The Pure Theory of Taxation

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THE PURE THEORY OF TAXATION

The theory of the incidence of taxation . . . really . . . is an integral part of the general theory of value."—MARSHALL.

THE science of taxation comprises two subjects to which the character of pure theory may be ascribed: the laws of incidence, and the principle of equal sacrifice.

The first subject presents a variety of distinct cases demarcated by several cross divisions. Of these divisions the following four appear to me the most important for the purposes of theory :—

Either (A) all the transactions[1] under consideration are exposed to competition; or (a) among the parties with whom we are concerned there is at least one monopolist.[2]

Either (B) all the products with which we are concerned obey the law of increasing cost; or (b) some do not.[3]

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[1] I suppose in each case parties to an exchange, the play of demand and supply. Taxation in a *régime* of socialism or of slavery is not considered.

[2] I understand by a monopolist an individual, or a combination, having the sole control of an article of exchange, and dealing with it solely in the interest of the monopolist. I agree with Professor Walras in thinking that much confusion has been caused by extending the term to cases in which a commodity absolutely limited, such as land of a certain sort is in the hands of a *plurality* of uncombined possessors (*Éléments d'Économie Politique*, 2nd edition, Art. 408. Cp. *Dictionnaire d'Économie Politique*, Art. "Monopole"). As to the definition of maximum advantage in the case of a *combination*, see the present writer's article on "The Pure Theory of Monopoly" in the *Giornale degli Economisti* for 1897.

[3] I define the laws of increasing and decreasing cost thus. If $\phi(x)$ be the expense —or more generally the equivalent in money of the "real cost"—of producing the quantity x of a certain commodity, the law of increasing cost holds, when $\frac{d_2\phi}{dx^2}$ is positive; the law of decreasing cost, when $\frac{d_2\phi}{dx^2}$ is negative (*cp.* Cournot, *Principes Mathématiques*, Art. 29). Generally if $\phi(x, y, z ..)$ is the cost of producing the quantities $x, y, z . . .$ of several commodities, the law of decreasing returns does or does not hold, according as the second term of variation of ϕ does or does not fulfil the conditions of a *maximum*. "Decreasing and increasing returns" will be here used as synonyms of increasing and decreasing cost. This definition is not identical with that of some distinguished economists.

Either (C) the mobility of capital and labour[1] is not taken account of, or (c) exists and is taken account of.

Either (D) the taxation considered varies with the quantities of articles exchanged (including money, as in the case of a specific or an *ad valorem* tax, or one in kind), and so may be described as a tax on *margin*; or (d) it does not so vary (as in the case of a tax on profits, or a poll-tax), and so may be described as a tax on *surplus*.[2]

I proceed to consider the more important of the cases formed by the combination of these attributes, giving priority to the first member of each division, the one designated by a capital letter. According to the order adopted, the case first to be considered is that which is defined by taking the first member of each division and which may accordingly be designated as A B C D; indicating that (A) the parties considered consist of two or more groups, the members of each group supplying the same article[3] in competition with each other; (B) each additional increment of every product is obtained by a more than proportional increase of outlay; (C) the groups are " non-competing " in Cairnes' sense, " industrial competition " is not supposed to exist; (D) the tax is of the same genus as an export or import tax.

A B C D. The case thus defined is nearly coincident with the case which I have discussed in a former article; that of an export or import tax on an article of international trade; understanding international trade in the generalised sense of " exchange without mobility." [4] Following Mill, we may begin with the simplest variety where there are only two " nations." The case as conceived by us comprises not only international trade (in the proper sense) between two islands isolated from the rest of the commercial world, but also a simple abstract market, such as the corn market, of which Professor Marshall has described the " temporary equilibrium " [5] or his ideal nut

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[1] As mobility may exist with respect to some—not all—of the agents of production (*cp.* article on " International Value " in the ECONOMIC JOURNAL, vol. iv. p. 35), the more exact distinction might be between (A) a greater and (C) a less degree of mobility.

[2] For certain theoretic purposes it might be better to distinguish the cases in which the tax (D) strikes the variables by the variation of which the parties under consideration seek each his maximum advantage; or (d) strikes the quantity which it is sought to maximise. The distinction between *margin* and *surplus* hovers between this one and the one in the text. (See " Margin," *Palgrave's Dictionary*. *Cp.* below, p. 57.)

[3] Or articles in the case of joint or more generally correlated production (below, p. 54).

[4] ECONOMIC JOURNAL, vol. iv. p. 36.   [5] *Principles*, Book V. ch. 2, § 1.

and apple-market ;[1] also the dealings by which the shares of the parties in distribution are determined, the labour market, the loan market, the land market, each considered at first abstractedly by itself, and not yet in its true interdependence with the others.[2]

A tax of the kind now under consideration, affecting such a market, will in general prejudice both parties more or less. If, in the metaphor of a distinguished economist, we represent the undisturbed relation of the parties by the equilibrium of two balls resting against each other in a bowl, it may seem, at first sight, that a wedge inserted between the two balls will raise one of them to the full extent of the thickness of the wedge. But on reflection it is evident that this only occurs in the limiting case when the mass of one ball may be neglected in comparison with that of the other. In the absence of data respecting the relative masses of the balls all we can say is that the distance between them will be equal to the thickness of the interposed lamina. Corresponding to the masses of the two balls are the elasticities of demand and supply for the two parties. The general principle is that the tax inflicts more loss on either party, the less the elasticity of that party's demand or supply; other things, including the other party's elasticity, being the same.[3]

This proposition has been demonstrated at length in former articles.[4] It must suffice here to add some remarks suggested by an examination of certain extreme cases.

An instance of infinite elasticity of supply is afforded by the labour market upon the Ricardian hypothesis that, in Mill's words, " there is everywhere a minimum rate of wages, that they can never be lower beyond the length of time required for a diminished rate of increase [of population] to make itself felt, and can never long continue higher." [5] Upon this assumption, it is

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[1] *Principles*, Book V. ch. 2, § 1, *note on Barter* (latter part).

