

THE
PURE THEORY OF (DOMESTIC) VALUES.

CHAPTER I.

§ 1. IN the present part of the treatise we are concerned with the causes which determine the relative values of commodities produced in the same country under the action of free competition. This theory is called by Mill and others the "theory of Value," but I prefer to call it "the theory of Domestic values." For the term "theory of value" is a generic term, and ought, I think, to be interpreted so as to include the theory of Domestic values and the theory of International values. The apparatus of diagrams which was best adapted for the investigation of the latter will not be of service here; where another apparatus must accordingly be supplied.

The necessity of this change can be easily seen. For in the theory of international values it is important to bring out the similarity between the positions in which the country that buys and the country that sells any particular ware stand to one another. And, to refer to the example of foreign trade which was discussed in the previous Part, the economic causes that govern Germany's willingness to exchange her linen for English cloth are in every respect homogeneous with those that govern England's willingness to exchange her cloth for German linen. It was expedient, therefore, that the curves which represented the respective demands of England and Germany should be drawn on the same principle. This would not have been effected if we had taken distances along Ox to represent numbers of yards of cloth, and distances measured along Oy to represent the exchange value of cloth in terms of linen. Such an arrangement of the diagrams would have some advantages; but it would have involved the laying down of two complete sets of

laws for the construction of the curves; so that, in fact, the laws which governed the shape of Germany's curve would have been in no respect similar to or symmetrical with those which governed the shape of England's curve. This want of symmetry would have marred, though it would not have rendered impracticable, the application of the method of diagrams to the more elementary portions of the theory; but in other portions it would have led to unmanageable complications.

In the theory of Domestic values on the other hand, the causes that determine the price at which producers are willing to bring into the market any given amount of a commodity are, in most respects, of a different character from the causes which determine the price at which consumers are willing to buy any given amount. There is not in the nature of the case any symmetry between these two sets of causes. Therefore it is useless to attempt to express the operation of these two sets of causes by curves, the laws of which shall be symmetrical.

It may at first sight seem that in consequence of the absence of symmetry the diagrams which interpret the pure theory of Domestic values must be very complex. But it is not so; for this theory, although in one respect it is at a disadvantage relatively to the pure theory of International values, yet has a compensating advantage. In the theory of Domestic values it is not necessary to consider at one time the special circumstances of more than one commodity; whereas in the theory of International values, with the partial exception of a certain portion of it, to be discussed hereafter, it is necessary to consider together the circumstances that govern the demand for at least two commodities, as e.g. cloth and linen. The importance of this advantage is so great that the application of the method of diagrams to the former theory involves on the whole less difficulty than does its application to the latter theory.

§ 2. The progress of the theory of Domestic values has been much hindered by contentions as to the relation in which value stands to "cost of production," and the meaning which is to be attributed to this phrase. The phrase is used in two different senses. Sometimes it means the sum total of the efforts and abstinences which have been undergone by the various labourers and capitalists who have had share in the production. At other times it means the economic measure of these efforts and abstinences, i.e. the price that must be paid by any person who wishes to purchase them.

In the present investigation we are concerned with cost of production only in its latter use, or, as I prefer saying, with "expenses of production." We have to deal only with the machinery of exchange. We have not to estimate the fatigue

or discomfort which must be undergone by those who perform any given task; we have only to consider the price which must be paid to them in order to induce them to perform it. We have to consider the consequences which result from the great central law of economic science.

This law is that "producers, each governed under the sway of free competition by calculations of his own interest, will endeavour so to regulate the amount of any commodity which is produced for a given market during a given period, that this amount shall be just capable on the average of finding purchasers during this period at a remunerative price. A remunerative price is to be interpreted to be a price which shall be just equal to the sum of the exchange or economic measures of those efforts and sacrifices which are required for the production of the commodity when the amount in question is produced. These economic measures are the expenses which must be incurred by a person who would purchase the performance of these efforts and sacrifices¹."

Accordingly, we take as before two fixed straight lines Ox and Oy at right angles to one another. But while we take distances along Ox to represent amounts of the commodity in question, we must take distances measured along Oy to represent values of a unit of the commodity; as e.g. a ton, if the commodity be coal; a yard, if the commodity be cloth, &c. These values must be measured in terms of some other commodity; in general it is convenient to measure them in terms of money, or, which is the same thing, in terms of command over commodities in general, so that distances measured along Oy represent prices. The curves are capable of being applied in the solution of many problems concerning market values. But here they will be applied only to average values.

