Alfred Marshall
The Principles of Economics

Book III
On Wants and Their Satisfaction

Chapter 3
Gradations of Consumers' Demand

1. When a trader or a manufacturer buys anything to be used in production, or be sold again, his demand is based on his anticipations of the profits which he can derive from it. These profits depend at any time on speculative risks and on other causes, which will need to be considered later on. But in the long run the price which a trader or manufacturer can afford to pay for a thing depends on the prices which consumers will pay for it, or for the things made by aid of it. The ultimate regulator of all demands is therefore consumers' demand. And it is with that almost exclusively that we shall be concerned in the present Book.

Utility is taken to be correlative to Desire or Want. It has been already argued that desires cannot be measured directly, but only indirectly by the outward phenomena to which they give rise: and that in those cases with which economics is chiefly concerned the measure is found in the price which a person is willing to pay for the fulfilment or satisfaction of his desire. He may have desires and aspirations which are not consciously set for any satisfaction: but for the present we are concerned chiefly with those which do so aim; and we assume that the resulting satisfaction corresponds in general fairly well to that which was anticipated when the purchase was made.(1*)

There is an endless variety of wants, but there is a limit to each separate want. This familiar and fundamental tendency of human nature may be stated in the law of satiable wants or of diminishing utility thus:-The total utility of a thing to anyone (that is, the total pleasure or other benefit it yields him) increases with every increase in his stock of it, but not as fast as his stock increases. If his stock of it increases at a uniform rate the benefit derived from it increases at a diminishing rate. In other words, the additional benefit which a person derives from a given increase of his stock of a thing, diminishes with every increase in the stock that he already has.

That part of the thing which he is only just induced to purchase may be called his *marginal purchase*, because he is on the margin of doubt whether it is worth his while to incur the outlay required to obtain it. And the utility of his marginal purchase may be called the marginal utility of the thing to him. Or, if instead of buying it, he makes the thing himself, then its marginal utility is the utility of that part which he thinks it only just worth his while to make. And thus the law just given may be worded:-

The marginal utility of a thing to anyone diminishes with every increase in the amount of it he already has.(2*)

There is however an implicit condition in this law which should be made clear. It is that we do not suppose time to be allowed for any alteration in the character or tastes of the man himself. It is therefore no exception to the law that the more good music a man hears, the stronger is his taste for it likely to become; that avarice and ambition are often insatiable; or that the virtue of cleanliness and the vice of drunkenness alike grow on what they feed upon. For in such cases our observations range over some period of time; and the man is not the same at the beginning as at the end of it. If we take a man as he is,

without allowing time for any change in his character, the marginal utility of a thing to him diminishes steadily with every increase in his supply of it.(3*)

2. Now let us translate this law of diminishing utility into terms of price. Let us take an illustration from the case of a commodity such as tea, which is in constant demand and which can be purchased in small quantities. Suppose, for instance, that tea of a certain quality is to be had at 2s. per lb. A person might be willing to give 10s. for a single pound once a year rather than go without it altogether; while if he could have any amount of it for nothing he would perhaps not care to use more than 30 lbs. in the year. But as it is, he buys perhaps 10 lbs. in the year; that is to say, the difference between the satisfaction which he gets from buying 9 lbs. and I 0 lbs. is enough for him to be willing to pay 2s. for it: while the fact that he does not buy an eleventh pound, shows that he does not think that it would be worth an extra 2s. to him. That is, 2s. a pound measures the utility to him of the tea which lies at the margin or terminus or end of his purchases; it measures the marginal utility to him. If the price which he is just willing to pay for any pound be called his demand price, then 2s. is his marginal demand price. And our law may be worded:-
    The larger the amount of a thing that a person has the less, other things being equal (i.e. the purchasing power of money, and the amount of money at his command being equal), will be the price which he will pay for a little more of it: or in other words his marginal demand price for it diminishes.
    His demand becomes efficient, only when the price which he is willing to offer reaches that at which others are willing to sell.
    This last sentence reminds us that we have as yet taken no account of changes in the marginal utility of money, or general purchasing power. At one and the same time, a person's material resources being unchanged, the marginal utility of money to him is a fixed quantity, so that the prices he is just willing to pay for two commodities are to one another in the same ratio as the utility of those two commodities.