[2] One of the best, and I believe the first statements of the simultaneity, in the mathematical sense, of the several equations pertaining to value and distribution is given by Professor Walras in his *Éléments d'Économie Politique Pure*.

[3] When, as in my Articles on International Value, we make abstraction of money, and consider *price* in the generalised sense of M. Walras, *i.e.* rate-of-exchange, then it is unnecessary to distinguish the elasticity of supply from that of demand. The less the extension of the demand attending a fall of price, the less is the extension of supply attending a rise of price. When demand becomes perfectly inelastic the elasticity of supply becomes *negative*. This is the case alluded to in the criticism of Messrs. Auspitz and Lieben (ECONOMIC JOURNAL, Vol. IV. p. 637) as not adapted to a curve which represents the variations of supply with money-price.

[4] The general principle is well stated by Professor Carver in his article on ' Shifting of Taxation " in the *Yale Review* for November 1896.

[5] *Pol. Econ.* Bk. II. Ch. XI. § 2.

"hypothetically true" that a tax on wages would not permanently rest on the working classes ;[1] a conclusion which is justly regarded as the opprobrium of pure theory, if it is applied to justify a tax on wages or on the necessities of the wage-earner. We have, however, Mill's authority for saying that " the assumption contains sufficient truth to render it admissible for the purposes of abstract science."[2]

It should be observed that this perfect elasticity of the supply of labour is predicated only of long periods ; for short periods to evoke more work there would presumably be required a higher rate of wages. A similar difference in respect of elasticity between long and short periods is to be noticed in other markets. Thus, according to Professor Seligman, " an equal tax on all capital must fall on the lender, that is the capitalist. There would be no way for him to shift the burden."[3] But he admits that further accumulations might be discouraged. *Pro tanto* then the rate of interest in a long period would be increased.[4] Thus, too, we may partly account for Mill's statement respecting " the attempt to tax all purchases and sales " that " neither class [buyers or sellers] could throw the burden upon the other."[5] This is true, for instantaneous periods, at least of sellers, so far as they are under the necessity of selling what they have brought to market. But can it be affirmed in general of a tax like the Spanish *alcavala* that " if levied from the sellers " in the long run it would burden sellers more than buyers ?[6]

The difference between the elasticity of supply according as short or long periods are considered is conspicuous in the case of houses.

For times so short and in places so limited that the number of houses offered may be regarded as a fixed quantity,[7] a tax on house-

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[1] See Mill's application of the principle, *Pol. Econ.* Book V. ch. iii. § 4, par. 4.

[2] *Cp.* Adam Smith on taxes upon the wages of labour and the necessaries of life (*Wealth of Nations*, Book V. ch. 2). M'Culloch's remarks on these passages (M'Culloch's edition of Adam Smith, vol. iv. note xxiv.) seem just ; his own views (*Ibid.* p. 544) human. On this point Prof. Seligman, as always where *friction* is the subject, is instructive (*Shifting and Incidence*, p. 174). Among the numbers of other writers who might be referred to, Prof. Bastable may be distinguished (*Public Finance*, pp. 358–60, and 436, 2nd edition).

[3] *Shifting and Incidence*, p. 132. *Cp. Wealth of Nations*, Book V. ch. 2 : " a tax upon the interest of money could not raise the rate of interest ; the quantity of stock or money in the country . . . being supposed to remain the same." But it would not remain the same (*Ibid.* infra).

[4] *Cp.* Bastable, *Public Finance*, Book III. ch. v. § 7.

[5] *Pol. Econ.* Book V. ch. 5.

[6] The effect attributed to a " tax on all commodities " by Mill in an earlier passage (Book V. ch. iv. § 1, par. 2) would require a long period.

[7] The case of a commodity of which the quantity cannot be increased may be

rent, whether imposed on the occupier or owner of the house, is in general borne altogether by the owner. This conclusion of the older economists [1] is verified by the newer methods.[2]

regarded as a limiting case of one which can only be increased at an increasing cost ; and so belongs to our class B.

[1] Mill, *Pol. Econ.* Book V. ch. iii. § 6, par. 3 ; Ricardo, *Pol. Econ.* ch. xiv. first two pars.

[2] In the accompanying figure S S' and D D' are taken as, in Professor Marshall's phrase, "the typical diagram for stable equilibrium for a commodity that obeys the law

Fig. 1.
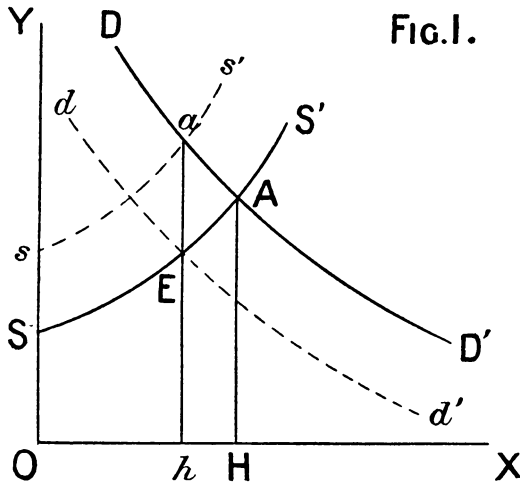
of diminishing return " (*Principles of Economics*, p. 425, ed. 3 ; *cp.* p. 524). A is the position of undisturbed equilibrium, O H is then the supply. When equilibrium is disturbed by a tax (of the kind now under consideration) on the producer, the supply is reduced to O h ; h E is the price received by the producer, Ea the tax paid per unit of commodity (Marshall, *loc. cit.*). The figure shows that, if the tax is levied from the consumer, the result is the same. For d d', the demand-curve as displaced by the tax, strikes the original supply-curve in E. This theorem is given by Professor Carver in his article on " Shifting of Taxes " in the *Yale Review* for Nov., 1896 (Compare Auspitz and Lieben, *Theorie der Preise*, Art. 82).