§ 3. Let us consider first the curve which represents the circumstances of the average demand in a given market for a particular commodity; say for coal, supposed to be all of uniform quality. The market may be a district of any size; it may be the whole of a country. The amount of coals which will be bought or "demanded" in a given time, say in a year, will depend upon the average price at which they are offered for sale. Thus, if it is possible to dispose of, say, a million tons annually in this market, at an average price of 25s. a ton; it would not have been possible to dispose of eleven hundred thousand tons annually, save at a lower price, say at an average of 23s. a ton. Let us suppose that we know the price at which each several amount of coals can be disposed of annually. If

¹ From an article by the present writer in the *Fortnightly Review* for April, 1876.

then we measure numbers of tons of coals along Ox and the number of shillings in the price of a ton of coals along Oy , we may draw what may be called "the Demand curve," thus: Let M be any point on Ox (fig. 20), and let the price at which it is possible to dispose of OM_1 coals annually be estimated and found to be equal to ON_1 . 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 , and finding the position of P_1 corresponding to each position of M_1 , we can obtain a continuous series of positions for P_1 ; i. e. we can make P_1 describe the curve which we are seeking.

Of course it may not be possible to conjecture, with any approach to accuracy, the price at which it would be possible to dispose of a quantity of the commodity, either very much greater or very much less than that amount which is wanted to be sold in the market in question. Consequently in the discussion of any particular practical problem the demand curve can be regarded as trustworthy, only within somewhat narrow limits on either side of this amount. But this difficulty is of importance only in connexion with Applied Economics. In Pure Economics, with which alone we are concerned here, we may suppose the curve to be properly drawn throughout its whole length.

Recollecting that P_1M_1 is equal to ON_1 , we may define the Demand curve thus:

The Demand curve DD_1 for a commodity in a market 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 the market in each year (or other given period).

Since every increase in OM_1 causes a decrease in PM_1 , a point moving from D along DD_1 will continually increase its distance from Oy and diminish its distance from Ox . We may here recall a definition already given. It has been said:

Whatever portion of a curve lies in such a direction that a point which moves along it so as to recede from Ox recedes also from Oy ; that portion of the curve is said to be *inclined positively*. Conversely, whatever portion of a curve lies in such a direction that a point which moves along it so as to recede from Ox approaches Oy ; that portion of the curve is said to be *inclined negatively*.

With this definition we may enunciate

PROP. XVII. *The Demand Curve is throughout inclined negatively.*

§ 4. On similar principles we may draw the curve which

represents the circumstances of the average supply of the commodity: or as we may say, "the Supply Curve." It may be that every increase in the amount supplied involves a more than proportional increase in the expense of producing it. Thus we may suppose that if a million tons annually can be raised and brought into the market at a price of 25s. a ton, the requisite allowance being made for traders' profits of various kinds; that for an annual supply of nine hundred thousand tons, a price of 23s. would be sufficient; but that for an annual supply of eleven hundred thousand tons, a price of 27s. would be required. Let us suppose that we know the price which is sufficient to cover the expenses of production of each several amount of coal supplied annually in the market. We may then draw the Supply curve thus:

Let M_2 be any point on Ox , fig. 20. Let the price which will just cover the expenses of producing and bringing into the market OM_2 tons of coal annually be calculated and found equal to ON_2 . 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 ; i. e. we can make P_2 describe the curve which we are seeking.

The calculations necessary for drawing the Supply curve in any particular practical problem, are in general trustworthy only for amounts either very much greater or very much less than that which is wanted actually to be sold in the market in question. But as has been already remarked with reference to the Demand curve, this difficulty does not prevent us from reasoning in pure Economics on the supposition that the curve is properly drawn throughout its whole length.

We may then define the Supply curve thus:

The Supply curve SS' for a commodity in a market 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 price per unit at which a supply of the commodity of which the amount is represented by OM_2 can be remuneratively produced and brought into the market in each year (or other given period).

The law which governs the shape of this curve is not so simple as the corresponding law for the Demand curve. Some remarks will be made in the following section as to the manner in which an increase in the total production of any commodity affects the price at which its producers can afford to offer it for sale. For the present we may assume that in general an increase in the production of a raw commodity can be effected only at a more than proportionately increased expense: while an increase in

the demand for manufactured commodities in most cases tends to a diminution of the price at which they can be offered for sale. Thus if SS' be the Supply curve for a raw commodity, the law in most but not in all cases will be, that if a point moves from S along the curve it will increase its distance from Ox at the same time that it increases its distance from Oy : or in other words, that the curve is inclined positively throughout. If, however, SS' be the Supply curve for a manufactured commodity, the law in most, but not in all, cases will be that if a point moves from S along the curve, it will while increasing its distance from Oy diminish its distance from Ox . But after the point has moved in this way for a certain distance, it may cease to approach Ox , and begin to recede from it. For it may happen that a further increase in the amount produced will not render possible any important further economies in the production; and that in consequence of the increasing expense to which manufacturers are put in obtaining additional supplies of the raw material or of labour, any further increase in the amount produced can be profitably effected only at an increased price. But again, the production of an amount considerably larger than this may render possible further economies of such magnitude as to outweigh the tendency which the expense of obtaining additional supplies of labour and of raw material has to increase the price at which the commodity can be produced. So that as the point continues to move along SS' it may, while continuing to recede from Oy , again commence to approach Ox , and so on. Thus SS' may have the shape that is given to it in fig. 21. This result may be expressed by saying that it is possible that some portions of the supply curve may be positively inclined and others negatively. It is, however, obvious that the Supply curve cannot bend backwards after the manner of the curve drawn in fig. 22. For the circumstances on which the difficulty of production of any given amount OM_2 of the commodity depends, being definite; it cannot be true that each of two prices P_2M_2 and QM_2 is just sufficient to render remunerative the production of the same amount OM_2 . Hence we obtain the only law to which the Supply curve must in all cases conform, viz.:

PROP. XVIII. *The Supply Curve cannot cut twice any vertical straight line.*

It may be observed that the law that has been given with regard to the shape of the Demand curve includes the law:

The Demand curve cannot cut twice either any vertical straight line or any horizontal straight line.

