will not submit to *equal costs* in order to obtain returns at the respective rates of 100, 80, 60; but will, on the contrary, procure *equal returns*, i.e. each equal to 60, submitting to different costs.



the extra amount obtained by the first two investments, viz. forty by the first, and twenty by the second, are rent.

Rent is therefore said to have three possible efficient causes, viz.: (a) differences of fertility in lands cultivated at the same time; (b) differences in the distance of the lands cultivated from the market,—such distances to be reckoned not topographically, but in terms of cost of carriage; (c) decreasing productiveness of the capital invested in the same land for the same purpose.

Abstracting from the law of indifference, rent, according to what has been said above, is due to the concurrence of two conditions, viz.: (a) that the supply of instrumental commodities of the first quality, or maximum productiveness, should be less than the demand; (b) that the law of decreasing productiveness should exist, *i.e.* that the products derived from the instrumental commodities of the first quality should have a higher cost of reproduction. In view of these conditions, we may formulate this law: *Rent is not the cause, but the effect, of high price.*<sup>1</sup> In fact, the person who produces 100 quarters at a given cost, whilst another whose produce is of a quality that is still in demand, only produces 80 at that same cost, and a third only produces 60, receives a rent of £40, and the second a rent of £20, if the price per quarter is twenty shillings, and just suffices to cover the expenses of the one who produces 60, together with the interest on his capital and remuneration for his labour, amounting in all to £60. But the price per quarter is not twenty shillings, *because* the rents are £40 and £20; it is the amount of the rents that is determined by the price; and the price is twenty shillings per quarter, because if it were not, then the individual who produces only 60 quarters, at the same cost at which others produce 80 and 100, *would leave off producing*, and the supply

<sup>1</sup> Ricardo, p. 51. A. Smith, *Wealth of Nations*, 1892, p. 115: "Rent, it is to be observed, therefore, enters into the composition of the price of commodities in a different way from wages and profit. High or low wages and profit are the causes of high or low price; high or low rent is the effect of it. It is because high or low wages and profit must be paid, in order to bring a particular commodity to market, that its price is high or low; but it is because its price is high or low, a great deal more, or very little more, or no more, than what is sufficient to pay those wages and profit, that it affords a high rent, a low rent, or no rent at all."

of corn no longer satisfying the demand of the market, the price would rise until it again became remunerative for the third producer. It is therefore the cost of his production,—which is still necessary—that regulates the price and enables the others to obtain a rent.

Can there be a rent apart from qualitative differences in lands cultivated at the same time?

Let us suppose that there are only instrumental commodities of the first class,<sup>1</sup> *i.e.* lands which, at a given cost, produce 100; and that these lands are *less in amount than the demand*. It is clear then that the only limit to the price of the produce consists in the comparative degrees of final utility of these and of other commodities for consumers, or, as we usually say, the demand forms the only limit to price. But the price obtained over and above the reimbursement of cost, is termed a *surplus profit*. Now let us suppose that in addition to the former, there come into existence instrumental commodities of the second class, that is lands which, at the same cost, produce only 80, and let these be unlimited in quantity. It is obvious that now the former lands will yield a surplus profit limited, no longer by the demand alone, but by *the cost of reproducing the products obtained from them, on the inferior lands*; they will therefore yield a rent in kind of 20. This rent will be the same surplus profit as before, only reduced in amount, *i.e.* it will be a qualified surplus profit. If the demand for their produce grows to such an extent that the available amount of instrumental commodities of second quality comes to be limited, these, equally with those of first quality, will yield a surplus profit which will again be *limited solely by the comparative degree of final utility of their produce and of the other products that are in demand*. Let us now suppose that instrumental commodities of the third class come into existence, *i.e.* lands that are still less fertile, and that, in return for an equal cost, yield only 60. These in turn will determine a *cost of reproduction which will limit the surplus produce* of the instrumental commodities of the two preceding categories, the owners of which respectively

<sup>1</sup> A. E. Cherbuliez, *Précis de la science économique*, Paris, Guillaumin, 1862, p. 483; Mathieu Wolkoff, *Opuscules sur la rente foncière*, Paris, Guillaumin, 1854, p. 5.

will now receive rents of 40 and 20. Hence it is obvious that rent is only a *qualified surplus produce*, and that it is due to the *scarcity* of instrumental commodities of superior productiveness.<sup>1</sup>

If a surplus produce is realised in the case of instrumental commodities of the same class existing in a limited quantity, so that it has no limits save in the comparative degrees of final utility, or as Ferrara puts it, the economic cost of reproduction, or as it used to be termed, the demand of consumers, it is also said to be the result of a *monopoly*, a most inappropriate term by which to express the relation between demand and disposable quantity. As soon as an inferior instrumental commodity comes into competition with a pre-existing one of superior quality, so that the surplus produce of the latter is limited by the cost of reproduction<sup>2</sup> of the former, *the surplus produce is called rent*. As to whether it is the effect or cause of price, it is clear that, even in the case of there being only one class of instrumental commodities, it may always be said that surplus produce is the effect of price, for even if the owners of the scarce instrumental commodity were to decline it, which would be antihedonic, it would still exist in the shape of the reduced price paid by consumers; for it is in the nature of things,<sup>3</sup> and is not due to the will of the parties.

Just as rent, or surplus produce, may be exhibited in the case of a single class of instrumental commodities, *e.g.* lands of the same quality, provided the amount of such commodities be inadequate to the *demand*, so too it may be realised, when there are several classes of instrumental commodities, in the case of the *least productive instrumental commodity, provided the demand for the product due to these instrumental commodities is greater than the disposable quantity*, and hence that the price of the product is greater than the cost of production, but yet not so much as to make it remunerative to fall back upon a

<sup>1</sup> Sidgwick, *op. cit.* p. 298. See Ferrara's *Prefazione al Carey, Biblioteca degli econ.*, tome xiii. p. xliii. : "Rent arises apart from the competition of different lands."

<sup>2</sup> Recent German writers use the term *Substitutionswerth*, which appears to be nothing else than Ferrara's *cost of reproduction*. See the *Teorica dei succedanei* in Minghetti's *Dell' econ. pol.*, book ii. p. 110, note.

<sup>3</sup> *i.e.* in the relation between two FACTS: the demand, which has given dimensions, and the supply, which likewise has determinate dimensions.

class of instrumental commodities of yet inferior productiveness, if such there be, or to induce people to use some substitute in lieu of the product. This rent which may be yielded, say by lands of the lowest quality that are yet cultivated, should rather be called a *surplus produce*, if the name of "rent" is denied to the surplus produce that may be yielded even by instrumental commodities of one class.<sup>1</sup>

As regards the law of the variation of rent, Ricardo suggested the hypothesis of a rise in the price of commodities, *i.e.* of the produce derived from the instrumental commodities of various fertility that were employed, and of this rise being due in turn to an increase of the population, that is of the demand for food. In this way he explained the rise of rent, by supposing that the increased demand covered the cost of production on lands less fertile than the worst that had till then been cultivated; and *vice versa*, he explained the fall of rent, as due to some agricultural improvement (that is, to a reduction of the maximum cost of production) making it possible to produce the same amount as before, whilst cultivating a smaller extent of land, the population remaining stationary.<sup>2</sup>

These hypotheses must be allowed to constitute sufficient causes to determine a variation of rent in the precise sense indicated by Ricardo. It must however be observed: (a) that they do not constitute the only possible combination of causes that may determine a variation of rent; (b) that probably they would not really be found to exist in the combination supposed. In fact, as regards the first point, it is clear that just as an increase of rent may be occasioned by a rise in the prices of the produce of land, if the cost remains the same, so too an increase may be realised, *if the prices of the produce remain stationary, whilst the maximum cost of production falls*, and

<sup>1</sup> The possibility of rent being derived from the lands of lowest quality still under cultivation was noticed by J. B. Say in his Note to Ricardo, p. 52. Cherbuliez, vol. i. book iii. chap. i. sec. 2, § 1, p. 409. If the surplus produce from lands of lowest quality, which is theoretically possible and has probably been realised hundreds of times in close markets, is admitted to be rent properly so called, then the surplus produce that land of one uniform quality may yield when its quantity is short of the demand, is also rent, and there is an end to the distinction some have made between rent and many forms of surplus produce.

<sup>2</sup> Ricardo, *op. cit.* pp. 53-56.

*vice versâ*.<sup>1</sup> Now all progress of the technical arts produces reduction of cost (for that is precisely what it consists in), and the value of the produce may, notwithstanding the reduction of cost, remain stationary, if there is an increase of the demand due to an increase of population. This explanation of rent, *which is fully as adequate as the former*, supposes a combination of causes that is easily realised. For, to touch on the second point, Ricardo's combination supposes that the increase of population *precedes* the increase in agricultural production, and is indeed the *cause* of the latter, whilst the other explanation, which is due to Thorold Rogers,<sup>2</sup> supposes that the progress of agricultural improvements determines a larger production at an equal cost (or an equal production at a less cost), which is neutralised by a *subsequent* increase of the population, so that there is no diminution in price.<sup>3</sup>

It must be observed, that if the prices of produce increase, whilst the cost remains stationary, as also if the cost diminishes, whilst prices remain stationary, rent rises owing to a *twofold cause*. A rise in the prices of produce has the effect of making a smaller amount suffice to cover the maximum expenses of production, so that a larger quantity of produce remains available as rent. But if prices have increased, each unit of that quantity of produce which constitutes the rent is worth more than it was before. Conversely, if prices fall, the rent diminishes owing to the action of a twofold cause.

The theory of rent may nowadays be stated in a more accurate, general and concise form, which we borrow from Signor Pareto, and which is as follows:—The price which we pay for the use of land differs in no way from the price payable for whatever capital, say, an engine. After having restored the land or the engine, in the same

<sup>1</sup> Cairnes has formulated these two possibilities in the following elegant theorem: *Given the price of agricultural produce, economic rent will vary directly as the productiveness of agriculture; or, given the productiveness of agriculture, rent will vary directly as the price of produce.*

<sup>2</sup> This theory was really originated by Richard Jones: *An Essay on the Distribution of Wealth*, London, Murray, 1831, p. 283.