3. A greater utility will be required to induce him to buy a thing if he is poor than if he is rich. We have seen how the clerk with £100 a year will walk to business in a heavier rain than the clerk with £300 a year.(4*) But although the utility, or the benefit, that is measured in the poorer man's mind by twopence is greater than that measured by it in the richer man's mind; yet if the richer man rides a hundred times in the year and the poorer man twenty times, then the utility of the hundredth ride which the richer man is only just induced to take is measured to him by twopence; and the utility of the twentieth ride which the poorer man is only just induced to take is measured to him by twopence. For each of them the marginal utility is measured by twopence; but this marginal utility is greater in the case of the poorer man than in that of the richer.
    In other words, the richer a man becomes the less is the marginal utility of money to him; every increase in his resources increases the price which he is willing to pay for any given benefit. And in the same way every diminution of his resources increases the marginal utility of money to him, and diminishes the price that he is willing to pay for any benefit.(5*)

4. To obtain complete knowledge of demand for anything, we should have to ascertain how much of it he would be willing to purchase at each of the prices at which it is likely to be offered; and the circumstance of his demand for, say, tea can be best expressed by a list of the prices which he is willing to pay; that is, by his several demand prices for different amounts of it. (This list may be called his demand schedule.)
    Thus for instance we may find that he would buy

6 lbs. at 50d. per lb.		10 lbs. at 24d. per lb.	
7 "	40 "	11 "	21 "
8 "	33 "	12 "	19 "
9 "	28 "	13 "	17 "

If corresponding prices were filled in for all intermediate amounts we should have an exact statement of his demand.(6*) We cannot express a person's demand for a thing by the "amount he is willing to buy" or by the "intensity of his eagerness to buy a certain amount," without reference to the prices at which he would buy that amount and other amounts. We can represent it exactly only by lists of the prices at which he is willing to buy different amounts.(7*)

When we say that a person's demand for anything increases, we mean that he will buy more of it than he would before at the same price, and that he will buy as much of it as before at a higher price. A general increase in his demand is an increase throughout the whole list of prices at which he is willing to purchase different amounts of it, and not merely that he is willing to buy more of it at the current prices.(8*)

5. So far we have looked at the demand of a single individual. And in the particular case of such a thing as tea, the demand of a single person is fairly representative of the general demand of a whole market: for the demand for tea is a constant one; and, since it can be purchased in small quantities, every variation in its price is likely to affect the amount which he will buy. But even among those things which are in constant use, there are many for which the demand on the part of any single individual cannot vary continuously with every small change in price, but can move only by great leaps. For instance, a small fall in the price of hats or watches will not affect the action of every one; but it will induce a few persons, who were in doubt whether or not to get a new hat or a new watch, to decide in favour of doing so.

There are many classes of things the need for which on the part of any individual is inconstant, fitful, and irregular. There can be no list of individual demand prices for wedding-cakes, or the services of an expert surgeon. But the economist has little concern with particular incidents in the lives of individuals. He studies rather "the course of action that may be expected under certain conditions from the members of an industrial group," in so far as the motives of that action are measurable by a money price; and in these broad results the variety and the fickleness of individual action are merged in the comparatively regular aggregate of the action of many.

In large markets, then -where rich and poor, old and young, men and women, persons of all varieties of tastes, temperaments and occupations are mingled together,- the peculiarities in the wants of individuals will compensate one another in a comparatively regular gradation of total demand. Every fall, however slight in the price of a commodity in general use, will, other things being equal, increase the total sales of it; just as an unhealthy autumn increases the mortality of a large town, though many persons are uninjured by it. And therefore if we had the requisite knowledge, we could make a list of prices at which each amount of it could find purchasers in a given place during, say, a year.