The extent to which § 5. No attempt can be made in the present work fully to investigate the data which would be required for the construc-

tion of the supply curve in any particular case. For in such an attempt it would be necessary to work over a very large portion of the ground covered by the science of applied Economics. Enough has been said to indicate to those who are already acquainted with that science the general character of the required investigation¹. But I would venture to remark that the customary method of treating the advantages of division of labour and of production on a large scale appears to me to be in one respect defective. For the manner in which these advantages are discussed in most Economic treatises is such as to imply that the most important of them can as a rule be obtained only by the concentration of large masses of workmen in vast establishments. If this were the rule, it would be reasonable to object that the introduction of economies into the process of manufacture does not depend directly and in the main on the magnitude of the total amount of the commodity produced. It may indeed be argued that an industry which gives employment to only some twenty thousand men altogether may happen to be concentrated in the hands of a few large firms, and may thus have command over most of the more important advantages of production on a large scale. And it may be argued that industries of far larger dimensions may be conducted almost entirely by small masters. Such, for instance, is the case with some of the metal trades and with the trades of boot-making and tailoring in England. The answer to this objection is twofold.

In the first place it must be insisted that such industries as the two last mentioned are not fairly to be classed as manufacturing industries. For in them the producer who is brought into immediate contact with the consumer is generally in a position of great advantage relatively to the manufacturer, who lives at a distance from the ultimate purchaser of his wares, and who has to make them to fit a number of lay models. But even in trades of this class, when the progress of invention renders possible important economies of which none but large establishments can avail themselves, such establishments will rise more speedily and more surely if the total demand for the produce of the industry is great than if it is small. I may quote, in illustration of this principle, the history of the boot-making trade in America: in which the growth of large establishments and a localized industry has been simultaneous with the development of various forms of the sewing machine and of other great economies in manufacture. And the clothing trades in America and elsewhere appear to be entering upon a similar phase.

We may then properly limit the title of manufacturing

¹ But compare the Appendix on Mill's *Theory of Value*.

the economies derived from manufacturing on a large scale depend on the amount of the total production.

Characteristics of industries

which may properly be called manufacturing industries to those the produce of which is adapted for being dealt with wholesale, which do not require the producer to be brought into immediate contact with the consumer; which are not concerned with raising raw produce from the earth; and which give scope for various forms of specialised skill and specialised machinery.

The term manufacturing industries when thus limited will include the metal trades which have been referred to as being mainly in the hands of small masters. This brings us to the second portion of the answer to the objection with which we are dealing. For in these trades the advantages of production on a large scale can in general be as well attained by the aggregation of a large number of small masters into one district as by the erection of a few large works. It is true that the disadvantages under which the small masters lie in the competition with large firms are increasing more rapidly than are their peculiar advantages; and that in most though not in all directions there is a tendency for small masters to be supplanted. But in the metal trades in question, and in many others, the advantages which are generally classed under the heads of division of labour and production on a large scale can be attained almost as fully by the aggregation into one district of many establishments of a moderate size as by the erection of a few huge factories. The customary method of treating the advantages of division of labour appears to me to be defective, inasmuch as it takes but little account of this fact. I cannot, however, do more here than indicate in outline an explanation of it.

The advantages which a large industry, particularly if it be localized, may have even if it be not conducted in large establishments.

Firstly, with regard to many classes of commodities it is possible to divide the process of production into several stages, each of which can be performed with the maximum of economy in a small establishment: though the larger capitalists have even in these cases superior advantages as regards the buying of materials, and occasionally as regards the selling of that which they produce. If there exist a large number of such small establishments specialised for the performance of a particular stage of the process of production, there will be room for the profitable investment of capital in the organising of subsidiary industries adapted for meeting their special wants. The most important of these subsidiary industries fall chiefly into two groups.

Subsidiary industries. One of these groups is occupied with making the special tools and machinery required for this stage of the production. Such a task offers large scope for enterprise both in other ways and in particular in the invention and erection of machinery designed for making these special tools and machinery. But in order that such a task may be efficiently performed, it is neces-

sary that the total demand for these tools and machinery should be very great.