<sup>3</sup> Rogers, *Six Centuries of Work and Wages*, 2nd ed., 1886, p. 482. Also his *Manual of Political Economy*, 3rd ed., pp. 152 to 168; Shadwell, *op. cit.* p. 197.

condition in which they were received, we pay a certain sum in addition, only because these capitals exist in a smaller quantity than the demand, *i.e.* they are economically rare. What distinguishes the case of the land from that of the engine is that savings earned by the use of the latter may be easily and rapidly invested in other engines, which cannot usually be done in the case of land, or only at such prices as to be no longer advantageous.

In order to make it clear how it is, that capitals existing in a quantity that admits of no increase produce a rent, let

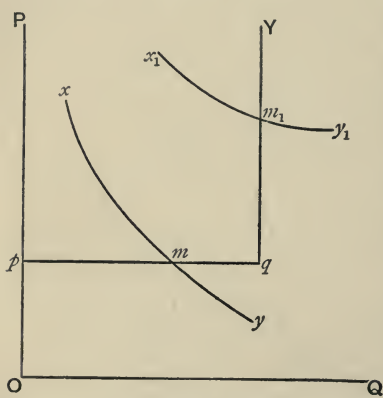


DIAGRAM XLIX.

us suppose a colony in which lands are at first abundant, but are ultimately all occupied. In order to simplify the argument, let us suppose lands of the same degree of fertility. Let  $OQ$  (diagram XLIX.) denote the quantity of land, and  $OP$  the rents that are paid. Let us suppose that to till the land involves an expense equivalent to a rent  $Op$ . At the price  $Op$ , as much land can be had as  $as$  is wanted, as long as the quantity  $pq$  lasts. Afterwards the quantity of land remaining the same, only the price will vary. The supply of land will therefore be denoted by  $pqY$ . So long as the demand is denoted by a curve like  $xy$ , which cuts  $pq$ , the price, *i.e.* the rent, will be constant, and only the quantity ( $pm$ ) of land which will be cultivated will vary. But if the demand were to increase in the measure denoted by  $x_1 y_1$ , which cuts  $qY$  in  $m_1$ , all the available land will have been occupied, and only the price, denoted by  $m_1$ , will vary.<sup>1</sup>

<sup>1</sup> See V. Pareto, *op. cit.* §§ 759, 760. This author also explains why it is erroneous to say that *price is the cause of rent*, or that *rent does not enter into cost of production*. §§ 766 and following.

### § 3. *The Dynamic Theory of Ricardo's Law of Rent*

The static theory of rent has shown us, that rent necessarily increases if, *ceteris paribus*, an increase of the population and the public wealth is supposed. Now, Ricardo opined that, in consequence of this, rent *must* tend to increase, such tendency being neutralised only by the progress of the technical arts.<sup>1</sup> The dynamic doctrine of rent supposes, as a fact, that population has a constant tendency to increase more rapidly than the means of subsistence; which premiss is called Malthus's law<sup>2</sup> of the increase of population, and is in its turn intimately connected with the law of decreasing productiveness.

In fact, Malthus's law consists of two cardinal propositions, the first of which asserts, that if individuals were to marry as soon as they are of a marriageable age, and if they were not decimated by vice and poverty, and did not artificially avoid the procreation of children, the population would be doubled every twenty or twenty-five years. The second proposition asserts, that the law of decreasing productiveness being what it is, economic productiveness could not, after the population had attained a certain limit of density, keep pace with the potential birthrate; and that this deficiency acts as a check on the tendency to multiply the race more rapidly than the growth of the means of subsistence. The operation of this check is attended by much suffering which can, and should be, artificially alleviated.

It is easy to understand how the increase of rent is

<sup>1</sup> Whilst the static theory makes a hypothesis, the dynamic theory affirms the hypothesis as a reality.

<sup>2</sup> The static law of rent had been expounded by other writers before Ricardo, particularly by Malthus in 1815, to whom Ricardo refers in his preface. Moreover Anderson formulated it with great precision in 1777, in a monograph of merely passing interest, and the celebrated Serra noticed it in 1613 in his *Breve trattato delle cause che possono fare abbondare li regni d'oro e d'argento*, part i. chap. iii. p. 24, Ed. Custodi, Parte Antica, tome i. vol. xlii. Similarly Malthus had many predecessors, notably the Swiss physician Herrenschand in his *Discours fondamental sur la population*, 1786 (translated from English into French in the third year of the Republic), and Ludovico Ricci of Modena, who wrote in 1787 on the reform of the charitable institutions of his town. See also Ortes, *Riflessioni sulla popolazione delle nazioni per rapporto all' Econ. Naz.*, Collez. Custodi, vol. xxiv. chap. i. p. 23.

explained by supposing the population to be constantly increasing, for this circumstance necessitates less fertile lands being brought under cultivation than those which had till then been utilised. It should be observed, that by demonstrating inductively that prices of agricultural produce have risen wherever population and wealth have increased, we do not demonstrate the truth of Ricardo's law; since it may be—and is actually the case as we have already seen in demonstrating the static theory—that another hypothesis will equally explain that fact. Similarly, by demonstrating inductively that prices of agricultural produce have remained stationary throughout extensive districts, we do not refute the same law, which admits that the tendency of population to increase, and consequently of prices of agricultural produce to rise, may be neutralised by the progress of the technical arts; and this would be said to have occurred, in accordance with that law, in view of the fact of prices remaining the same.

In fact, inductively and with the aid of history and statistics, on this question, as on almost every other economic question until now, no final conclusion has been arrived at, one way or the other. On the contrary, *à priori*, it may be held that whilst population may increase more rapidly than the production of many kinds of produce, it cannot increase without an antecedent increase of the produce on which the sustenance of the human race mainly depends. In the event of a sudden increase of population taking place,—which may occur locally, as *e.g.* through immigration,—it becomes necessary to recur to inferior lands. But even this phenomenon presupposes a supply of food that will suffice until the production is increased. As a general and normal phenomenon, the preparation of food must precede the increase of population, in accordance with the law of Ortes (part iii. chap. iii. § 1), and therefore increments of population do not determine the supposed rises in price of alimentary produce, nor the consequent rise of rent. Hence in formulating the dynamic law of rent, instead of saying with Ricardo, that because land which yields only 84 quarters is cultivated, therefore land that yields 105 quarters produces rent, we should rather say that, owing to the progress of agricultural improve-



ments, it is possible to obtain 105 quarters from land that yielded formerly only 84, and more than 105 from land that previously yielded that amount, and that these increments in productiveness become rent because the increase of population rendered possible thereby prevents the fall of prices.

#### § 4. *Historic Theory of Ricardo's Law of Rent*

The historic theory maintained by Ricardo, as we have already remarked, possesses no doctrinal importance; it must however be noticed briefly, both having regard to the fact of its having been propounded by so eminent a thinker, and because it is in harmony with the two theories already explained. It may be summed up in the formula that: the human race, having always cultivated land only from hedonic motives, have always confined themselves, in the first instance, to those lands which, *having regard to the technical knowledge and appliances*, and generally to *the resources, available for the time being*, and considering the *kind of wants* that required to be satisfied, yielded the largest return in proportion to cost.

It must be borne in mind, that the fertility of land can only be discussed *with reference to some particular kind of produce*, a point Ricardo emphasised by considering it with reference to only *one kind*, viz. wheat. This being so, Ricardo's theory is not disproved by demonstrating inductively, that with the progress of civilisation and the consequent changes in human wants, sandy soils have come to be more valued than heavy soils, or *vice versâ*. It must further be borne in mind, that the fertility of any soil is always relative to the means available for cultivating it; or in other words, that the maximum fertility consists in the maximum difference between production and cost. Hence Ricardo's theory is not refuted by proving inductively that lighter and less fertile soils were cultivated first, and that the cultivation of richer soils was undertaken only when the technical arts were more advanced, and capital and labour more abundant. Indeed that argument confirms his theory, inasmuch as it proves that the lighter soils were cultivated before the others, because the cost involved in tilling them was so much less than would have been required, at that time, to cultivate the richer soils:

that the net produce of the former was more than that of the latter.<sup>1</sup>

### § 5. *Of Profits as Rent—Mr. F. Walker's Theory*

Ricardo's law of rent applies very widely, but the precise limits of its scope are still a matter of controversy.<sup>2</sup> In any case among instrumental commodities that are natural agents existing in extremely limited quantity, must be ranked the aptitude for various kinds of work, and among these the capacity to conceive, direct, and carry out industrial and commercial undertakings. It was noticed already by J. S. Mill that agricultural productions are not the only commodities which have several different costs of production at once, but that even fisheries, unless in the open sea, exhibit phenomena of rent, and that mines are also an instance. But what is most remarkable is that extra profits similar to, or identical with, Ricardo's rent are exhibited in the case of legal monopolies, such as are created by the grant of patents, or of natural monopolies consisting in the special aptitudes of mind, or character, or physique of the workers. "The extra gains which any producer or dealer obtains through superior talents for business, or superior business arrangements, are very much of a similar kind."<sup>3</sup>

This theory has been developed by Mr. Walker, so as to form a special *theory of profits*,<sup>4</sup> which should be called by his name. An *entrepreneur* usually contributes to the success of an

<sup>1</sup> On this subject see the minute and accurate study of Mr. F. Walker, *Land and its Rent*, chap. ii. p. 37.

<sup>2</sup> A. Loria, *Rendita fondiaria*, pp. 145-164, E. Nazzari, *Saggi di econ. politica*, Milano, Hoepli, 1881, No. 2, p. 3. Those who limit the phenomenon of rent most, admit its existence in agriculture and in the extractive industries, which are subject to the law limiting the productiveness of capital and labour; but not in manufacturing industries, save in so far as these make use of natural forces connected with the soil.

<sup>3</sup> J. S. Mill, *Principles of Political Economy*, p. 290; A. Marshall, *Pure Theory of Domestic Values*, chap. ii. § 5, p. 29: "The increased wage may be regarded partly as a rent of scarce personal qualities"; A. Schaeffle, *Die Nationalökonomische Theorie der ausschliessenden Absatzverhältnisse*, Tübingen, Laupp, 1867, iii. iv. v. vii.