The total demand in the place for, say, tea, is the sum of the demands of all the individuals there. Some will be richer and some poorer than the individual consumer whose demand we have just written down; some will have a greater and others a smaller liking for tea than he has. Let us suppose that there are in the place a million purchasers of tea, and that their average consumption is equal to his at each several price. Then the demand of that place is represented by the same list of prices as before, if we write a million pounds of tea instead

of one pound.(9*)

There is then one general law of demand: -The greater the amount to be sold, the smaller must be the price at which it is offered in order that it may find purchasers; or, in other words, the amount demanded increases with a fall in price, and diminishes with a rise in price. There will not be any uniform relation between the fall in price and the increase of demand. A fall of one-tenth in the price may increase the sales by a twentieth or by a quarter, or it may double them. But as the numbers in the left-hand column of the demand schedule increase, those in the right-hand column will always diminish.(10*)

The price will measure the marginal utility of the commodity to each purchaser individually: we cannot speak of price as measuring marginal utility in general, because the wants and circumstances of different people are different.

6. The demand prices in our list are those at which various quantities of a thing can be sold in a market during a given time and under given conditions. If the conditions vary in any respect the prices will probably require to be changed; and this has constantly to be done when the desire for anything is materially altered by a variation of custom, or by a cheapening of the supply of a rival commodity, or by the invention of a new one. For instance, the list of demand prices for tea is drawn out on the assumption that the price of coffee is known; but a failure of the coffee harvest would raise the prices for tea. The demand for gas is liable to be reduced by an improvement in electric lighting; and in the same way a fall in the price of a particular kind of tea may cause it to be substituted for an inferior but cheaper variety.(11*)

Our next step will be to consider the general character of demand in the cases of some important commodities ready for immediate consumption. We shall thus be continuing the inquiry made in the preceding chapter as to the variety and satiability of wants; but we shall be treating it from a rather different point of view, viz. that of price statistics.(12*)

NOTES:

1. It cannot be too much insisted that to measure directly, or per se, either desires or the satisfaction which results from their fulfilment is impossible, if not inconceivable. If we could, we should have two accounts to make up, one of desires, and the other of realized satisfactions. And the two might differ considerably. For, to say nothing of higher aspirations, some of those desires with which economics is chiefly concerned, and especially those connected with emulation, are impulsive; many result from the force of habit; some are morbid and lead only to hurt; and many are based on expectations that are never fulfilled. (See above I, II, sections 3, 4) Of course many satisfactions are not common pleasures, but belong to the development of man's higher nature, or to use a good old word, to his beatification; and some may even partly result from self abnegation. (See I, II, sec. 1) The two direct measurements then might differ. But as neither of them is possible, we fall back on the measurement which economics supplies, of the motive or moving force to action: and we make it serve, with all its faults, both for the desires which prompt activities and for the satisfactions that result from them. (Compare "Some remarks on Utility" by Prof. Pigou in the *Economic Journal* for March, 1903.)

2. See Note I in the *Mathematical Appendix* at the end of the Volume. This law holds a priority of position to the law of diminishing return from land; which however has the priority in time; since it was the first to be subjected to a rigid analysis of a semi-mathematical character. And if by anticipation we borrow some of its terms, we may say that the return of pleasure which a person gets from each additional dose of a commodity diminishes till at last a margin is reached at which it is no longer worth his while to acquire any more of it.

The term marginal utility (Grenz-nutz) was first used in this connection by the Austrian Wieser. It has been adopted by Prof. Wicksteed. It corresponds to the term Final used by Jevons, to whom Wieser makes his acknowledgments in the Preface (p. xxiii of the English edition). His list of anticipators of his doctrine is headed by Gossen, 1854.

3. It may be noticed here, though the fact is of but little practical importance, that a small quantity of a commodity may be insufficient to meet a certain special want; and then there will be a more than proportionate increase of pleasure when the consumer gets enough of it to enable him to attain

the desired end. Thus, for instance, anyone would derive less pleasure in proportion from ten pieces of wall paper than from twelve, if the latter would, and the former would not, cover the whole of the walls of his room. Or again a very short concert or a holiday may fail of its purpose of soothing and recreating: and one of double length might be of more than double total utility. This case corresponds to the fact, which we shall have to study in connection with the tendency to diminishing return, that the capital and labour already applied to any piece of land may be so inadequate for the development of its full powers, that some further expenditure on it even with the existing arts of agriculture would give a more than proportionate return; and in the fact that an improvement in the arts of agriculture may resist that tendency, we shall find an analogy to the condition just mentioned in the text as implied in the law of diminishing utility.