Fig. 2 represents the two limiting cases of this theorem. S S' is the perfectly elastic curve of constant cost, s s' the same displaced by a tax, as in Professor Marshall's Fig. 33 ; d d' has the same import as in the last paragraph.

In the other limiting case, when the supply is perfectly inelastic, let it equal $O\kappa$. Then κa is the supply-curve. If it is imagined as sloping a little outward, the limiting form not quite reached, the effect of a tax on supply would, as before, be represented by moving (every point of) the curve vertically upwards through a distance corresponding to the extent of the tax. The intersection of this displaced supply-curve—not shown in the figure—would cut the demand-curve in the neighbourhood of a, and accordingly the price paid by the consumer is nearly—in the limit quite—the same as before ; the whole tax falls on the other party.

But it is simpler to use the theorem that it comes to the same whether the tax is on supply or on consumption. In the latter case, if d d' is as before the demand-curve displaced by the tax, κa the price paid by the consumer is unaltered, the whole tax falls on the other party.

Some confusion appears to be caused by supposing the law of demand to alter concurrently with the imposition of the tax.[1] Is it not competent to the "mechanics of industry" to treat superposed disturbances independently and one at a time? If a person wears high heels may we not estimate the elevation due to that cause without putting him on a hill. If indeed there is some connection between the artificial elongation and the position of the wearer, it may be proper to note this. Xenophon tells us that the great king alone among the ancient Persians wore his

Compare Fleeming Jenkin: "If a holder sells unreservedly . . . the whole tax falls on the seller; the supply curve becomes a vertical straight line " (" Incidence of Taxes," p. 114 of *Papers Literary and Scientific*).

Fig.2.
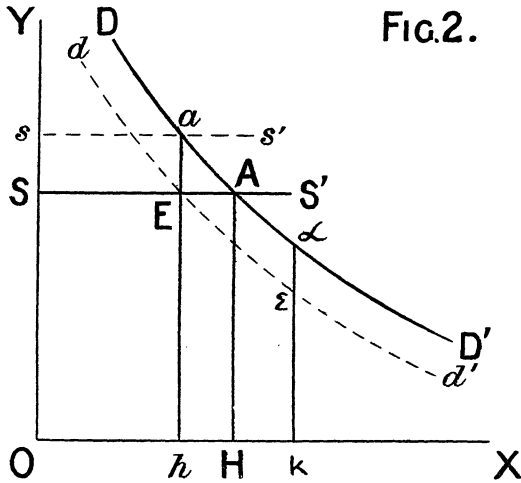
Or is it easier to say that, if with Cournot (*Principes Mathématiques*, Art. 51) we represent the equality of *demand* and *supply* before the tax by the equation $F(p) = \Omega(p)$ and after the tax (of u per unit imposed on the supply) by the equation $F(p') = \Omega(p' + u)$; then if Ω is degraded to a constant the equation for p' the disturbed price is the same as the equation for p the original price.

[1] Thus the Report of the London County Council Committee (Lord Farrer, chairman) concludes that in prosperous communities house-rate falls on tenants; in declining ones on landlords. Similarly the *Dictionnaire d'Écon. Pol.* art. " Incidence de l'Impôt." So Lord Farrer in his evidence before the Town Holdings Commission (Q. 1,244) : " The best authorities seem. to think that it depends very much on the state of the market." If it is asserted that the incidence of a tax depends on whether the demand is rising in the sense of the demand-curve being raised as a whole, I altogether dissent; if it is meant that the incidence depends on whether the demand becomes more urgent in the sense of the demand-curve becoming steeper, I give only a qualified assent. (See p. 53, par. 2, and p. 63 note). It is too true that the "best authorities" express, themselves carelessly. Pantaleoni forms a brilliant exception when he explains that a rise of rents does not mean shifting of tax (from the owner to the occupier) if the rents would have risen independently of the tax. (*Teoria della Traslazione dei Tributi*, p. 226 *et seq.*)

E 2

tiara erect. If then the king—as according to Dryden, the conqueror—of the Persians sate " aloft in awful state," the apex of the royal tiara would have been elevated both in itself and on account of the wearer's position. Yet Xenophon's statement is intelligible by itself. So rates on houses when expended in improving the neighbourhood tend to increase the demand for houses.[1] Yet in measuring the burden of the tax to the owner it is allowable in pure theory to abstract its influence on demand.

Another reflex influence of a house-rate on the demand for houses already built—reflected from the quarters where new building is possible—as it presupposes the mobility of capital, must be deferred to a later section. At present we are supposing the offer of built houses to be constant—the *fourth* of the cases so lucidly distinguished and discussed by Mr. Pierson in the second edition of his *Leerboek*.[2]

When it is affirmed that under these circumstances the burden of the tax falls altogether on the owner it is understood that the demand of the occupant is of an ordinary kind—not of that extreme or limiting variety which is perfectly inelastic. The contrary assumption is made by some writers ; Mr. Blunden, for instance, who puts houses in the category of those " absolute necessaries of life " of which the " prices may rise considerably without appreciably affecting the demand." [3]

No doubt it is so in particular instances, for instance, in the case of the dwelling houses of the labouring classes in certain localities.[4] But can it be affirmed generally that the demand for dwelling-houses is perfectly inelastic ? " If the tax, indeed, was very high," says Adam Smith, " the greater part of people would endeavour to evade it as much as they could by

[1] Mr. Fletcher Moulton, in his evidence before the Town Holdings Commission, has dwelt forcibly on this incident.

[2] Noticed in the ECONOMIC JOURNAL, vol. vi. p. 436.

[3] *Local Taxation and Finance*, p. 49. Compare the author's recapitulations of his views in the *Journal of the Statistical Society* for December 1896.

Similarly Prof. Seligman : " The landowner is not compelled to part with his land, but the tenant is compelled to occupy some apartments " (*Shifting and Incidence*, p. 111). Elsewhere, indeed (*Ibid.* p. 120), he admits that the tax might be " so high as to cause the tenant to content himself with meaner apartments, or rooms in a less desirable locality."