<sup>4</sup> F. Walker, *Political Economy*, pp. 247-257; *Quarterly Journal of Economics*, April 1887, vol. i. No. 3, p. 256, vol. ii. No. 3, p. 263; A. Marshall, *Economics of Industry*, p. 144.

industrial undertaking in a variety of ways, which may however be summed up under two heads:<sup>1</sup> his contribution to the capital of the undertaking, and his contribution to its labour. In his capacity of a capitalist, he must receive out of the returns of the business the current rate of interest, if the partnership is regulated by strictly hedonic principles; but such interest is not necessarily part of his remuneration, for he may also work only on account of others. If he is a capitalist, he necessarily bears the risk of the undertaking, and he will not incur this risk if the market is not such that the prices of products leave a sufficient margin to cover it during a longer or shorter series of years. But even if he is not a capitalist, he may have undertaken the risk under a contract *à forfait* or *per aversionem*, in which case he would pay a fixed sum to the capitalist and the workmen, reserving to himself the proceeds, large or small, of the undertaking. Mere compensation however for the risk of an undertaking cannot constitute a *normal source of rent*; for if this compensation has been estimated strictly in proportion to the risk, it must, on an average for a number of years, be exactly equivalent to the latter, so that the net rent left would be equal to zero; whilst, on the other hand, if the compensation is not commensurate with the risk, it is anti-hedonic in its origin, the disproportion being due to ignorance as to the frequency and magnitude of the risk. It is thus apparent that only his share in the undertaking as a worker can be a normal source of rent to an *entrepreneur*, and the character of this work is deserving of attention. In the first place, it involves the discovery or devising of undertakings, that is, the labour of seeking out opportunities for the profitable investment of capital and employment of labour. This presupposes an accurate knowledge of the conditions of the markets of capital and labour, *i.e.* of the current prices of both; a knowledge of the least costly technical processes by means of which the projected product can be obtained; and

<sup>1</sup> "Il n'y a que deux titres dans notre société qui confèrent un droit au partage : ou bien fournir son travail personnel, ou bien fournir un instrument du travail, terre ou capital. L'entrepreneur peut invoquer soit l'un, soit l'autre de ces deux titres, plus fréquemment même tous les deux à la fois, mais il ne saurait en invoquer un troisième, car il n'en existe pas."—Ch. Gide, *Principes d'écon. pol.*, Paris, Larose, 1884, liv. iv. chap. i. § 3, No. 4, p. 519.

a very nice estimate of the prospective value of the projected product, as compared with the present value of the instrumental commodities which the technical process fixed on requires to be employed, and consequently to be diverted from other uses in which they would also have final degrees of utility. It is further necessary, that the *entrepreneur* should not only carry out his scheme in conformity with his estimates, which entails a certain, and sometimes a considerable, amount of physical activity; and in addition to this he must, whilst the work is in progress, revise his estimates from time to time, in order to adjust them to the fluctuations in value that occur, either in the markets from which he obtains his implements, or in those in which he proposes to sell his produce.<sup>1</sup>

This being premised respecting the functions of *entrepreneurs*, let us suppose a close market in which there are a certain number of contractors having a monopoly of industrial or commercial undertakings; and this whether the monopoly be determined by a natural condition of things, *i.e.* by the fact of their alone possessing the requisite natural capacity, or by customs or laws conferring an exclusive privilege.<sup>2</sup> Let us suppose further that the natural capacities of all the *entrepreneurs* are in all respects equal. What share of the profits of the undertakings will they be able to command? If the *entrepreneurs* are few, and act together as one man, it is obvious that their services will command a price limited, like that of any complementary instrumental commodity which can neither be reproduced nor replaced, and which is at the same time absolutely necessary for the production of a given class of commodities, by the final degree of utility of these, compared with the final degree of utility of the price, *i.e.* as it is usually termed, by the demand. But if, instead of being few, the *entrepreneurs* are so numerous as to be unable to create a monopoly of their services, and rather compete against one another, then it is clear that the price of their services will fall to a point at which they will find it more advantageous to make some other use of their capacities for work, or at which,

<sup>1</sup> On the functions of the *entrepreneur* see a most brilliant analysis by W. H. Mallock, *Labour and the Popular Welfare*, book i. chap. v. p. 138 *et seq.*, and a mathematical analysis by E. Barone, *Studi sulla distribuzione*, besides Pareto, vol. ii. §§ 705-725.

<sup>2</sup> *Quarterly Journal of Economics*, April 1887, p. 269.

in other words, their services are the cost of reproduction of another price; or to express this proposition, in terms we have used before, the complementary instrumental commodity they dispose of has a different final degree of utility, in the three alternatives of its being a complementary commodity in other combinations, an instrumental commodity for other purposes, or a direct commodity. If no such point or limit existed, the remuneration of their services might, on the above hypothesis, fall to a limit at which it would barely suffice to maintain the requisite number of *entrepreneurs*, and to stimulate the development in them of the qualities demanded by the market.

We have, however, a downward limit to the price of their services, albeit a much higher one than the lowest limit just mentioned, in the possibility there is for the *entrepreneur* to offer his services in the labour market, *i.e.* in the current rate of wages. In this way, on the same hypothesis, profits must come to be effectually equalised, for the competition between *entrepreneurs* would prevent any price being obtained above that rate. If profits were cut down to this limit, they should be called *wages*, and should, as profits, be considered as nil.<sup>1</sup>

Now, varying our hypothesis, and supposing a difference in the respective aptitudes of the *entrepreneurs*, what will the consequence be, as regards the prices of their services? Let us suppose, in the first instance, two individuals whose productive capacity is expressed in terms of two indices, say the capacity of one by an index of 10, the capacity of the other by an index of 20. If it is worth a capitalist's while to pay thirty shillings a week to the first, it will be equally worth his while to pay sixty to the second. Both offer a complementary instrumental commodity, but the efficiency of the commodity offered by the first is only equal to half the efficiency of the commodity offered by the second. It is obvious that, if the second were content to offer his labour at thirty-one shillings, every one would prefer him to the first; and this would still be the case if he offered it at thirty-two shillings; and so on, up to sixty shillings per week. Supposing a society constituted on hedonic principles, the price of the labour of either individual could not but be in the direct

<sup>1</sup> *Quarterly Journal of Economics*, April 1887, p. 271. See *contra* F. Y. Edgeworth, *Journal of the Statistical Society*, Dec. 1889, p. 565. ‡

ratio of the efficiency of his work. Let us now suppose two individuals who, instead of offering their own labour, purchase the labour of others, but possess *different capacities for utilising it*, and combining it with instrumental commodities, and thus promoting the success of an undertaking. Let the first, though paying the same wages and the same interest as the second, be able to earn a net profit expressed by the index 10, whilst the other, under the same conditions, earns a net profit of 20. Evidently each of them will succeed in obtaining this net profit, as there is no economic force in operation to deprive either of them of it for the benefit of others. It is just as if two farmers, cultivating the same soil, with the same amount of capital, and paying the same wages, were nevertheless, owing to the superior technical and industrial skill of the one as compared with the other, able to obtain different returns from the land; say the one a return equal to 10, the other, one equal to 20. To the landlord both tenants would pay *the same Ricardian rent, since he would have no means of obliging the more skilful tenant to pay a higher rent*; so that the latter would retain the proceeds of his superior skill or productive efficiency. Now, if in conformity with the hypothesis we are considering, the *entrepreneurs* in a close market are classified, with respect to the efficiency of their labour, so as to range from a lowest class that only receive the current rate of wages up to classes exhibiting a superlative degree of productive efficiency, the prices of products must conform to a level sufficient to cover the cost of production of that portion of the products which is obtained under the most disadvantageous conditions; and amongst these elements of cost must be ranked the labour of the least skilful and productive *entrepreneurs*. But then the most skilful ones, after having paid, *cæteris paribus*, the same rent, the same interest, and the same wages as the others, will have a larger produce in hand, which they can sell at the same units of price as the produce of the less efficient *entrepreneurs*; in other words, they will have an extra profit, in all respects similar to that of the owner of land endowed with a superior degree of fertility. That this extra profit, or rent, is not derived either from interest or wages, is evident if we consider that the most skilful *entrepreneur* can

*a fortiori*, pay the same interest and wages as the least skilful, and that competition will compel him to do so.<sup>1</sup> Such profits must therefore be attributed to the different capabilities of individual contractors,<sup>2</sup> and it is probable that they will increase, or at least that they will not diminish, with the advance of civilisation; for the demand for such services grows as technical processes become more subtle and complex, and as markets become more extensive, whilst there is no apparent reason to expect an increase of the supply.

<sup>1</sup> *Quarterly Journal of Economics*, April 1887, p. 277.

<sup>2</sup> Profits may also be due to superior skill acquired by more assiduous study or prolonged training. In that case, we have to do, not so much with a form of rent, as with a capitalistic profit, which may be very remunerative, but is subject to a very different law from that regulating the investment of capital. As, with the advance of civilisation, education is diffused, it is probable that this source of profit will tend to decline. Here we must at all events observe that the contractor may, in view of his personal abilities, be regarded as an instrumental commodity in which capital has been invested, and may, on this account, obtain an altogether different remuneration from that we have hitherto discussed under the name of profit.

## CHAPTER V

### OF THE VALUE OF LABOUR

#### § 1. *The Premises of the Theory of Wages*

FOR the person engaged in it, labour is an evil, *i.e.* a negative commodity, and can only possess a *negative value*; the labour of *others*, on the contrary, is a direct,<sup>1</sup> or an instrumental commodity,<sup>2</sup> *i.e.* a positive commodity susceptible of various uses. If we like, we may even consider labour as being always an instrumental commodity;<sup>3</sup> but we must then distinguish the cases in which a direct utility is its immediate result, from those in which it is more remotely instrumental, its immediate effect being at most the production of a commodity, the effects of which in turn possess direct utility.

I. In the theory of wages<sup>4</sup> abstraction is made from labour that is a direct commodity—or that is an instrumental commodity so proximate to a direct commodity that the latter is its immediate effect;—for the law of value does not present, with respect to such labour, any difficulties that are

<sup>1</sup> *e.g.* the labour of the surgeon who sets a dislocated arm, or that of a valet who assists his master to dress, or that of a barber who shaves a customer, or that of a public singer who entertains an audience.