4. See I, II, sec. 2.

5. See Note II in the *Mathematical Appendix*.

6. Such a demand schedule may be translated, on a plan now coming into familiar use, into a curve that may be called his demand curve. Let Ox and Oy be drawn the one horizontally, the other vertically. Let an inch measured along Ox represent 10 lbs. of tea, and an inch measured along Oy represent 40d.

      tenths of   fortieths of
      an inch.   an inch.

 Take Om1 = 6, and draw m1p1 = 50
        Om2 = 7   "   "   m2p2 = 40
        Om3 = 8   "   "   m3p3 = 33
        Om4 = 9   "   "   m4p4 = 28
        Om5 = 10 "   "   m5p5 = 24
        Om6 = 11 "   "   m6p6 = 21
        Om7 = 12 "   "   m7p7 = 19
        Om8 = 13 "   "   m8p8 = 17

m1 being on Ox and m1p1 being drawn vertically from m1; and so for the others. Then p1 p2... p8 are points on his demand curve for tea; or as we may say demand points. If we could find demand points in the same manner for every possible quantity of tea, we should get the whole continuous curve DD' as shown in the figure. This account of the demand schedule and curve is provisional; several difficulties connected with it are deferred to chapter v.

7. Thus Mill says that we must " mean by the word demand, the quantity demanded, and remember that this is not a fixed quantity, but in general varies according to the value." (*Principles*, III, II, sec. 4) This account is scientific in substance; but it is *not clearly expressed and it has been much misunderstood*. Cairnes prefers to represent "demand as the desire for commodities and services, seeking its end by an offer of general purchasing power, and supply as the desire for general purchasing power, seeking its end by an offer of specific commodities or services." He does this in order that he may be able to speak of a ratio, or equality, of demand and supply. But the quantities of two desires on the part of two different persons cannot be compared directly; their measures may be compared, but not they themselves. And in fact Cairnes is himself driven to speak of supply as "limited by the quantity of specific commodities offered for sale, and demand by the quantity of purchasing power offered for their purchase." But sellers have not a fixed quantity of commodities which they offer for sale unconditionally at whatever price they can get: buyers have not a fixed quantity of purchasing power which they are ready to spend on the specific commodities, however much they pay for them. Account must then be taken in either case of the relation between quantity and price, in order to complete Cairnes' account, and when this is done it is brought back to the lines followed by Mill. He says, indeed, that "Demand, as defined by Mill, is to be understood as measured, not, as my definition would require, by the quantity of purchasing power offered in support of the desire for commodities, but by the quantity of commodities for which such purchasing power is offered." It is true that there is a great difference between the statements, "I will buy twelve eggs," and "I will buy a shilling's Worth of eggs." But there is no substantive difference between the statement, "I will buy twelve eggs at a penny each, but only six at three halfpence each," and the statement, "I will spend a shilling on eggs at a penny each, but if they cost three halfpence each I will spend ninepence on them." But while Cairnes' account when completed becomes substantially the same as Mill's, its present form is even more misleading. (See an article by the present writer on Mill's Theory of Value in the *Fortnightly Review* for April, 1876)

8. We may sometimes find it convenient to speak of this as a raising of his demand schedule. Geometrically it is represented by raising his demand curve, or, what comes to the same thing, moving it to the right, with perhaps some modification of its shape.

9. The demand is represented by the same curve as before, only an inch measured along Ox now represents ten million pounds instead of ten pounds. And a formal definition of the demand curve for a market may be given thus:-The demand curve for any commodity in a market during any given unit of time is the locus of demand points for it. That is to say, it is a curve such that if from any point P on it, a straight line PM be drawn perpendicular to Ox, PM represents the price at which purchasers will be forthcoming for an amount of the commodity represented by OM.

10. That is, if a point moves along the curve away from Oy it will constantly approach Ox. Therefore if a straight line PT be drawn touching the curve at P and meeting Ox in T, the angle PTx is an obtuse angle. It will be found convenient to have a short way of expressing this fact; which may be done by saying that PT is inclined negatively. Thus the one universal rule to which the demand curve conforms is that it is inclined negatively throughout the whole of its length.