The other group of subsidiary industries is occupied with collecting and distributing the various materials and other commodities which are required by the small establishments in question, and with collecting and distributing the produce of their work. This task will be performed partly by carriers, including those who make and manage railways and canals: partly by intermediate traders, some on a small scale and some on a large. In this class of subsidiary industries are to be reckoned also the trade newspaper and other agencies for collecting and disseminating information relating to particular trades.

Secondly, among the most important of the economies which are available in the production of many classes of commodities are those which are concerned with the education of specialised skill. When large masses of men in the same locality are engaged in similar tasks, it is found that, by associating with one another, they educate one another. To use a mode of speaking which workmen themselves use, the skill required for their work "is in the air, and children breathe it as they grow up." Moreover, a man who has the faculties required for the work of a foreman, or for any specially difficult class of manual work, is likely soon to be put to the best work for which he is fitted, if there are in his neighbourhood many workshops in which he may seek a berth. Thus nascent talent is quickly and surely developed. Again, the large extent of the market in which employers can seek skilled labour makes it easy for them, when they want to extend their business, to obtain additional supplies of ready trained workmen. And they escape that disorganisation of their business, which would arise if they could not easily fill up the gap occasioned by the illness or death of a foreman or other highly skilled workman.

Thirdly, if the total number of firms engaged in a particular industry is small, there are but few men in a position to make improvements in the processes of manufacture, to invent new machines and new methods. But when the total number of men interested in the matter is very large there are to be found among them many who, by their intellect and temper, are fitted to originate new ideas. Each new idea is canvassed and improved upon by many minds; each new accidental experience and each deliberate experiment will afford food for reflection and for new suggestions, not to a few persons but to many. Thus in a large localised industry new ideas are likely to be started rapidly: and each new idea is likely to be fertile of practical improvements.

The education and economy of technical skill.

The inter-communication of ideas.

This inter-communication of ideas has in recent times been rendered possible to a considerable extent, even in trades that are not localised, by the trade newspapers, to which reference has already been made. But such a newspaper cannot have an adequate supply of able editors and correspondents unless the trade interests with which it deals are on a sufficiently great scale to enable it to obtain a large circulation.

It may then be concluded that an increase in the total amount of a commodity manufactured can scarcely fail to occasion increased economies in the production, whether the task of production is distributed among a large number of small capitalists, or is concentrated in the hands of a comparatively small number of large firms.

§ 6. We shall want to represent geometrically the scale on which the total production of the commodity in question is being actually carried on at any particular time. For this purpose we have the following

DEFINITION. R (fig. 22 A) being a point on Ox , let OR measure the amount of the commodity which would be produced in a year if the scale on which the production is carried on at a given time were continued uniformly. Then R is the *Amount-index* at that time¹.

With this definition we may enunciate the fundamental

PROP. XIX. *Let a vertical straight line drawn through the Amount-index cut the Demand curve in d , and the Supply curve in s . If d is above s the Amount-index will tend to move to the right. If d is below s the Amount-index will tend to move to the left. If d coincides with s , as at A , the Amount-index will be in equilibrium, tending to move neither to the right nor to the left.*

For, R being the Amount-index, an amount OR can be produced just at the price Rs , and can be disposed of at the price Rd . If then Rd is greater than Rs , the producers will make at an expense Rs what they can sell at the price Rd ; and will thus obtain over and above the ordinary profits on their capital a profit sd on each unit of the commodity they produce. The trade will therefore be exceptionally profitable, and capital will flow into it. Thus an increased amount of the commodity will be produced; or in other words, the Amount-index will move to the right. Again, if Rd , the price at which the amount OR can be disposed of annually in the market, be less than Rs , the price which is required to enable the business to return the ordinary profits to the capitalist, capital will leave the trade. Thus the production of the commodity will be diminished;

¹ Compare the definition of the term "Exchange-index" and the remarks on it in the *Pure Theory of Foreign Trade*, c. 1. § 9.

that is, the Amount-index will move to the left. But if Rd be equal to Rs , the trade will return the ordinary profits to the capitalist; and there will be no tendency for the Amount-index to move either to the right or to the left. Of course Rd is equal to Rs when R is vertically below a point of intersection of the Demand and Supply curves. We may then formulate

PROP. XX. *The Amount-index is in equilibrium whenever it is vertically below any point of intersection of the Demand and Supply curves.*

It follows from Prop. XIX. that if in fig. 20 the Amount-index be anywhere between O and H it will tend to move to the right; if anywhere beyond H it will tend to move to the left. So in fig. 21 if the Amount-index be between O and T it will tend to move to the left; if between T and H , to the right; if between H and K , to the left; if between K and L , to the right; if beyond L , to the left. These results are indicated in each figure by arrowheads placed along Ox . They may be expressed by saying that A in fig. 20 and A and C in fig. 21 are points of stable equilibrium. But E and B in fig. 21 are points of unstable. For we may give the following

DEFINITION. If the Amount-index on being slightly displaced from any position in which it is at equilibrium tends to return to that position, the equilibrium is said to be *stable*; if not, it is said to be *unstable*. Thus, as an immediate consequence from Prop. XIV., we obtain

PROP. XXI. *The equilibrium of the Amount-index corresponding to any point of intersection of the Demand and Supply curves is stable or unstable according as the Demand curve lies above or below the Supply curve just to the left of that point.*

If the curves touch one another at any point, the equilibrium corresponding to it will be stable for displacements in one direction, and unstable for displacements in the other. No practical interest attaches to the investigation of this case¹.