<sup>2</sup> *e.g.* the labour of a mason who takes part in building a house, that of a farm-labourer who takes part in the cultivation of the soil, that of a tailor who makes his customer a coat.

<sup>3</sup> As, for instance, if we regard the surgeon's labour merely as the means of procuring for us the good which consists in having our arm set, etc.

<sup>4</sup> It is perhaps advisable to note that we must distinguish between *nominal* and *real* wages. Nominal wages are the sums of money received by a labourer for a given piece of work; real wages are the quantities of direct commodities that he can obtain with the money. This is the real measure of his wages,



not already comprised in the general law of value. In fact, in so far as it is a direct commodity, labour has a final degree of utility of its own, just like any other direct commodity; and the questions that may be raised as to the causes of our demand for it, and as to the causes affecting its disposable quantity, are intimately connected with the merceological nature of labour; just as similar questions touching any other direct commodity (*e.g.* bread, meat, wine, etc.) are connected with the merceological nature of those articles, and can only be the subject-matter of special studies. On the other hand, labour as an instrumental commodity, presents a new problem, *viz.* that of the distribution of wealth among the various factors that have contributed to its production, or in other words, the problem of attributing an effect due to an aggregate of causes to these considered severally.

II. Moreover the theory of wages is not the theory of the remuneration of every kind of labour, at least not in the first instance; but of *labour pure and simple*, *i.e.* of ordinary labour such as may be performed by a *workman without either capital or special knowledge, or rare or exceptional skill*. For any special knowledge, such as the knowledge of a foreign language possessed by a clerk in a counting-house, or the professional knowledge acquired by a doctor or a barrister, is the outcome of *investments of capital*; and a considerable portion of the salary or remuneration commanded by such special knowledge represents *interest on the capital spent in acquiring it*. Similarly, special skill is a source of extra profit or rent. The law of the value of these superior services can only be a compound law, in which account is taken of the different laws of value to which capital, natural agents, and pure labour<sup>1</sup> are respect-

from the operative's point of view. Here real wages are always meant. It must be further noted that the remuneration of a labourer may be estimated in respect of the length of time he has worked, or of the amount of the produce that is the fruit of his labour. This is the real measure of the labourer's remuneration, from the employer's point of view. If two labourers who work the same number of hours with different degrees of efficiency *are paid at the same rate for the time during which they work, they are paid at different rates for the work done*; the one whose work is most productive being paid least.

<sup>1</sup> "It is convenient, in discussing the law of wages, to proceed in the first instance as if there were no other kind of labour than common unskilled labour, of the average degree of hardness and disagreeableness."—J. S. Mill, *Principles*, p. 207.

ively subject. It is a necessary consequence of the hypothesis on which the theory of wages is based, that the latter can only be applicable in a limited measure to actual fact, unless modified to suit the exigencies of cases; but this drawback, if it be one, is common to every other branch of pure economics, nor can this transition stage be avoided by any inquirer who desires to become acquainted with the law of reality in all its complexity.

III. The theory of wages presupposes finally the existence of a *single rate of wages* to which all actual wages *tend*. How is this to be understood, and to what extent does this hypothesis differ from the truth? The question is not unimportant, for the theory of wages only claims to explain *the causes that determine the level of the rate of wages*. It is obvious that some kinds of labour are *more agreeable than others*; that some, for instance, are held in the highest honour.<sup>1</sup> Now this circumstance, other conditions being equal, may cause the pecuniary remuneration in such employments to be less than in many others, without on that account preventing their being largely sought after.<sup>2</sup> It is moreover well known that some professions and trades are more dangerous than others, so that hedonists will not pursue them without some premium to cover the risk.

The theory postulating a uniform rate of wages (and affirming the existence of a tendency towards such uniformity) supposes that allowance has been made for the two above-mentioned causes of deviation from the purely arithmetical uniformity of wages. In other words, the postulate is conditioned by the non-existence of these two causes of deviation.

But the postulate of a uniform rate of wages<sup>3</sup> presupposes

<sup>1</sup> There are also some kinds of labour so disgusting and dishonourable that only those will undertake them who are cut off from all other callings. The remuneration in these cases is very small.

<sup>2</sup> This is a clear proof of the feasibility of establishing commensuration and equivalence between so-called material and immaterial commodities, and that the latter are just as material as the former. Part i. chap. iv. § 2.

<sup>3</sup> Sometimes *regularity of employment* is enumerated among the preventive causes of uniformity in the rate of wages. It is in fact obvious, that in certain employments, work is only obtainable at certain times of year, and that no one would engage in them unless during those periods the work were paid for at a rate which enabled the labourers to live also during the intervals of idleness. This cause however does not affect the rate of wages, and only serves to equalise

that labour is in a certain degree migratory; or else the rate of wages must be understood to be uniform within those labour markets in which labour can migrate from one to the other. In fact it is supposed that, within certain limits, whilst the proportion between cost and remuneration varies from one trade to another, labourers are able, within certain limits, to exchange a trade in which this proportion is less advantageous for one in which it is more so. This change may be effected, partly by the actual change from one employment to another, or from one locality to another, and partly by the rising generation being brought up to the employments that have become more lucrative, and by a more rapid increase of the population in the localities where labour is most remunerated. The employments that present the possibility of a transfer of labour from one to the other, according as the ratio between cost and remuneration varies in each of them, are said to be constituted by *competing groups* (a term first used by Cairnes), the others by non-competing groups.<sup>1</sup>

## § 2. *Determination of the Rate of Wages in Isolated Economies*

The case of an isolated individual affords an unqualified exemplification of Ortes's principle that "capital limits industry," or in other words, that the amount of disposable capital forms an insurmountable limit to the range of choice of an employment. In fact, if we suppose that there is no disposable capital, an isolated individual *who has before him a*

the rate of wages in those trades, *taking longer periods than in other trades.* Moreover as regards the probability of success being greater in some trades or professions than in others, so that those who succeed are overpaid and those who do not succeed are ruined, it must be held that, in so far as the observation does not coincide with a distinction respecting the degree of danger of different professions, we are not dealing with a factor that affects the rate of wages, because it is the high remuneration that attracts numbers of people, accentuating amongst them the competition that eliminates the least skilful. Shadwell, book ii. chap. iii. p. 145.

<sup>1</sup> The subject of competing and non-competing groups in actual life, so important for the application of economic laws, has been investigated chiefly by Bagehot, *Economic Studies*, p. 21; Cairnes, *Leading Principles*, pp. 66, 91, 190; A. Marshall, *Economics of Industry*, p. 106; J. S. Mill, *Principles of Political Economy*, p. 238; F. Walker, *Wages Question*, chap. ii.; *Political Economy*, part iv. chap. v. § 303; Edgeworth, *Journal of Stat. Soc.*, Dec. 1889.

*series of employments, one more productive than the other, can only choose the one which yields him the READIEST return, altogether independently of the position it occupies in the supposed scale of remunerativeness of the employments in question.* For him the highest degree of utility attaches to an *immediate* wage, however small; and it is thus only with reference to the scale of wants of other individuals who are not in his position, that we can apply the term "more productive" to employments in which the return is more remote.

Supposing two individuals, one of whom already possesses a considerable amount of capital, whilst the other is in the position of the isolated individual already referred to, the latter may effect an operation which in modern economics would be termed a *credit operation*, by borrowing from the other a portion of his capital, to enable him to engage in some employment yielding a larger, but tardier, return. This kind of operation, as exhibited under the complex economic conditions of civilised countries, has led some to infer that industrial employment is limited, not by capital, but by credit.<sup>1</sup> And yet it is clear that the total mass of capital existing in the hands of the second individual forms the absolute limit to the choice of employments, since all those must be avoided that would require a larger capital, whatever may be their productiveness; and it is further evident that the credit obtained by the first individual from the second is a *limit*, at most equal to, but generally *more restricted than, that set by the mass of disposable capital* to the choice of an employment. Credit creates no wealth: it only shifts it from one hand to the other.

Returning to our hypothesis of an isolated individual, it is further evident that the remuneration of his labour is *its entire product: his wage is in proportion to the efficiency of his labour; but this efficiency is confined by the amount of his*

<sup>1</sup> The attacks of Macleod and Walker on the wage fund theory are based on the conception that, through the instrumentality of credit, every limit set to the expansion of industry, in respect of the amount of disposable capital, vanishes, and that the pure and simple productiveness of labour determines its remuneration. This appears to me one of the errors for which there is least to be said. Walker, *loc. cit.*; Macleod, *Elements of Economics*, vol. ii. chap. xiii. § 23, p. 126.

*disposable capital within a narrower circle than that constituted by the opportunities of employing his labour productively.*

This principle may also be applied without difficulty to the most complex economic problems of a civilised community. Thus let us consider the case of gold-diggers, at the time of the discovery of the gold fields in California or Australia. With little capital or skill a common labourer was enabled to obtain about a quarter of an ounce of gold in a day. The immediate result was a great rise in wages, *i.e.* in the labourer's remuneration, determined by the efficiency of his labour in the production of gold. Hence also: "*the cost of obtaining any commodity, that is the efficiency of the labour which produces it, must regulate wages measured in that commodity.*"<sup>1</sup> Even here however it is obvious that the efficiency of labour continues to be limited by the amount of disposable capital.

The prospective productiveness of an undertaking does not affect wages, unless the disposable capital is sufficient to admit of the labourer waiting until the results are reaped. If it is not, the prospective productiveness of his labour, even though it should consist in the realisation of milliards, avails him nothing: he cannot do what is necessary to gain the milliards (*i.e.* work the requisite time), which for him are *inaccessible* commodities, and do not therefore constitute his wages. But within the limits of the amount of disposable capital, the *prospective productiveness* of labour determines wages,—only however as a *maximum limit*, as we shall see in the sequel.

The labourer can only obtain the whole of the produce of his labour, if he works without the aid of capital and natural agents, or if he obtains gratuitously the use of these elements of nearly every kind of production. Their gratuitous aid however can only be obtained if their amount is altogether in excess of the demand, so that no given portion has a final degree of utility for any one; whilst, on the other hand, their aid becomes increasingly onerous, in proportion as the supply falls short of the demand.