I regard it as the general case, that the tax on the occupier *tends* to diminish his demand for house accommodation. Thus Mr. Bourne, steward of the London estates of the Duke of Bedford, affirmed, " with the greatest confidence," " from the knowledge that I have of every day work for many years in London," " that the person taking the house is so free in his choice, that he can afford to throw up the houses when he takes into consideration what the rates and taxes are " (Town Holdings Committee, 1887. Q. 11,288-9.)

[4] *Cp.* Cliffe Leslie, *Taxation of the Working Classes*.

contenting themselves with smaller houses." And even if the tax be not high, is not a consequence similar in kind, if less in degree, to be apprehended by the owner who offers it for hire ?

In fine, even granted the premiss that the demand for houses is inelastic, the conclusion that the tax falls wholly or chiefly on the occupier does not follow. The supply of houses (already built) being, as here supposed, also inelastic, the price or rent becomes *indeterminate*.[1]

The extreme cases which have been instanced form rather limits than exceptions to the rule that both sides of the market suffer by a tax. An exception is presented by a species of export-tax analysed in a preceding article ;[2] the abstraction of a certain portion of the exports in kind, to be disposed of in a manner not affecting the market under consideration.[3] An instance would be the virtual export-tax which is imposed by the capture of smuggled goods ; the intercepted goods being destroyed, or so disposed of as to produce the same effect on the demand and supply in the two countries as if they were destroyed. It is not contended that the exception is of any practical importance.[4]

Another class of exceptions comprises what Mill has called " peculiar " or " anomalous " cases of value.[5] Such is the case of " joint production," as defined by Mill, when " the same outlay would have to be incurred for either of the two [commodities] if the other were not wanted or used at all." Akin to this case is that in which the increase of the production of either commodity, though it does not necessitate, yet facilitates, the increased production of the other.[6] I propose to call products connected by this relation, which I have elsewhere defined more precisely,[7] *complementary*.

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[1] The intersection of two coincident perpendiculars !

What the actual effect of a tax under such conditions will be would seem to depend on circumstances which from the point of view of pure theory may be called accidents ; among which no doubt the circumstance whether the demand is rising or falling (above, p. 51) may in practice be important.

[2] ECONOMIC JOURNAL, vol. iv. p. 429 *et seq*.

[3] The condition is stated with much precision by Cournot with respect to the taxation of *monopolies :* " Il peut se faire que le produit de l'impôt en nature soit appliqué à une consommation qui n'aurait pas eu lieu sans l'impôt, et qui n'influe en rien sur la demande que les autres consommateurs font au producteurs " (*Principes Mathématiques*, Art. 42).

[4] As this kind of tax is in practice rare, I have to acknowledge that I have, in a preceding article (ECONOMIC JOURNAL, vol. iv.) exaggerated the asymmetry between export and import taxes ; and to retract my criticism of Prof. Bastable on that point (*Ibid.* p. 624).

[5] *Pol. Econ.* Book III. ch. 16 *passim*, and last par.

[6] *Cf.* Marshall, *Principles*, Book V. ch. vi

[7] *Giornale degli Economisti*, 1897.

If we suppose the degrees of complementariness to be gradually diminished, we shall pass through the zero point of absolute independence to a relation which may be distinguished as *rival* production; when the increased production of one commodity renders the increase of the other more difficult. For instance, where a limited amount of time, strength, or other resources may be spent in either of two sorts of otherwise unconnected production.

The following propositions respecting the taxation of products correlated in either of the two ways just defined may easily be proved; it being supposed that the demand for one commodity is independent of the demand for the other. A tax upon one of two rival products will raise the price of both. A tax on one of two complementary products will raise the price of the taxed one, and lower the price of the untaxed one. In the latter case it is conceivable that the consumers as a whole might be advantaged by the tax, if we may set the gain of one class against the loss of another.

The gain and loss to be balanced would appertain to the same persons in the corresponding case of correlated demand. The demand for two products may be called *complementary* when a rise in the price of one is attended by a fall in the price of the other, *rival* when a rise in the price of one is attended with a rise in the price of the other.[1]

The following propositions respecting the taxation of commodities for which the demand is correlated may be proved. A tax on one of two rival commodities will raise the price of both. A tax on one of two complementary commodities will raise the price of the taxed one, and lower the price of the one which is not taxed. It is conceivable that the latter effect should so exceed the former that, on balance, a gain results to the consumers.

The possibility of a positive gain resulting to one side of the market—one of the two " nations "—from the imposition of a tax[2] is more evident in the case of commodities which are complementary, both as regards production and consumption. In this compound case it may be shown—but not, I think, very easily,

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[1] *Ceteris paribus*, and in particular the marginal utility of money being supposed constant. I have used a more essential attribute for the definition of *rival* and *complementary* demand in my paper on *Monopoly* already referred to.

[2] Exclusive of the gain accruing from the tax to the importing country, a gain which must in general be included in order that an import-tax may result in a net gain to the importing country; as maintained by Messrs. Auspitz and Lieben (*Théorie der Preise*, Art. 81), and by the present writer (ECONOMIC JOURNAL, vol. iv.)

perhaps not without the use of mathematics—that a tax on one commodity may lower the price of either, but not of both.[1]

Our estimate of the importance of these exceptions to the rule that neither party gains by a restriction of trade depends partly on the question whether the " peculiar cases " are frequent. According to Jevons the cases of joint production, " far from being ' some peculiar cases,' form the general rule, to which it is difficult to point out any clear or important exceptions."[2]

However that may be, the exceptions which have been adduced do not militate against the general rule considered as expressing the most frequent, the typical case. In all the varieties of correlated demand and supply it is still true that most frequently the price of the taxed commodity will be raised,