It is obvious that if we move along either of the curves in either direction from one point of stable equilibrium to the next, we must pass through a point of unstable equilibrium. In other words, in cases in which the curves cut each other more than once points of stable and unstable equilibrium alternate.

Also the last point of intersection reached as we move to the right must be a point of stable equilibrium. For if the amount produced were increased indefinitely the price at which it could be sold would necessarily fall almost to zero: but the

¹ Compare the remarks on the analogous case, *Pure Theory of Foreign Trade*, c. 11. § 4.

price required to cover its expenses of production would not so fall. Therefore if a point moves to the right along the Supply curve it must ultimately rise and remain above the Demand curve.

The first point of intersection arrived at as we proceed from left to right may be a point either of stable or of unstable equilibrium. If, as in fig. 21, it be a point of unstable equilibrium, this fact will indicate that the production of the commodity in question on a small scale will not remunerate the producers. So that this production cannot be commenced at all unless some passing necessity has caused temporarily an urgent demand for the commodity of a character similar to that represented by the dotted curve in the figure. But the production, when once fairly started, could be carried on profitably.

§ 7. In discussing the unstable equilibrium which was met with in the theory of foreign trade some remarks were made (Part II. Ch. III. § 7) with regard to the fact that in Economics every event causes permanent alterations in the conditions under which future events can occur. To these the reader is referred. It was argued that in the theory of foreign trade an unstable equilibrium is met with which conforms completely to the conditions which are fulfilled by the unstable equilibrium of mechanics. This case was discussed in connection with curves of Class I., and is illustrated in fig. 4. But it was remarked that these conditions are not completely conformed to by the so-called unstable equilibrium, which depends upon the diminution of the expenses of production that arises from an increase in the amount produced.

It was argued that when any casual disturbance has caused a great increase in the production of any commodity, and thereby has led to the introduction of extensive economies, these economies are not readily lost. Developments of mechanical appliances, of division of labour and of organisation of transport, when they have been once obtained are not readily abandoned. Capital and labour, when they have once been devoted to any particular industry, may indeed become depreciated in value when there is a falling off in the demand for the wares which they produce: but they cannot quickly be converted to other occupations; and their competition will for a time prevent a diminished demand from causing an increased price of the wares. Precisely similar remarks apply to what I have called unstable equilibrium in the present theory: and *mutatis mutandis* they may be reproduced here.

Thus for instance, the shape of the Supply curve in fig. 23 implies that if the ware in question were produced on the

scale OV annually, the economies introduced into its production would be so extensive as to enable it to be sold at a price TV . If these economies were once effected the shape of the curve SS' would probably cease to represent accurately the circumstances of supply. The expenses of production, for instance, of an amount OU would no longer be much greater proportionately than those of an amount OV . Thus in order that the curve might again represent the circumstances of Supply it would be necessary to draw it lower down; possibly so much lower as to make it fall into the position of the dotted curve in the figure and make only one intersection with OG . Thus we may lay down a general principle to the effect that if the process by which a ware is manufactured be of such a nature that an increase in the scale of production within certain limits causes great additional increased economies to be introduced into the manufacture, then the Supply curve for the ware between these limits will require some special treatment. For this portion of the curve can only be taken to represent the circumstances of Supply before and up to the occurrence of any event which renders it profitable to produce the commodity on a large scale for a time sufficiently long for the introduction of these economies. After the occurrence of such an event, the curve must be, partially at least, re-drawn. Thus if at a point on OX below this portion of the curve there be drawn in accordance with the rules laid down, an arrow-head pointing to the left; this arrow-head will indicate a resistance that must be overcome before the Amount-index can move to this point. But if by any means the Amount-index is brought to this point, the existence of the arrow-head will not justify us in assuming without investigation that in the corresponding practical problem there will be in operation a force tending to make the Exchange-index move towards the left. Conclusions based upon the assumption of the rigidity of the curves may be applied to practical problems concerning domestic values in so far as the conclusions relate to the resistances which must be overcome before there can be effected an increase in the scale on which cloth or linen is exported: but not in so far as they relate to the forces which may operate to diminish this scale.

Therefore the account of positions of unstable equilibrium which has been deduced from an examination of the curves may not be applied to practical problems generally until a careful enquiry has been instituted in each particular case as to the probability that economies which had once been introduced, would be quickly lost. But though as far as at present appears they cannot be largely used for the immediate de-

duction of conclusions in matters of practice, there seems to be large scope for the use of them in the suggestion of new practical problems.