Now let us again suppose the case of two individuals, one possessing capital and able to work, the other having no

<sup>1</sup> W. D. M'Donnell, *A History and Criticism of the various Theories of Wages*, Dublin, 1888, § 13, p. 67.

capital, but able to perform more productive work than the first.<sup>1</sup> For Primus, let the final degree of utility of his capital, as a direct commodity, be expressed by the index 10, the final degree of utility of his labour without the aid of capital be expressed by 3, and lastly let the productiveness of his labour combined with capital be expressed by the index 21. We should then have:  $c_1 = 10 : l_1 = 3 ; c + l = 21$ .<sup>2</sup> Hence in accordance with Gossen's rule, the final degree of utility of Primus's labour, as a complementary commodity, is equal to the difference between the value of the product of the combination of capital with labour and the value of capital as a direct commodity; *i.e.*  $l_2 = 21 - 10 = 11$ .<sup>3</sup> Similarly we find a value for the capital, as a complementary commodity, expressed by  $c_2 = 21 - 3 = 18$ . Now, for Secundus, let the final degree of utility of his labour, unaided by capital, be expressed by an index, say of 4, and let him be capable of producing, if possessed of a capital equal to that of Primus, an amount equal to 30. We should then have  $L_1 = 4 ; I + C = 30$ ; and therefore, in accordance with Gossen's rule,  $C_2 = 30 - 4 = 26$ ; *i.e.* if Secundus does not obtain a capital, or is deprived of the one he has, instead of earning 30, he will only earn 4. It is therefore worth his while to pay for  $C_2$  up to a price expressed by the index 26, in terms of the product. Let us then ascertain the value of  $L_2$ , *i.e.* the amount of the wage.

Primus, it must be observed, cannot give  $c_2$  in exchange for less than 18, because otherwise it would be more advantageous for him to combine it with his own labour. On the other hand, it is not to Secundus's advantage to pay more

<sup>1</sup> Let us leave natural agents out of the question, assuming them to be so abundant as to exceed the demand, but not so as to render labour superfluous.

<sup>2</sup> It is, I trust, superfluous to observe that the sign + here does not indicate addition, but technical combination of labour and capital. I have used  $c$  to indicate capital, and  $l$  labour when they are combined, *i.e.* when they are mutually complementary commodities;  $c_1$  and  $l_1$  indicate capital and labour considered separately as direct commodities;  $c_2$  and  $l_2$  indicate capital and labour considered as instrumental or complementary commodities, apart from each other, *i.e.* severed from the combination  $c + l$ .

<sup>3</sup> In fact, Primus, supposing him to be possessed of  $c_1$ , will be disposed to pay for labour equal to his own up to 11, seeing that by combining it, as a complementary commodity with  $c$  he will obtain a total product of 21; otherwise, if he loses his capacity to work, instead of earning 21 as before, he will only have 10. Therefore his loss will be equal to 11, and this is the value of his labour as a complementary commodity.

than 26 for  $C_2$ , because otherwise his labour would be remunerated by a smaller net return than he can obtain without capital. Any price above 18 and under 26 will suit the convenience of both parties to pay and to accept respectively for the use of  $c_2$  or  $C_2$ , and if the market is restricted to these two individuals, there is no criterion to determine the point the price for the use of Primus's capital will reach, within these limits (part ii. chap. i. § 4).

If Primus is satisfied with 19, Secundus having a total product of 30, and  $C_2$  having cost him 19, it follows that the remuneration of  $L_2$  was 11, *i.e.* that the remuneration of his labour was 11, because that is the product of his labour after deducting the interest on the capital borrowed from Primus. If Primus, on the other hand, succeeds in obtaining 25 for the use of his capital, Secundus's wage is only 5; *i.e.* the product amounts to 30, and from this must be deducted 25 for Primus, leaving a balance of 5 to Secundus in respect of his labour.

If there happens to be a Tertius<sup>1</sup> in the same conditions as Primus, so that the two compete with each other, Secundus will *certainly* obtain his capital for 19, and his wage will in *no* case be less than 11. If Tertius, by combining his labour with his capital, can only obtain 15, the value of the capital as a complementary commodity is represented for him by  $15 - 3 = 12$ , and the price of the capital will oscillate for Secundus between a minimum limit of 12 and a maximum of 18, and the wage between a minimum limit of 11 and a maximum of 18. In fact, if he obtains the capital at the price of 12, the

<sup>1</sup> The subjoined table may facilitate the comprehension of the case:—

| Primus        | Secundus        |
|---------------|-----------------|
| 1) $c_1 = 10$ | 1) $C_1$ vacant |
| 2) $l_1 = 3$  | 2) $L_1 = 4$    |
| 3) $c+l=21$   | 3) $C+L=30$     |
| ergo :        | ergo :          |
| 4) $l_2 = 11$ | 4) $C_2 = 26$   |
| 5) $c_2 = 18$ | 5) $L_2 = ?$    |

ergo :

6) the price of  $C_2$  > 18  
< 26

ergo :

7)  $L_2 < 12$  > 4

gross product he derives from it being 30, there remains to him a wage of 18. If however he is obliged to pay 18, the net product is reduced to 12, and that is the remuneration of his labour.

It does not seem necessary to dwell further on this point, since every possible case may be solved on the basis of Gossen's law and of the general theory of value. It may be advisable however to advert to two more hypotheses. Let us suppose first that Tertius, instead of being provided with capital, and thus entering into competition with Primus for the loan of capital to Secundus, is a labourer and competes with Secundus for the capital of Primus. Then, if Tertius is in the same condition as Secundus, *i.e.* if his isolated labour produces 4, whilst his labour combined with Primus's capital produces 30, it is evident that the price of Primus's capital attains its maximum limit, because each of the two labourers will outbid the other until they reach the amount of 25. If either offered 26, he would no longer derive any profit from the capital. The latter can only be obtained by one of them, and neither will give more than 25. This price will *certainly* be paid, but which of the two competitors will obtain it cannot be determined in general. If however we suppose, that the final degree of utility of isolated labour is, for one of them, 3, and for the other, 4, it is clear that most can be offered by that one of the twain whose labour, without the aid of capital, is *least productive*; just as we saw in the theory of foreign trade, that other countries are driven out of a neutral market by the country which has the largest difference in its comparative costs, *i.e.* by the one whose labour is least productive.<sup>1</sup>

So too, if we suppose that one of the two individuals is capable of obtaining from the combination of labour and capital ( $\gamma + \lambda$ ), instead of 30, a larger product, say 35, the price of the capital<sup>2</sup> will range for him between 26 and 30; because up to 25 he will encounter the competition of the individual who can only derive 30 from the combination of the capital with his labour, *i.e.* of Secundus. But at the price of 26 Secundus will be excluded from competing, as his net

<sup>1</sup> Part ii. chap. iii. § 2.

<sup>2</sup> The case is as follows (see foot of page 293):—



product would no longer show any increased profit. Tertius however will still have to compete with Primus, for if he pays between 26 and 30 for the capital, he will have a gross product of 35, and hence a wage ( $\lambda_2$ ) which may vary from 9 to 5. Here again the price of the capital ( $\gamma_2$ ) between 26 and 30 will be undetermined.

From what has been stated it appears that *the productiveness of labour, as a complementary commodity, is the maximum limit of wages (i.e. of its remuneration), and that competition may lower this limit to a level with that of the productiveness of isolated labour, i.e. of labour unaided by capital.* The converse of this applies to capital, *the maximum remuneration of which is given by its productiveness as a complementary commodity; but such productiveness may be cut down by competition to the limit which is given by the final degree of utility of the capital as a direct commodity.* Now it happens that under a *system of divided labour*, the labour of many individuals sometimes loses *every degree of utility as a direct commodity, or as a commodity to be used singly*, as each individual's labour was adjusted only to serve as a complementary commodity, and as each individual counted on forming part of an economic organism. In other words, the cost of reproduction of a wage, be it ever so small, may be altogether absent for one whose labour can only be utilised as a complementary commodity. This is also true of certain forms of investment of capital.

A second possibility that may be mentioned is the following: It not only may, but will frequently, happen that if Primus and Secundus are joined by Tertius, either as a capitalist

| Primus                                | Secundus   | Tertius   |   |
|---------------------------------------|--|---|---|
| $c_1 = 10$<br>$l_1 = 3$<br>$c+l = 21$ | $C_1$ vacant<br>$L_1 = 4$<br>$C+L=30$                                    | $\gamma_1$ vacant<br>$\lambda_1 = 4$<br>$\gamma + \lambda = 35$                   | Value of the capital if Tertius eliminates Secundus.  |
| $l_2 = 11$                            | $C_2 = 26$   | $\gamma_2 = 31$ (maximum)   | $\gamma_2 < 31$<br>$\gamma_2 > 25$  |
| $c_2 = 18$                            | $C_2 > 18$<br>$C_2 < 26$<br>If Secundus is alone to compete with Primus. | $\gamma_2 > 18$<br>$\gamma_2 < 31$<br>If Tertius is alone to compete with Primus. | $\lambda_2 < 10$<br>$\lambda_2 > 4$<br>Profit of the labourer if he eliminates Secundus and treats with Primus. |

or as a labourer, instead of being compelled to choose between the capital of Primus and that of Tertius, or between the labour of Secundus and that of Tertius, the one may employ both portions of capital, and the other both the labourers. In fact, supposing Tertius to be a new capitalist, it may be that Secundus's labour will become much more productive if aided by double the amount of capital. If we said before that his own unaided labour was worth 4 to him ( $L_1 = 4$ ), and that with the assistance of Primus's capital it produced 30 ( $C + L = 30$ ), we may say now, for instance, that his labour with the further assistance of Tertius's capital produces 80 ( $\gamma + C + L = 80$ ), and we may suppose that the quantity of capital supplied by Tertius is equal to that supplied by Primus, so that we have  $2C + L = 80$ . Then it is clear that if we carry our minds back to the moment when Secundus, having nothing but his own labour that yields him 4, applies for capital, he will be disposed to pay for  $2C$  any price up to 75, since the increased utility he derives from  $2C$  is equal to  $80 - 4 = 76$ . Primus will not part with his capital for less than 18, on the above hypotheses respecting his position, and Tertius will not part with his capital for less than 12.<sup>1</sup> Hence the price of the sum of the two capitals may vary between 30 (*i.e.*  $12 + 18$ )<sup>2</sup> and 75. If Secundus however has already secured a first portion of capital, whether that of Primus or that of Tertius, at a price between 12 and 18, say 15, the second portion of capital will only have for him a utility measured by 50, for with  $C + L$  he already realises 30 and obtains a net wage of 15, and with  $2C + L$  he would only realise 50 more, his gross product being 80. Whilst therefore 49 would be the maximum price for the second