[1] x and y being the quantities purchased, consider the collective total utility (the *Gesammtnutzlichkeit* of Messrs. Auspitz and Lieben), and also the collective total cost (the *Gesammtkoste* of the same authors), each as a function of x and y. Before the tax, the price of the first commodity = its marginal utility (*i.e.* the differential of the total utility with respect to x) = its marginal cost (*i.e.* the differential of the total cost with respect to x). The price of the second quantity is similarly determined. After the tax—which may be at first supposed small and specific, say n per unit of x, and levied from the producer—if x' and y' be the new quantities then (1) marginal utility of x' = the marginal cost thereof + n; (2) the marginal utility of y' = its marginal cost. Substituting $x + \Delta x$, $y + \Delta y$ for z' and y', expanding and neglecting higher powers, we obtain two simultaneous linear equations for Δx and Δy. Solving these, we can find the increments of the prices and the decrement of Consumers' Rent, in terms of three kinds of data : (1) the extent of the tax, (2) the rate of decrease of utility and the rate of increase of cost, and (3) the measures of the correlation between the two commodities in demand, and also in supply (the second differential with regard to x and y of the utility-function, and also that of the cost-function). These magnitudes must comply with certain conditions ; but those conditions are not inconsistent with the statements in the text. But, if only one of these correlations exists, though the price of the taxed commodity cannot fall, yet the Consumers' Rent may rise.

By parity of reasoning it may be shown that though in the case of a single commodity, " if the commodity obey the law of diminishing return . . . the result [of a tax] will be to raise the supply price by something less than the full amount of the tax " (Marshall, *Principles*, V. ch. xii. § 4), yet in the case of *correlated* commodities it is possible that the result of a tax on one may be to raise its price by more than the full amount of the tax ; that though in general, the producers' surplus is diminished by a tax, yet in the case of correlated commodities it may be increased.   The negative case of this paradox is, that a bounty may prejudice the bountied parties (directly and apart from ulterior effects, and from the cost to their Government).

What has been proved of a small specific tax may be extended (by neglecting higher powers of small quantities) to *any* small marginal tax (increasing with the increase of the commodity). What has been proved for an indefinitely small tax may be extended to a finite tax by reasoning which Cournot has made familiar. (For further explanations see my article on " The Pure Theory of Monopoly," in the *Giornale degli Economisti.*)

[2] *Theory*, p. 217. *Cp.* Preface, p. liii. Jevons is speaking of " joint " products in the narrow sense above attributed to Mill. If Jevons is right in using such strong language (which I am disposed to doubt), then *à fortiori* with reference to the wider category of goods that are *complementary* either in production or consumption.

while the price of the correlated commodity will as often be raised as it will be lowered in consequence of the tax. Whence it follows that the cases in which a balance of gain results to one party are a minority.

In these examples we have insensibly passed the frontier, not very important for the present purpose, which separates the case of two " non-competing groups " from that of several. We may now restore to the various markets involved in " Distribution and Exchange," the interdependence which we at first abstracted. We may now suppose a whole system of countries connected by international trade.

The reader may be referred to a former article for a discussion of this general case—the case of several balls in the bowl. It may be well to remark that when in equilibrium one ball presses against another, and that other against a third, it is not in general indifferent between which two balls a wedge shall be inserted. For example, suppose three islands, A, B, C, engaged in this sort of international trade. A imports from B goods, for the manufacture of which B has to import materials from C.[1] An import tax in A (or an export tax in B) on the goods exported from B to A will not come to the same as an import tax in B (or an export tax in C) on the materials imported by B from C. As an extreme case, suppose that the materials imported from our island C are supplied there yearly in constant quantities independently of human effort—e g., seaweed deposited on the shores of C. A tax on the price charged by inhabitants of C for permission to inhabitants of B to remove this seaweed would fall altogether on the inhabitants of C ; the price of the goods imported from B into A would not be affected. But a tax on these latter imports would be followed by a rise in the price of those imports, and a fall in the price of the materials imported from C ; all three parties will be worse off—in general, and except in the limiting case in which the demand in A for the imports from B is perfectly inelastic, in which case the entire burden of the tax will fall on A, B and C will be unaffected.

ABCd.[2] The possibility which has been shown in the pre-

[1] Compare Prof. Carver's correct decision on the case of a tax that is placed upon an article on its way through the hands of a merchant from the producer to the consumer. (*Yale Review*, Nov. 1896.)

[2] See the explanation of these symbols above, p. 46.

It would have been agreeable to classical tradition to place in this section the theorem, that a tax on rent falls entirely on the landlord (above, p. 56). Thus James Mill : " To him [the capitalist cultivator] it is a matter of perfect indifference, whether he pays the surplus in the shape of rent, to an individual proprietor, or in that of revenue, to a government collector " (*Elements*, chap. iv. § v. par. 1). So

ceding section that a tax upon products may be in part shifted by the producer, even though he has not the power of changing his occupation, no longer exists when the tax is imposed on profits, or generally *surplus*.[1] The case is not now that of a wedge inserted between two balls in a bowl; it is rather as if the position from which one of the two balls was started to run down to equilibrium was lowered. The height at which it would finally settle would not be altered by this abbreviation of its descent to equilibrium [2] (the bowl being supposed spherical). The conditions of economic equilibrium are not affected by a tax on surplus.

This is the first approximation. But it must be remembered that in general it is not possible for the tax-collector to hit a surplus which is altogether " intramarginal." A tax on profits—such as Schedule D of our Income Tax, or such as a payment for a license to carry on a trade—cannot be levied without some little disturbance of economic margins. This proposition might be illustrated by considering the classical theorem that the remission of rent to all farmers would not lower the price of corn. That is the first approximation. But if the farmers' " margin of saving " was displaced by their increased income, they might be willing to invest more capital in agricultural improvement, and so lower the marginal cost of produce.[3] Contrariwise there might be now required a higher rate of remuneration to evoke the same exertion from the cultivator ; his new affluence having displaced the margin at which the decrements of the utility of consumption become equal to the increment of the discommodity of labour.[4]

Florez Estrada, Book IV. chap. v. ; Prof. Seligman, *Shifting and Incidence*, p. 35 and p. 184, and many other authorities.