§ 8. In applying the curves of Demand and Supply to the solution of any particular problem we must determine definitely what is the length of the period with the average circumstances of which the problem deals. For this purpose much care is required. Even the best writers on Economics have sometimes failed clearly to discriminate the various senses in which they have used the word average in such phrases as "average supply," "average demand," "average value."

Let us consider for instance the case of wheat. The supplies of wheat come almost exclusively from the northern hemisphere, and are therefore harvested at about the same time of year. Consequently if all the facts of the harvest were known, and their bearings properly estimated by all dealers, there need be no important fluctuations in the price of wheat during the year; or at all events none until the prospects of the next harvest had begun to declare themselves. The great fluctuations that do occur even in the winter months, are not to be regarded as the effects of economic causes in the narrower use of the phrase. Their causes are rather to be sought among mental phenomena; in the insufficiency of men's knowledge and the fallibility of men's judgments.

With reference to market prices for markets of long duration some care is required in order to discover the average price or the level about which the market price oscillates. For in comparing prices obtained at two different dates allowance must be made for the interest due on the price obtained at the earlier date. Thus if interest be reckoned at 5 per cent. per annum, the price of 60s. for a quarter of corn sold in January would be on the same level as a price of 61s. 6d. for a quarter sold in the ensuing July.

A list of the monthly prices of wheat since 1793 (Tooke's *History of Prices*, II. p. 390, and *Statistical Abstracts*) exhibits in many cases two oscillations, in some even three, in the course of a single harvest year. Not nearly all these oscillations can be accounted for by variations in the prospects of a good harvest in the coming year. After allowing for these variations and also for the effect of partial and temporary combinations open or tacit among dealers, we find a large margin of irregularities which has to be put to the account of the difficulty of obtaining rapidly the requisite data. This difficulty has been increased by the growing complexity of these data almost as much as it has been diminished by our improved means of transmitting information. It is true that the average price for July for

the last 80 years is at least as much in excess as it ought to be—by about 3s. 6d.—of the average price for January. But so tardily are facts ascertained, that when a scanty harvest is followed by an abundant one, not only is the fall in price exhibited in the September column in general comparatively small, but in many cases the progress of the fall is protracted throughout the greater part of the harvest year. For the last 30 years the price has been lower on the average for February than for November; and but little higher for April than for October. The causes that determine the relations of the average price of wheat to the market prices, when the term "average" means average during six winter months, are of an entirely different character from the causes which determine these relations when the period for which the average is taken is long enough to include several harvests.

The periods with which we are concerned in the present discussion are of the latter character. They are sufficiently long to eliminate the casual disturbances which arise from the failure of producers so to adjust the supply to the demand, that the amount supplied may be just sold off at a remunerative price. But they are sufficiently short to exclude fundamental changes in the circumstances of demand and in those of supply. On the side of demand for the ware in question it is requisite that the periods should not include (i) any very great change in the prosperity and purchasing power of the community; (ii) any important changes in the fashions which affect the use of the ware; (iii) the invention or the great cheapening of any other ware which comes to be used largely as a substitute for it; (iv) the deficiency of the supply of any ware for which the ware in question may be used as a substitute, whether this deficiency be occasioned by bad harvests, by war, or by the imposition of customs or excise taxes; (v) a sudden large requirement for the commodity, as e.g. for ropes in the breaking out of a maritime war; (vi) the discovery of new means of utilising the ware, or the opening up of important markets in which it can be sold.

On the side of Supply it is requisite that the periods should not include (i) the opening up or cutting off, as e.g. by a war, or a tax, of any important source of supply of the ware itself or of the material of which it is made; or (ii) the invention of any fundamentally new process or machine for the manufacture of the ware. But the period may include such extended applications of known processes and machinery, and such economies in conveyance and distribution as are direct consequences of an increase in the scale of production.

Thus, to revert to the case of wheat, the supply and demand curves cannot, at all events as applied in the present discussion,

be made to exhibit the operation of causes which govern the changes in the value of wheat which have occurred in the course of many generations. Recent controversies render it expedient to examine this point somewhat carefully. British economists have enunciated a Law of Diminishing Return. They assert that a considerable increase in the amount of wheat raised from a given area in a country which is already thickly peopled can be raised only at the cost of an amount of labour increased more than proportionately. American economists assert that in a new country, at all events, and often even in an old country, the growth of population brings with it such improvements in agricultural skill, such new knowledge of processes and implements, such near access to good markets for buying and selling, and such developments of communication by road and railway, that an increased supply of food can be produced at the cost of labour increased less than proportionately. In particular they insist that the amount of labour which has to be expended in order to raise a quarter of wheat under the most unfavourable circumstances in which wheat is grown in England is less than it was many centuries ago. These statements on which British and the American economists severally lay stress are doubtless both true. But they do not traverse one another. The law of diminishing returns may be expressed by a Supply curve for wheat which is throughout inclined positively as in fig. 20. The complementary fact which the special circumstances of America have made prominent may be expressed by a Supply curve for wheat, some portions of which are inclined positively and others negatively, as in fig. 21. It would however be necessary in this case to measure the value of the corn produced in terms of a unit of some particular kind of labour; while in the former case the value may be expressed either in this unit or in terms of a unit of the precious metals. But the two Supply curves thus drawn would correspond to wholly different problems. Each curve would represent changes in the cost, measured in money or labour, of raising corn which would be occasioned by changes in the amount produced. But the former curve would refer to an interval of time so short as to include no fundamental change in the general condition of the country, in the development of the arts of cultivation, of the means of locomotion, and generally of the industries subsidiary to agriculture. Corresponding to this curve there might be drawn a demand curve roughly representing the circumstances of average demand for the wheat during the same period. The position of the point of intersection of the two would then represent approximately the average amount which would be produced and the average price about which the mean price would oscillate. But in the second case