<sup>1</sup> The hypotheses were :—

| Primus       | Tertius                 |
|--------------|-------------------------|
| $c_1 = 10$   | $\gamma_1 = 10$         |
| $l_1 = 3$    | $\lambda_1 = 3$         |
| $c + l = 21$ | $\gamma + \lambda = 15$ |
| $l_2 = 11$   | $\lambda_2 = 5$         |
| $c_2 = 18$   | $\gamma_2 = 12$         |

<sup>2</sup> Tertius will not part with his capital for a lower price than Primus receives, because Secundus requires *both* the capitals. If they combine, they may oblige Secundus to pay 75 for the two together; if however they compete with each other, Secundus will obtain the capital of Tertius at a price between 18—Primus's lowest price—and 12—the lowest price Tertius can accept.

portion of capital, if Secundus had already obtained the first, the minimum price thereof will be 12 or 18, according as the first portion has been granted by Primus or by Tertius, and its price may therefore vary between 12 and 49, or between 18 and 49. We might also have supposed that a fresh portion of capital would yield a less quantum of utility than the first, that is we might have supposed the law of decreasing productiveness to be in operation; still the solution of this problem would have been determined by the same rules. The same reasoning would apply if Tertius were supposed to be a labourer without capital, and Primus a capitalist capable of employing both Secundus and Tertius with a proportionately larger or smaller profit. The principles above set forth contain the whole law of wages in isolated economics. It remains for us to see their application in social economics, and to guard against certain errors to which those who study this point are liable.

§ 3. *That Wages do not vary in Proportion to the Productiveness of Labour and are not independent of the disposable Capital.*

Some writers, overlooking the fact that labour is a *complementary* instrumental commodity, have held that wages must be exactly equivalent to that part of the product which is due to labour, and that they are derived directly from the latter. It appeared to them that, as the productiveness of labour increases, wages must always rise in proportion, and *vice versa*. From this they claimed to deduce two principles, viz.: 1st, That wages are not paid out of capital; 2nd, That wages are derived directly from the produce of labour.

In view of what has been stated, and having regard to the fact that labour is a *complementary* instrumental commodity, it is certain that, as its productiveness increases, other things being equal, the TOTAL PRODUCT increases; and *vice versa*, as its productiveness decreases, other things being equal, the total product decreases also. Thus, *e.g.*, suppose Chinese labour is only one-third as efficient as American labour, and that the former is suddenly substituted for the latter in all the workshops of the United States, the consequence will be

a sensible decrease in the TOTAL PRODUCTION.<sup>1</sup> *But it would be altogether a fallacy to conceive: 1st, That only wages would necessarily diminish; 2nd, That they would decrease in proportion to the diminished productiveness and vice versâ.*

Let us work out this problem in detail. Let the productiveness of a Chinaman's isolated labour be expressed by the index 4, that is  $l_1 = 4$ . Let the productiveness of a given quantity of capital taken by itself be expressed by the index 10, that is  $c_1 = 10$ . Let the productiveness of a Chinaman working with that capital be expressed by 21, that is,  $c + l = 21$ .

Then by severing the labour from the capital, 11 points are lost, that is to say, a capitalist will be disposed to pay for the Chinaman's labour, *as a complementary commodity* ( $l_2$ ), at most 10; and the Chinaman will sell his labour for not less than 5, since by working on his own account he produces 4. The position may therefore be denoted by the following equations:—

- 1)  $c_1 = 10$
- 2)  $l_1 = 4$
- 3)  $c + l = 21$ , ergo :
- 4)  $l_2 = 11$
- 5)  $c_2 = 17$ , ergo :
- 6) Price of  $l_2 > 4$   
 $< 11$ , or between 5 and 10.
- 7) Price of  $c_2 > 10$   
 $< 17$ , or between 11 and 16.

Now let us proceed to consider the case of the American labourer. Let us again suppose isolated capital to be worth 10, *i.e.*  $C^1 = 10$ ; let the isolated labour of the American be

<sup>1</sup> This theory is not quite the same as the one stated and maintained by Professor Marshall. It must be observed that his argument is based on a *supplementary hypothesis*, which deserves attention. He says: "If the efficiency of labour could be suddenly doubled, whilst the capital of a country remains stationary, there would be a great and immediate rise in real wages. *The supplies of capital already in existence would be distributed among the labourers more RAPIDLY than would otherwise be the case*, and the increased efficiency of labour would soon make good the diminished supplies. The fact is that an increase in the efficiency of labour *would bring about an increase in the supply of capital.*" Professor Marshall, it will be observed, makes the hypothesis that there are *reserves* of capital, whether in the form of riches that would not have been used as capital but for the increased efficiency of labour, and the consequently increased remuneration *also of capital*, or in the form of real capital, but which is slower in being offered (*i.e.* of participating in the

three times more productive than that of the Chinese, *i.e.*  $L_1 = 12$ ; let the total product of the same capital which was disposable for the Chinaman, joined to the American's labour, be thrice as much as before, that is,  $C + L = 63$ . On these hypotheses, the capitalist will be disposed to pay the American labourer not more than 52, for to dispense with his co-operation means the loss of a net profit of 53; whilst the labourer in turn will not agree to work for less than 13, since he can earn 12 without the capitalist; nor would he pay more than 50 for the aid of the capital, for if he obtains it and thereby succeeds in realising a gross profit of 63, only 51 points will represent the product added to that of his isolated labour. The equations will therefore be:—

- 1)  $C_1 = 10$
- 2)  $L = 12$
- 3)  $C + L = 63$ , ergo<sup>1</sup>
- 4)  $L_2 = 53$
- 5)  $C_2 = 51$ , ergo :
- 6) Price of labour as a complementary commodity, *i.e.*  
 $L_2 \begin{matrix} > 12 \\ < 53 \end{matrix}$ , that is between 12 and 53.

Now, the Chinaman's wage ranged between 5 and 10, and the American's was to have been three times as much, in respect of his treble productiveness. But what has become of that? The American may indeed be paid 13 or 14 where the Chinese is paid 10, or 52 where he gets 5; this will depend entirely and exclusively *on the conditions of demand and supply, that is on the laws of value already explained, and on the existence and nature of competition with the labourer or the capitalist.*<sup>1</sup>

demand for labour) than it would otherwise have been. This observation is valuable in applied economics, but it has no place in pure economics. In the latter the whole amount of capital is offered with the greatest promptitude, and there is no reserve or storehouse from which more can be drawn at a given moment, nor can it be turned over more rapidly than it happens to be turned over. *Capital limits industry.*

<sup>1</sup> Professor Marshall, to whom this criticism does not apply, takes the same view. In fact he says: "The new doctrine shows how their wages depend *not only on the capital* which others have stored up, but also, and to a greater extent, on the efficiency of their own work." And in a note: "On the other hand Professors Jevons, Cliffe Leslie, Hearn, and Francis Walker, and Mr. Shadwell have all adopted the same general idea *that wages are the share of the produce which THE LAWS OF SUPPLY AND DEMAND enable the labourer to secure.*"—Marshall, *Economics*

It might therefore have happened that whilst the American's isolated productiveness was three times as much as that of the Chinese, the productiveness of his labour, *as a complementary commodity*, was only double, or on the contrary that it was, say, five times as much; *and it is in accordance with this last productiveness that the MAXIMUM limit of wages varies, whilst the MINIMUM limit varies as the first.*

The illusion that the sequence is other than the above is arrived at by a method of reasoning somewhat like the following:—

“Wages are drawn from the produce of labour, and the maintenance and the payment of this labour do not even temporarily trench upon capital. Supposing a hundred men to be landed without any stock of provisions in a new country. Will it be necessary for them to accumulate a season's stock of provisions before they can begin to cultivate the soil? Not at all. It will only be necessary that fish, game, berries, etc., shall be so abundant that the labour of a part of the hundred may suffice to furnish daily enough of these for the maintenance of all, and that there shall be such a sense of mutual interest, or such a correlation of mutual desires, as shall lead those who in the present get the food, to divide (exchange) with those whose efforts are directed to future recompense. To take another instance, suppose a number of workmen engaged in building a ship, which it will take two years to finish, and that their wages are paid by the *entrepreneur* weekly, *i.e.* long before the ship is completed. Here too, it is argued, the wages are not drawn from the *entrepreneur's* capital, but from the produce of the workmen's labour, because before payment of each week's wages his capital has been increased by that part of the ship which has been built during the week; so much so that if he were to sell the unfinished ship as it stands, he would expect to get back his outlay plus a profit. Consequently the workmen have increased the *entrepreneur's* capital before they receive

*of Industry*, iii. 6, § 4, p. 205. Walker says expressly: “In saying that production furnishes the measure of wages, it is, of course, not to be understood that wages equal the product of industry.”—Walker, *Political Economy*, p. 381. Leroy-Beaulieu maintains that wages are regulated in accordance with the productiveness of labour. *Le travail des femmes*, etc., 1873; *Répartition des richesses*, 1881; *L'État moderne*, p. 341, note, 1891.‡

any salary from him, and what they get is a part equal to the increase of capital they have given.”<sup>1</sup>

Now, as regards the instance of the hundred men who settle in a new country, it is clear that as nature has supplied a stock of direct commodities, no capital is necessary to carry on any labour, and the hundred workmen find themselves in the position of a hundred individuals backed by a great *altruistic* capitalist. We might just as well suppose that nature had been more generous still, and had furnished us with so many direct commodities as even to render all labour unnecessary for the enjoyment of every commodity we can imagine.

Wages therefore are independent of capital only when they are derived from the prodigality of nature; and the rule is that this prodigality does not exist, and that where it does exist, it soon disappears.