Yet in spite of the almost universal practice, I venture to think that there is some advantage in the classification here adopted. It may be observed that though under a *régime* of competition, a tax imposed upon the payment for an article absolutely limited in quantity, such as land, may be viewed as falling either upon margin or surplus, it is otherwise in a *régime* of monopoly : the tax is there certainly marginal.

[1] Compare Hadley, *Economics*, 512, 3.

[2] Energy representing total utility by a metaphor familiar to the mathe-matical economist. *Cp.* Irving Fisher's *Mathematical Investigations*, Part II. ch. 3 (*Mechanical Analogies*).

[3] *Cp.* Ricardo, *Pol. Econ.* chap. viii. " There are no taxes which have not a tendency to lessen the power to accumulate."

[4] Against the probability that taxation will diminish accumulation, there is the possibility that " curtailment of profit may act as a stimulus " (Mill, Book V. chap. iii. § 3). A very bare possibility, according to Bastable (*Public Finance*, Book III. 2nd ed.). For the cognate doctrine that the impoverishment of the labourer will act as a stimulus, see the apt quotations at p. 16 of Prof. Seligman's *Shifting and Incidence*.

If with Jevons, or still more elegantly with Gossen,[1] we represent that margin by the point along a line at which the perpendiculars to certain two curves become equal, it will be evident that neither tax on profits, nor poll tax, nor licenses, nor any other form of impost under category d will be able to reduce the area representing surplus, without disturbing its boundary.

Some little disturbance of this kind is to be attributed to an income tax, in so far as it strikes the shareholders in a joint stock company. But in so far as it strikes those who are entitled to a fixed payment from the proceeds of a going concern, it affects economic margins only in so far as the reduction of income may cause an alteration in the consumers' scale of demand.[2]

To the present section belong also consumers'—as well as producers'—licenses. A tax on license to consume a thing differs in its effect from a tax upon the thing, when more than one unit of the thing are, or would be in the absence of taxation, consumed during the period within which the license must be renewed, say a year. If no sportsman wanted more than one gun a year, the effect of a sporting-license in checking demand would be much the same as that of a specific tax on guns. But the license to drink tea for which, as Adam Smith tells us,[3] people used to pay so much a head in Holland, would act differently from a tax of so much per pound on tea. It would be a tax on surplus. It would knock off all those consumers who do not derive from the consumption of tea a consumers' rent or surplus more than equivalent to the payment of the license. On the remaining consumers it would act simply as a tax on their income.

ABc.[4] Let us now remove the barriers which have so far been supposed to separate our "non-competing groups." Let us introduce that mobility of the agents of production which is the essential attribute of domestic as distinguished from international trade, which is an important property of long periods as distinguished from short ones. Admitting the classical hypothesis respecting the freedom of capital and labour, we must accept the classical theorems concerning the effects of taxation : that, in the words of Adam Smith,

" A tax . . . upon the profits of stock employed in any particular branch of trade can never fall finally upon the dealers . . . but always upon the

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[1] See Palgrave's *Dictionary*, Art. Gossen, Fig. 3.
[2] The effect of changes in income upon prices is well analysed by Professor Irving Fisher in his *Mathematical Investigations on Prices*.
[3] *Wealth of Nations*, Book V. ch. ii.
[4] The category thus designated comprises both ABcA and ABcd.

consumers, who must be obliged to pay in the price of the goods the tax which the dealer advances " (*Wealth of Nations*, Book V. chap ii. art. 2).

In the words of Ricardo,

" A tax on the profits of the farmer would raise the price of corn ; a tax on the profits of the clothier, the price of cloth " (*Principles*, chap. xv. par. 3).

In the words of J. S. Mill,

" If a tax were laid on the profits of any one branch of productive employ-ment, the tax would be virtually an increase of the cost of production, and the value and price of the article would rise accordingly ; by which the tax would be thrown upon the consumers of the commodity, and would not affect profits " (*Principles*, Book V. chap. iii. § 2, par. 1).

I do not know that these expressions can be improved upon. Yet as the attempt to paraphrase our literary classics, which is sometimes made a school exercise, however feeble in itself, brings out more fully the inimitable excellence of the originals, in the like humble spirit it may be allowable to expand the above cited authoritative dicta.

As I understand the " industrial competition " with which we are now concerned, the conditions of equilibrium are twofold—(1) [1] one common to the " commercial competition," which was sup-posed to exist in our first two sections, namely that in any busi-ness the outlay in every direction should be pushed up to the " margin of profitableness," [2] and (2) one which forms the differ-entia of industrial competition ; namely, that the " net advan-tages " in all businesses between which there is mobility should be equal.[3]

Now let a tax on profits disturb the second condition. If equilibrium is restored by the consumers being " obliged to pay in the price of the goods the tax," it follows from condition (1) that the marginal costs of the business taxed must be raised.

This would, I think, be generally allowed in the most familiar case, that of the " margin of cultivation." Consider the following simplified version of an example which Mill has put among " pecu-liar cases of value." [4] " For simplicity we will confine our sup-position to two kinds of agricultural produce; for instance, wheat

[1] See *Address to the British Association*, Sec. F, Report for 1889. I have endeavoured to defend this view in an article in the *Revue d'Économie Politique* for January 1891, and in a passage in the ECONOMIC JOURNAL for 1896, vol. v. p. 173.

[2] *Cp.* Marshall, *Principles of Economics*, p. 433 *et passim*.

[3] Or rather equally attractive, as explained by Prof. Marshall in the *Principles of Economics*. I suppose the condition to hold not only for the typical *entrepreneur*, but also when enterprise delegates the task of superintendence—*e. g.* shareholders in a joint-stock undertaking. *Ceteris paribus*, the chance of profit tends to be the same in one undertaking as another.