the supply curve would refer to a period so long as to include fundamental changes in the character of the various industries of the country. In drawing the curve, allowance would be made not only for those economies which spring directly from the increase in the amount produced, but also for those inventions and other improvements which were caused by the growth of civilisation that was concurrent with the increase of population. A supply curve can be thus drawn to express the result of statistics as to past history or of conjectures as to future history. But it is obvious that we cannot properly pair this curve off with a corresponding demand curve, and determine by the intersection of the two an average value about which the market value has oscillated.

We might indeed add together the prices of wheat in the various years, and divide the sum by the number of years, in order to find an arithmetic mean of the prices. But this mean would not be rightly called an average result of economic causes. For such a phrase cannot be strictly interpreted without assuming some uniformity at least in the general character of the causes operating. And we could not make any assumption of this kind which would correspond even approximately to the facts of the case. Malthus indeed has made¹ some instructive investigations as to the relations which in the course of English history have existed between the average price of corn, the average wages of labor, and the growth of population. It is true that the statistics at his command were not thoroughly satisfactory, but he made good use of such as he had; and more recent investigations have on the whole tended to confirm his conclusions. He concludes, "that during a course of nearly 500 years the earnings of a day's labor in this country have probably been more frequently below than above a peck of wheat; that a peck of wheat may be considered as something like a middle point, or rather above the middle point, about which the market wages of labor, varying according to the demand and supply, have oscillated; and that the population of a country may increase with some rapidity, while the wages of labor are even under this point."

But he finds that average corn wages were not far short of two pecks during the latter part of the fifteenth century, and that in the seventeenth century they were generally under three quarters of a peck. "From 1720 to 1750 the price of corn fell and the wages of labor rose, but still they could command but little more than the half of what was earned in the fifteenth century. From this period corn began to rise, and labor not to rise quite in proportion; but during the forty years from 1770

¹ *Political Economy*, Ch. IV.

to 1810 and 1811, the wages of labor in the command of corn seem to have been nearly stationary."

"It appears then that, making a proper allowance for the varying value of other parts of the wages of labor besides food, the quantity of the customary grain which a laboring family can actually earn, is at once a measure of the encouragement to population and of the condition of the laborer; while the money price of such wages is the best measure of the value of money as far as one commodity can go¹."

These facts may, perhaps with some little violence to words, be made to represent supply of and demand for employment as determining the average wages of labor. This is how Malthus endeavoured to use them. But they cannot fairly be made to represent the way in which the average price of corn is determined by economic causes.

§ 9. The reader will have no difficulty in drawing for himself diagrams representing the alterations in the curves and in the positions of equilibrium which may arise from any general change in the circumstances either of supply or of demand. The principles on which he will have to proceed are in every respect similar to those on which the investigation of the corresponding problem in the theory of international values has been conducted. We may follow the analogy of the terms used there in describing the alteration of the supply curve which is required when any event causes an increase in the expenses of producing each several amount of the commodity. We may say that such an event, whether it be a tax, or the cutting off of any sources of supply, or any other difficulty, "pushes upwards" the supply curve.

For let P be any point on the curve (fig. 24), so that PM is the price which is necessary to cover the expenses of production of the commodity when the amount OM is produced. Then after the change some larger price pM will be required in order to cover these expenses. Thus as P is made to move along SS' , the old supply curve, p will trace out ss' , the new supply curve. If the change be the imposition of a tax which bears a fixed ratio to the selling price of the commodity, the ratio of pM to PM will be constant for all positions of P .

Similarly the supply curve may be "pushed downwards" by the remission of a tax or the awarding of a bounty, by the opening up of new sources of supply, or by the invention of an improved method of manufacture. For, as has been said already, any substantially new invention is a change in the circumstances

¹ Cairnes, *Leading Principles*, Part I. ch. v. § 3, apparently in ignorance of this investigation and of the conclusive evidence that corn wages have been higher in some centuries than in others, assails the brief reference that Mill has made (*Pol. Econ.* Bk. III. Ch. xv. § 2) to this evidence.

of supply which invalidates the old supply curve. An increase in the scale of production will necessarily lead to increased economies in consequence of the scope which it will offer for the application of already known methods and machinery. In drawing the original supply curve it was assumed that these economies could be predicted; and that allowance could be made for them. But new inventions and other improvements which are not directly caused by an increase in the scale of production are not capable of being predicted; and when they occur they render it necessary to draw a new supply curve from new data.