What do settlers in a new country live on where nature does not spontaneously provide their maintenance? What do the crew of a ship live on when the latter is six months out at sea? Can more land be sown in one year than the amount of corn that has been garnered for the purpose admits of? It is in this way that the disposable capital limits industry and wages. As for the second instance, it is quite untrue that the work done by the labourer during the week is the *equivalent* of his wage. In fact, to begin with, it is not an equivalent *as regards himself*; so much so that he is anxious to exchange his labour for wages, and would rather *give* his labour and *receive* wages, than *keep* his labour and *receive no* wages. Besides, the *entrepreneur* cannot sell the unfinished ship to whatever individual, so as to recoup his expenditure and obtain a profit. That may be the case, if he finds another *entrepreneur* who wants the unfinished vessel in order to *complete* it; but if he does not, then the unfinished ship is worth less than the timber with which it is built, and the wages paid are lost to the *entrepreneur*. And even if the ship were finished, it remains to be seen whether it can sail, and if so, whether it

<sup>1</sup> This reasoning is so puerile that I should not have ventured to reproduce it, but for the fact that it is put forward by Mr. Henry George in his *Progress and Poverty*, 5th ed., Kegan Paul, 1883, pp. 15-81. Also by the same author: *Social Problems*, Kegan Paul, 1884, pp. 170-194.

will find passengers and goods to carry. Until all this has happened, *and it may not happen*, the *entrepreneur* has no equivalent for the wages paid for the labour expended on the ship.<sup>1</sup>

The truth as regards the productiveness of labour in proportion to wages, is rather this: the productiveness of labour is one of the factors of the amount of the total product, just as capital is, and the division of the total product between capitalist and labourer is effected in strict accordance with the laws of value, so that a larger total product, whether it be due to the increased efficiency of capital, or the increased productiveness of labour, is apportioned *independently of the fecundity of either labour or capital*; so that it may be that the remuneration both of the capitalist and of the labourer will be increased, but it may equally well be that only the remuneration of the one will increase, that of the other remaining stationary; and it may also be that the remuneration of one will be less than formerly, and that of the other be proportionably increased.<sup>2</sup>

Hence we must not even exclude the possibility that, the total product remaining the same, the remuneration of one only of the two factors increases, whilst that of the other diminishes.

In fact the division of the product is effected within the limits of price that are obtained by dividing it, according to Gossen's rule, exclusively in accordance with the curves of reciprocal demand. It depends therefore on the quantities offered by either party, and on the scale of wants of either party for successive portions of the other's commodity.

<sup>1</sup> W. H. Mallock, *Property and Progress, or Facts against Fallacies*, London, 1884, pp. 18-37. Mr. Mallock's work is a complete refutation of Mr. Henry George's theories.

<sup>2</sup> It is easy to suggest an instance in which, notwithstanding an increase in the productiveness of capital and labour, whether considered severally or jointly, we may have a smaller wage than before. In fact, suppose the insulated values:  $c_1=20$ ;  $l_1=1$ ; and the conjoint values:  $c+l=38$ ; then labour, as a complementary commodity, has a value of 18, for if we suppose it to be taken away from the capitalist, he loses 18, and is left with 20 instead of 38; therefore  $l_2=18$ , and for the same reason  $c_2=37$ . Now let us suppose the insulated productiveness of capital and labour to be increased, so as to make  $c_1=25$  and  $l_1=10$ , and their conjoint productiveness to be increased so as to make  $c+l=40$ ; that will give for  $l_2$  the value of 15 and for  $c_2$  the value of 30. Therefore: whilst in the first case the wage, *i.e.* the value of  $l_2$ , must be *more than 1 and less than 18*, now it must be *more than 10, but less than 15*.



§ 4. *Determination of the Rate of Wages under Conditions of Economic Statics*

Let us suppose any economic situation of a close market rendered sufficiently lasting to admit of its being examined; or in other words, let us suppose the economic relations prevailing, at a given moment, in a close market to be rendered invariable, and let us ask ourselves, on what factors wages will, for the time being, depend there. Moreover, let the hypotheses be realised which we have already shown to be the premisses of every pure theory of wages, and in particular, let the labourer be exclusively a labourer, and not a capitalist as well.

In that case, we shall have on the one hand capitalist-*entrepreneurs* who dispose of a given quantity of direct commodities and of instrumental commodities of diverse kinds, and on the other a number of labourers destitute of such commodities. The quantity of direct and instrumental commodities in the hands of the capitalists is the only existing supply, and it is of definite magnitude. No future event, foreseen or unforeseen, can affect the quantity of wealth now available, *i.e.* it cannot exercise a *retroactive* influence; it is at the present moment what it has been made by the economic forces of the past. Nor can any condition that has subsequently affected the minds of the owners exercise any influence on the amount of wealth available at a given moment: whether they desire it to be more or less, to dissipate it or to hoard it up, to employ it or to give it away, the amount of disposable wealth will, in each case, be, for the time being, a fixed quantity, and any possible variation in it can only be a future matter.

The causes which determine that wealth, at a given time and place, should be of a given amount, may easily be assigned. They are the same that determine the extent of production in a given environment; and the division of the wealth actually possessed into direct and instrumental commodities (raw materials and instruments properly so called) likewise depends on known causes, *viz.* on the nature of the kinds of products hitherto produced, on the methods

pursued in the process of production, and on the purposes for which the production has been carried on. In any case, all these causes belong to the past and have developed a *present state of fact*.

Now, supposing that at the present moment we have to do with individuals animated exclusively by hedonic aims, the disposable wealth, in so far as it consists of direct commodities, will be divided into two parts: one intended to satisfy present wants, which we shall term a fund for unproductive consumption; the other intended to satisfy prospective wants, and which we may designate as, in part, real capital, and in part a reserve and insurance fund. Two factors will determine the proportion in which this division will be made, viz. on the one hand the estimate of the pleasure afforded by the immediate enjoyment of the stock of direct commodities, as compared with the estimate of the pleasure afforded by the future possession of probably greater wealth, or the insurance against pains apprehended in the future; and on the other hand, a knowledge of the means of making profitable investments under present conditions of fact. The first factor will in turn vary according to a number of circumstances, which may be summed up by saying, that on the knowledge, the wants, and the character of the several individuals must depend the judgment they will form as to the measure in which present or remote wants are to be respectively preferred; and the second factor may again be decomposed into other factors, since it depends on the environment, the technical knowledge, the speculative tendencies, the aptitude for work, and the mass of capital and labour on which the calculations are based, whether there is a *larger or smaller field of profitable investment*.

We are thus forced to recognise that the disposable capital is a quantity predetermined, at all times, by economic causes, *i.e.* by conditions of fact partly physical, partly intellectual and moral. In this sense the disposable wealth is predetermined; the parts thereof consisting of raw materials and instruments on the one hand, and direct commodities on the other, are predetermined; and so too are the portions into which this mass of direct commodities is divided, under the respective names of fund of unproductive wealth, reserve (or

insurance) fund, or hoard, and capital fund. Among the causes that predetermine this distribution the past and prospective fecundity of the labourer's work figures repeatedly. In particular, the so-called "field of profitable investments" depends, in addition to other factors, also on the prospective efficiency of such work, and, in so far as such efficiency depends in turn on the character or physical qualities of the labourer, on these factors as well; and the past fecundity of labour has exercised its influence on the total mass of disposable wealth, and on the division of such wealth into raw materials and instruments on the one hand, and direct commodities on the other. It is therefore certain that, according as in the supposed close market Chinese or British labour is, or is expected to be, available, the disposable capital fund is different. But given this fact, it has a determinate magnitude.

Now this disposable capital, predetermined in the manner already expounded, constitutes the *entrepreneur*-capitalists' demand for labour, *i.e.* their offer. Their demand for labour is limited by the capital at their disposal, and according to the price of this labour they will take more or less. But given the quantity of disposable capital, and a number of labourers for whom each portion of capital has a determinate degree of utility, the price is a mechanical result, just like that of any other commodity, given the quantity and the demand, *i.e.* the law of demand (part ii. chap. ii. §§ 1, 2). We may conceive the capitalist as disposed in conformity with Menger's table, *i.e.* we may assign to each capitalist a series of degrees of utility denoting the price he is ready to pay for a first, a second, a third workman, and so on. This scale of degrees of utility of successive labourers for each capitalist is given by the degree of utility he attributes to successive portions of his capital in combination with labour, also in various quantities.<sup>1</sup> Given the number of labourers, these will be distributed among the capitalists precisely as in the instance given in discussing the formation of prices in Menger's table.

The theory expounded above is termed the *wage-fund*.

<sup>1</sup> We shall have curves of demand the general equation of which will take the form:  $y=f^1(x, z)$ , and sometimes  $y=f^1(x, z, a)$ .

theory, and is substantially due to the two Mills, and in a still larger measure, but subject to some slight modifications, to Cairnes.<sup>1</sup> It constitutes an exact law for the determination of the rate of wages under conditions of economic statics.

### § 5. *Some unfounded Objections to the Wage-Fund Theory*

1st. The wage-fund theory maintains that wages are always and necessarily paid out of capital. Now, this is sometimes the case; but it also happens sometimes that *entrepreneurs* do not pay their labourers until the work is completed, and give them at most an instalment drawn from their capital, the balance of the remuneration being paid out of the finished product.<sup>2</sup>

Now with reference to this objection, is it not evident that, if it does happen that labourers are paid with a portion of the product, they are not engaged *à forfait* or *per aversionem* by the *entrepreneur*, but are partners with him

<sup>1</sup> Cairnes, *Leading Principles*. "Aussi longtemps que la société peut déplacer son capital abstrait d'une forme d'investissement à une autre, toutes les unités ont la même importance, et pour toutes on paiera le même taux. Précisément le même principe est vrai dans le cas du travail; les opérations nécessitées par l'utilisation d'une série d'instruments sont aussi différentes les unes des autres que peuvent l'être les instruments eux-mêmes. Néanmoins si l'énergie du travail est libre de passer d'une forme à une autre, il sera rétribué sous toutes ses formes à un taux uniforme. Supposons que notre petite communauté s'accroisse en nombre, et que ses membres se consacrent à différents métiers, celui qui manie la hache, pourra-t-il obtenir des salaires plus élevés que celui qui se sert des couleurs? Assurément non, si l'unité du travail peut passer d'une forme à une autre aussi librement que le capital. Écartons le bucheron: quelqu'un autre des nouveaux travailleurs qui entre dans le champ de l'industrie prendra sa place au lieu de se joindre aux ouvriers peintres, et le résultat final pour la communauté ce sera qu'elle devra se passer d'une unité de ce dernier genre de travail. Dans les conditions que nous-avons supposées, toutes les unités de travail doivent avoir la même utilité effective et toucher une même rémunération qui, dans chaque cas, sera mesurée par l'importance de la moins nécessaire des diverses opérations que le travail doit accomplir."—J. B. Clark, *Revue d'écon. pol.*, 4<sup>e</sup> année, No. 3, pp. 263, 264.