[4] *Principles*, Book III. ch. xvi. § 2.

and oats." There are supposed (by us, not Mill) to exist only " medium soils which, without being specifically adapted to either, are about equally suited to both " products. The relative value of the two grains will of course be determined by the productivity of the marginal dose of outlay on each species of cultivation. Now let a tax be laid on the profits of oat growers. There will be a rush from the cultivation of oats to that of wheat. There will be established a new equilibrium in which, if the demand is constant, the area of wheat-growing is widened, the marginal cost of cultivation diminished ; while the converse is true of oats.[1]

I have been supposing the land to be owned by the cultivators. It comes to the same if the land is rented from competing land-lords, and a tax is imposed on the rent of oats-growing land. We have then an example of Professor Marshall's theorem that *partial* rent does enter into the cost of production, taking as a test of such " entrance " the circumstance that a tax on rent will affect price.

The action of mobility is similar when the tax is not on *surplus*, as we began in this section by supposing, but on *margin* —specific, *ad valorem*, or in kind.[2]

I propose to illustrate these principles by considering a tax affecting an industry which presumably obeys the law of decreasing returns,[3] a tax on the rent of urban dwelling-houses.

Let us take as sufficiently general the case put by the Select Committee on Town Holdings in their Final Report :—[4]

" The typical condition of a town holding under this system [the ' leasehold system '] as regards the parties and their respective interests . . . may be described as follows:—

" (A) The occupier of the house holding at a rack-rent, whether on a yearly tenancy or for a longer or shorter term.

" (B) His immediate landlord, the receiver of the rack-rent, who is ordinarily called ' the owner of the house,' and who holds for a term of years, paying during such term to the freeholder a fixed annual sum, generally called the ' ground rent ' . . .

" (C) The freeholder, who receives the ground rent during the term, and on its completion is entitled to the entire property absolutely."

For a first approximation, neglecting the distance in time

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[1] *Cp.* Marshall, *Principles of Economics*, p. 483, note ; 3rd edition.

[2] Regarding the ascending curve on Fig. 2 as an ordinary short-period supply-curve, we are to consider that it is first tucked back as there explained by a marginal tax, and then further—in general and except when the demand of the consumer is perfectly inelastic—furled in by the migration of *entrepreneurs* from the industry. In the case of a tax on surplus the curve is not tucked back ; it is always, not merely generally, but always.

[3] See Marshall, *Principles of Economics*, *sub voce* " Margin of building."

[4] 1892, No. 214, p. 6.

between the different bargains, we may substitute for the three interests A, B, C, described in the Report the three " nations " A, B, C defined at the end of our first section ;[1] A importing from B, goods for the manufacture of which B has to import materials from C, materials obtained in constant quantities independently of human effort. Only now B is no longer completely insulated, but is connected with a continent of capitalists, whereby the producers in B are kept as it were at a constant level of advantage. With allowance for this difference the solution is as before. A tax on the product houses—whether levied from the occupant or owner—will have the following effects. The occupants will suffer by having to pay a raised price, not in general raised to the full extent of the tax. The capitalist owners will not suffer though the price which they receive for their product falls ;[2] the net advantage of the industry being kept constant by migration into other industries; the ground landlord will suffer by a diminution of the ground rent. A tax on ground rent, whether levied from the ground landlord or the " owner," falls entirely on the ground landlord.

This is, of course, very pure theory, making abstraction of differences in time, that great source of complications in Economics.[3]

For a second approximation let us distinguish three periods, (1) the average duration of the occupant's lease, (2) the average duration of the owner's lease, (3) longer periods.

(1) It is not questioned that a tax imposed while the occupant's lease is running rests where it strikes during that period.

(2) A first approximation has already been obtained for this case,[4] on the assumption that during this period the offer consists entirely of houses already built. On that supposition the tax falls entirely upon the owner.[5] But we have now to take into account that the offer in general consists partly of houses already built in parts of the town already occupied, say the central area, partly of new houses which may be built on land which has hitherto been agricultural, say for brevity the suburbs.[6] Now if

[1] Above, p. 56.

[2] The law of decreasing returns being supposed to act.

[3] *Cp.* Marshall, Preface to *Principles of Economics.*

[4] Above, p. 49.

[5] Mr. Cannan clenches the matter thus, " We are not really ' mostly fools.' Who will stand up and confess that he took 76 —— Street at £100 a year, and subject to £20 of rates, when an exactly similar house next door, but in another parish, was to let at £100 a year, and only £12 of rates ? " (*History of Local Taxation,* p. 134).

[6] Our problem is here the same as that which forms Mr. Pierson's *third* case (noticed in the ECONOMIC JOURNAL, vol. v. p. 436) ; but our solution is not quite the same as his.

we had an exact measure of the advantage of the central area above the suburban periphery we should have an exact measure of the effect of the tax on house rent. Suppose, for instance, in the vein of von Thünen that the net advantage offered by houses of equally costly structure in the respective sites differed only on account of the different fares from each site to a central point. Then since the landlord at the suburbs can only stand out for a certain minimum of rent, that which he might have obtained in the way of agriculture,[1] the occupant in the suburbs has in general to pay the entire tax; and since the occupants of the central area are better off only in respect of the fares they also have to pay the same price for the same accommodation. The case would be exactly parallel to the familiar case of a tax on agricultural produce. The consumer thereof pays the tax except so far as he reduces his consumption; otherwise the landlords are untouched. This would be the solution, if there were perfect rivalry between central and suburban habitations.

But of course the capacity of houses at the circumference to act as substitutes for houses in the centre is not perfect; there is only a partial rivalry.[2] Since, then, when there is no rivalry, the owners of the central area suffer to the full extent of the tax, and when there is perfect rivalry, they do not suffer at all, it might be inferred that in the intermediate case of partial rivalry the owners would suffer, but not to the full extent of the tax. The inference, however, would not be correct. It is one of the *curiosa* of the theory of *correlated* demand[3] that a tax on house rent might so disturb the balance of demand for urban and suburban accommodation respectively as to cause a positive benefit to the owners.[4] The truth of this proposition is not impaired, because

[1] Professor Seligman is alone, as far as I know, in disputing this theorem (*Shifting and Incidence*, p. 106). I cannot agree with him that Mill's reasoning postulates the existence of a no-rent tract. The reasoning is akin to that on p. 60 above, relating to the taxation of rent.