In the same way the demand curve will be moved upwards by the discovery of any new purpose to which the commodity in question can be applied; and generally by every change that increases the demand for it. A diminution of the demand, arising perhaps from a change in fashion, or from the invention of some substitute for the commodity, will similarly push the demand curve downwards.

It may be noticed that a considerable movement of the supply curve upwards or of the demand curve downwards in fig. 24 will reduce the number of the points of intersection of the curves from three to one; and this one will lie to the left of A . Thus the amount-index may be moved from stable equilibrium at a point vertically below C to a point not very far from O . But it must be remembered that the hypothesis on which this result is obtained does not, generally speaking, correspond to the actual facts of important practical problems. For as has already been argued at length, the indications given by a negatively inclined portion of the supply curve are completely trustworthy only so long as the amount-index is moving under it from left to right; they cease to represent accurately the facts of the corresponding practical problem so soon as this movement has once been made.

CHAPTER II.

THE TOTAL BURDEN OF A TAX. CONSUMERS' RENT.

§ 1. IT has already been insisted that the burden which a tax on a commodity inflicts on the consumers does not consist only of the pecuniary loss which they undergo in paying an increased price for the commodity.

It was argued that the money that they used to expend on the commodity brought in to them a greater satisfaction than they could obtain by expending that money on other things; for if any other mode of expenditure had seemed preferable to them, they would have chosen it. The tax diminishes in two ways the satisfaction which they derive through their facilities for purchasing the commodity. Firstly, in so far as they continue to purchase the commodity, the tax causes them to pay a higher price for it; secondly, the tax deters them from consuming as large an amount of it as before.

In the present chapter a more careful investigation will be given of the amount of this pleasure or satisfaction which a person derives from being able to purchase a particular commodity at a given price; or, in other words, of the amount of the excess or surplus satisfaction which he derives from his purchases of the commodity over the value to him of the money he pays. Now that which a person would be just willing to pay for any satisfaction rather than go without it, is, as will be explained further on, the "economic measure" of the satisfaction to him. The economic measure of that excess or surplus satisfaction into which we are inquiring will be called "Consumers' Rent." Diagrams similar to those of the preceding chapter will be applied in estimating the amount of the total consumers' rent derived by all the several purchasers of the commodity in the market: and in inquiring into the diminution of this consumers' rent which will be caused by a tax on the commodity. It is somewhat difficult to discern clearly the nature of this surplus satisfaction and of its economic measure: but when this difficulty has been overcome, the appa-

ratus of diagrams that is here supplied will be found to be easily handled, and to be capable of achieving important new results.

§ 2. In order to give definiteness to our notions, let us consider the case of coals purchased for domestic consumption. Let us assume also for convenience, that it is not practicable to sell less than a ton of coals at a time. Let us take the case of a man who, if the price of coals were £10 a ton, would just be induced to buy one ton annually; who would just be induced to buy two tons if the price were £7, three tons if the price were £5, four tons if the price were £3, five tons if the price were £2, six tons if the price were £1. 10s., and who, the price being actually £1, does purchase seven tons. We have to investigate the consumers' rent which he derives from his power of purchasing coal at £1 a ton.

The fact that he would just be induced to purchase one ton if the price were £10, proves that the total enjoyment or satisfaction which he derives from that ton is as great as that which he could obtain by spending £10 on other things. In other words, the satisfaction derived from, or "the value in use" to him of, a single ton a year, is economically measured by £10. Therefore his power of purchasing one ton of coals for £1 gives him a surplus satisfaction of which the economic measure is £9 in excess of that satisfaction, command over which he gives up by parting with the £1; that is to say, it gives him a consumers' rent of £9.

Again, if the price were £7 a ton, he would just be induced to purchase a second ton; so that the value in use to him of a second ton is measured by £7. The consumers' rent that he derives from his power of purchasing this ton for £1 is therefore £6: and so on. Thus the whole consumers' rent which he derives from the power of purchasing coal at £1 a ton is £9+6+4+2+1+½, i. e. £22½.

We may put the same thing in another way. The economic measure of the total value in use, or, as Mr Jevons says, of "the total utility of the coal," is the sum of the prices that he would be just willing to give for each successive ton: i. e. £10+7+5+3+2+1½+1, i. e. £29. 10s. He has to pay for them seven times the value in exchange or market-price of a ton of coal. This value in exchange is of course equal to the measure of the value in use to him of the last ton of coal which he purchases, or in Mr Jevons' phrase, to the measure of the final utility of a ton of coal to him. For he will not pay for a thing more than it is worth to him: and if he can get a thing for less than it is worth to him, he will increase his purchases of it. So that the last ton of coals which he buys, i. e. the ton