<sup>2</sup> This objection, like all the rest in this paragraph, is taken from Mr. F. Walker's criticism of the wage-fund theory. He concludes thus: "It would be brutal to inflict further blows upon a body so exanimate as the theory of the Wage fund." Let the reader judge whether these criticisms shake the theory, or whether they do not rather show that the critics *ignore the premisses and misunderstand the conclusions*.

as regards the profits and losses, and that what they receive, on the completion of the product, is no longer wages ?

If a labourer can afford to await the completion of the work before obtaining his remuneration, he is possessed of capital, and this forms part of the wage fund. Such a case may occur, and frequently does occur in real life ; but it does not conflict with a theory one of the premisses of which is that the workman is *destitute of capital*.<sup>1</sup>

2nd. The *entrepreneur* employs his capital with a view to a profit, and the fact that he has a fund of disposable wealth is not by itself an inducement to him to use it for the purpose of production, just as the fact that a labourer has arms and legs is no reason why he should use them to work with. But if the profit expected is the cause of the transformation of disposable wealth into capital, it at the same time determines its amount, and therewith the amount of the wage fund.

This is so ; but has anything been said to the contrary in the wage-fund theory ? We have only added that, given an opinion as to the productiveness of capital and labour, at a given time and place, the wage fund is a predetermined sum.

3rd. If a capitalist lacks an adequate wage fund, and has confidence in the productiveness of a quantity of capital and labour, he will procure the requisite capital by means of credit, or he will pay the labourers themselves provisionally with promises of payment which he is to redeem when the works are completed and the profits have been realised.

To enable the *entrepreneur* to procure, by means of credit, the capitals he requires, it is necessary that these should exist in other hands ; hence, if given to him, they are taken from some one else ; and in a market including the lender and the borrower it will always be the disposable mass of capital that will limit the amount of real wages it is possible to pay.<sup>2</sup> If, on the other hand, the *entrepreneur* pays provisionally by means of promises of payment, we are again confronted by a case in which the labourer is himself also a capitalist.

<sup>1</sup> "The typical labourer is one who has not accumulated any considerable amount of wealth for himself, and must therefore depend for his support upon the capital of others who pay him for his services."—S. Newcomb, p. 436.

<sup>2</sup> The wage fund presupposes a close market ; but in a close market credit cannot increase the disposable capital.

4th. An increase in the number of labourers does not necessarily reduce the wages, though in accordance with the wage-fund theory this should be the case, because the divisor increases whilst the dividend remains unchanged. An increase in the number of labourers may cause to become operative the law of increasing productiveness, as it may also have the opposite effect.

If it is expected that the supposed increase of labourers will augment their productive efficiency, this expectation belongs to the numerous class of causes that may affect the efficiency of labour, and it will have been taken into consideration in determining the respective proportions of the fund of unproductive consumption, reserve fund and capital; just as the opposite fact, if anticipated, will have operated to determine the wages. But if it has not been anticipated, it is inconceivable how it can, for the time being, have any influence on wages: in that case either the capitalists will have made a good bargain, and the labourers a bad one, or *vice versa*. They will have learned a lesson for the future: that is all.

#### § 6. *Determination of the Rate of Wages under Conditions of Economic Dynamics*

Economic quantities may be considered under two aspects: as a *fund*, and as a *flow*. So many gallons of water contained in a tank are a definite conception, and so many gallons of water per hour flowing in and out of a reservoir constitute an equally definite conception. There is no necessary relation between the magnitude of a fund and that of a flow, for we may have a large fund with a small flow, and a small fund with a large flow; hence any indication of quantity is ambiguous which does not define both terms. A fund therefore is "a sum of values considered irrespectively of every other circumstance"; and a flow is "a sum of values considered in its transit through some position we are considering, and in relation to a determinate unit of time."<sup>1</sup>

The above distinction is well known with reference to the theory of money: the quantity of money existing in a country

<sup>1</sup> Simon Newcomb, *Principles of Political Economy*, New York, Harper, 1886, pp. 316, 321, 325, 408, 428, and 434.

may be considered under a twofold aspect, viz. either with reference to its volume pure and simple, *i.e.* as the sum of the existing monetary units (= fund), or as a flow, *i.e.* as the fund multiplied by the rapidity of its circulation within a determinate time. Now *the capital which remunerates labour is a flow and not a fund.* In fact, if the *entrepreneurs'* capital were not continually made up again by the proceeds of production, it could only serve once for the payment of wages. Capital consists of direct commodities that are absolutely consumed by industrial processes, *i.e.* they are transformed into substances destitute of the utility that human labour had conferred on them, and cannot serve twice over for the maintenance of the labourers. If we suppose, that under an economy of divided labour and of exchange, the industrial production of a country were technically so ill-directed that the sum of utilities produced were less than that of the utilities consumed, the wage fund would go on decreasing until it vanished altogether, whilst, on the opposite hypothesis, it would continuously increase. Therefore supposing a society of egoists, of sufficient average intelligence not to blunder in their anticipations as to the result of industrial undertakings, it is recognised that *the capital of the entrepreneurs functions simply as an intermediary between the labourer and the last consumer of the direct commodity that is produced.* The length of time during which, in various industries, the *entrepreneur* or capitalist advances wages on behalf of the last consumer differs largely; but considering the industrial process in its normal aspect, we have always to do with a *mere advance*; for each successive productive operation a *new capital* is required, and this must be furnished by the *consumer out of the proceeds of his own production.* In this way the law of wages in social economics, and under a *régime* of divided labour, corresponds with that which was formulated for a supposed state of isolated economics; nor could it be otherwise. As the theory of wages under static conditions deserves the name of Cairnes's theory, so that which presents itself under dynamic conditions deserves the name of Hermann's or Newcomb's theory.<sup>1</sup>

<sup>1</sup> F. B. W. Hermann, *Staatswirtschaftliche Untersuchungen*, p. 473; Newcomb, *l.c.*





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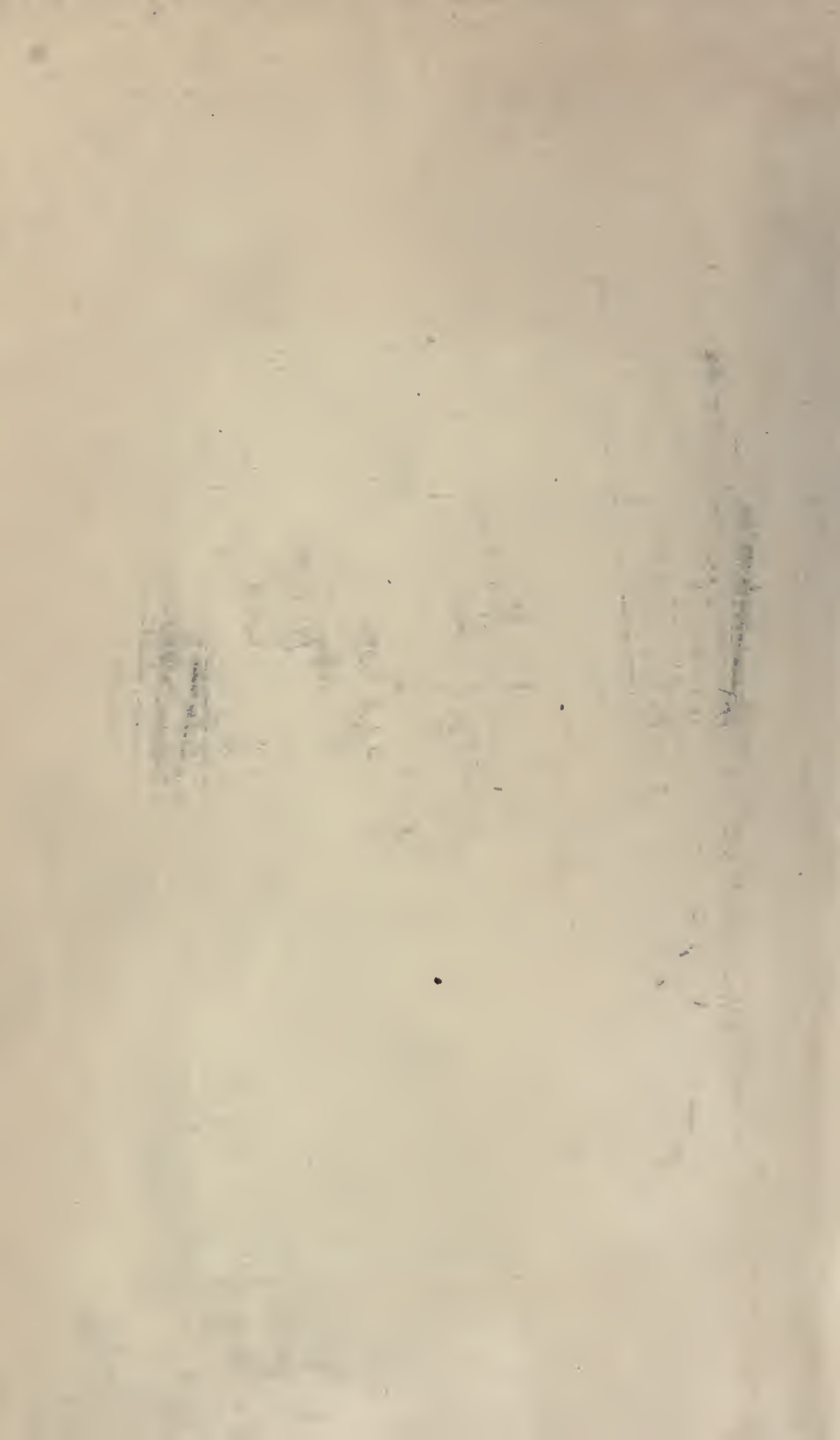
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