   It will of course be understood that "the law of demand" does not apply to the demand in a campaign between groups of speculators. A group, which desires to unload a great quantity of a thing on to the market, often begins by buying some of it openly. When it has thus raised the price of the thing, it arranges to sell a great deal quietly, and through unaccustomed channels. See an article by Professor Taussig in the *Quarterly Journal of Economics* (May, 1921, p. 402).

11. It is even conceivable, though not probable, that a simultaneous and proportionate fall in the price of all teas may diminish the demand for some particular kind of it; if it happens that those whom the increased cheapness of tea leads to substitute a superior kind for it are more numerous than those who are led to take it in the place of an inferior kind. The question where the lines of division between different commodities should be drawn must be settled by convenience of the particular discussion. For some purposes it may be best to regard Chinese and Indian teas, or even Souchong and Pekoe teas, as different commodities; and to have a separate demand schedule for each of them. While for other purposes it may be best to group together commodities as distinct as beef and mutton, or even as tea and coffee, and to have a single list to represent the demand for the two combined; but in such a case of course some convention must be made as to the number of ounces of tea which are taken as equivalent to a pound of coffee.

   Again, a commodity may be simultaneously demanded for several uses (for instance there may be a "composite demand" for leather for making shoes and portmanteaus); the demand for a thing may be conditional on there being a supply of some other thing without which it would not be of much service (thus there may be a "joint demand" for raw cotton and cotton-spinners' labour). Again, the demand for a commodity on the part of dealers who buy it only with the purpose of selling it again, though governed by the demand of the ultimate consumers in the background, has some peculiarities of its own. But all such points may best be discussed at a later stage.

12. A great change in the manner of economic thought has been brought about during the present generation by the general adoption of semi-mathematical language for expressing the relation between small increments of a commodity on the one hand, and on the other hand small increments in the aggregate price that will be paid for it: and by formally describing these small increments of price as measuring corresponding small increments of pleasure. The former, and by far the more important, step was taken by Cournot (*Recherches sur les Principes Mathematiques de la Theorie des Richesses*, 1838); the latter by Dupuit (*De la Mesure d'utiiite des travaux publics* in the *Annales des Ponts et Chaussees*, 1844), and by Gossen (*Entwickelung der Gesetze des menschlichen Verkehrs*, 1854). But their work was forgotten; part of it was done over again, developed and published almost simultaneously by Jevons and by Carl Menger in 1871, and by Walras a little later. Jevons almost at once arrested public attention by his brilliant lucidity and interesting style. He applied the new name final utility so ingeniously as to enable people who knew nothing of mathematical science to get clear ideas of the general relations between the small increments of two things that are gradually changing in causal connection with one another. His success was aided even by his faults. For under the honest belief that Ricardo and his followers had rendered their account of the causes that determine value hopelessly wrong by omitting to lay stress on the law of satiable wants, he led many to think he was correcting great errors; whereas he was really only adding very important explanations. He did excellent work in insisting on a fact which is none the less important, because his predecessors, and even Cournot, thought it too obvious to be explicitly mentioned, viz. that the diminution in the amount of a thing demanded in a market indicates a diminution in the intensity of the desire for it on the part of individual consumers, whose wants are becoming satiated. But he has led many of his readers into a confusion between the provinces of Hedonics and Economics, by exaggerating the applications of his favourite phrases, and speaking (*Theory*, 2nd Edn, p. 105) without qualification of the price of a thing as measuring its final utility not only to an individual, which it can do, but also to "a trading body," which it cannot do. These points are developed later on in Appendix I on Ricardo's Theory of value. It should be added that Prof. Seligman has shown (*Economic Journal*, 1903, pp. 356-63) that a long-forgotten Lecture, delivered by Prof. W.F. Lloyd at Oxford in 1833, anticipated many of the central ideas of the present doctrine of utility.

   An excellent bibliography of Mathematical Economics is given by Prof. Fisher as an appendix to Bacon's translation of Cournot's *Researches*, to which the reader may be referred for a more detailed account of the earlier mathematical writings on economics, as well as of those by Edgeworth, Pareto, Wicksteed, Auspitz, Lieben and others. Pantaleoni's Pure Economics, amid

much excellent matter, makes generally accessible for the first time the profoundly original and vigorous, if somewhat abstract, reasonings of Gossen.