[2] Compare Fleeming Jenkin : " The rents through the whole town are ruled by those of the new districts. There is a certain selective value between every house in the town, and if the rents of the new houses are dearer, the rents of the old houses are increased in due proportion " ("Incidence of Taxes," p. 117, *Papers, Literary and Scientific*).

[3] *Cp.* above, p. 55.

[4] Suppose, for simplicity of enunciation, that all the houses at the suburbs are of one kind; and also all the houses in the central area of another kind. Before the tax, let p_1 be the rent of a house, and x the number of houses taken, in the suburbs; and let the corresponding amounts for the central area be p_2 and y. By hypothesis, y is constant. Also, for a first approximation, we may make the classical assumption that p_1, the rent received by the capitalist-builder in the suburbs, does not vary with the tax. Under these conditions, if a tax proportional to the rent, say the ith part thereof (where i is small), is levied from the

there may be in fact from other causes a centrifugal movement of residents from central quarters. *Pro tanto* the tax may have the effect of diminishing the loss which from other causes is accruing to the owners of residential houses in these quarters.[1]

(3) For long periods the solution above given[2] as a first approximation holds good. We might regard the three interests A, B, C as three bodies held one above the other by a press or "vice," so that the sum of the depths of three bodies is constant. A wedge being driven in between A and B, the bodies—each obeying its peculiar law of compressibility and resilience—will behave as follows. At first A will be compressed to the full extent of the thickness of the wedge; B and C retaining their full dimensions. After a time A will re-expand, in part at least; B will be compressed to some extent, perhaps nearly to the whole extent of the thickness of the wedge; C will remain firm. But leave the bodies alone for a longer time and B will regain its original amplitude, and the compression due to the insertion of the wedge will be divided in uncertain proportions between A and C. It is not to be denied that during the long time required for the working out of these forces, other forces may have come

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occupiers in both quarters; for the disturbed equilibrium we have the following equations :—

$$\begin{cases} (1+i)p_1 = p_1 + dx\left(\dfrac{dp_1}{dx}\right) \\ (1 + i)(p_2 + dp_2) = p_2 + dx\left(\dfrac{dp_2}{dx}\right) \end{cases}$$

Whence

$$dp_2 = ip_2\left(- 1 + \frac{1}{p_2}\left(\frac{dp_2}{dx}\right) \div \frac{1}{p_1}\left(\frac{dp_1}{dx}\right) \right)$$

Whence it appears that the rent received by the urban owner falls to the full extent of the tax, when the demands for residence in the respective quarters are quite independent, and does not fall at all when the two articles are perfect substitutes. In the intermediate case the owner's rent falls, or rises, according as $\frac{1}{p_1}\left(\frac{dp_1}{dx}\right) >$, or $< \frac{1}{p_2}\left(\frac{dp_2}{dx}\right)$. The former case is, I think, the more probable; but the latter is by no means impossible ; for all that we know about the relative magnitude of these partial differentials is that $\left(\frac{dp_1}{dx}\right) \times \left(\frac{dp_2}{dy}\right) > \left(\frac{dp_2}{dx}\right)^2$. Probably $\left(\frac{dp_2}{dx}\right)$ is less than either of the two factors of which the product is greater than its square ; but not necessarily. *Ceteris paribus*, the event is more likely to occur, when the demand for urban houses is very inelastic ; for suburban houses very elastic. As to the conditions which the demand-functions must fulfil, see article on "Monopoly" in the *Giornale degli Economisti*, 1897.

The proposition is less likely to be true when p_1 is supposed to be lowered (in virtue of the law of diminishing returns, above, p. 60). It is strictly proved only for infinitesimal values of i, but may with probability be extended further. (Second end of note [1] on p. 55.)

[1] *Cp.* above, p. 51.   [2] P. 61.

into play. The bodies may have expanded from other causes, the press may have been warped so as to allow room for their expansion. But because the given forces are compounded with others known imperfectly, we are not precluded from calculating the resultant of the given ones.

The proof of the general theory relating to long periods may be verified by an examination of some limiting cases in which the statement of the theory requires modification ; the frequent occurrence of which cases may account for the prevalence of opposed theories.

(a) In the limiting case when the demand of the consumer, the occupier, is perfectly inelastic he will bear the whole tax. This assumption is more readily made, as it is usual, perhaps proper, to make it in problems about agricultural rent. The possibility of this incident has already been admitted with respect to the comparatively short period (2), and may also, though I think less easily, be admitted with regard to period (3).

(β) Suppose that ground rents are in general very small in comparison with the tax, then of course they can only bear a small part of the tax. May we not explain by this supposition Ricardo's *dictum* ?

" In ordinary cases it may be presumed that the whole tax would be paid both immediately and finally by the occupier." [1]

So J. S. Mill : [2] —

" In the vast majority of houses, the ground rent forms but a small proportion of the annual payment of the house." [3]

This is of course true of houses in the country ; [4] not so true now as fifty years ago of urban rates.

(γ) Again, suppose conditions such that only one " dose," so to speak, of building capital can be applied to one parcel of land— say in China or Peru, through the fixity of custom and the mobility of the earth, only a single-storied dwelling of uniform pattern can be placed on each unit of the area available for building. On such a supposition a tax on house rent would fall in general entirely on ground rent.[5] For the accommodation of the occupants could not be reduced without some of the sites being left unoccupied. Each landlord threatened with the loss

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[1] *Pol. Econ.* chap. xiv. par. 3.

[2] A different view of the Ricardian dictum appears to be taken by Esquiros de Parieu, *Traité de l'Impôt*, p. 74, and some other eminent writers.

[3] *Pol. Econ.* Book V. chap. iii. § 6, par. 5.

[4] Cp. *Wealth of Nations*, Book V. ch. 2.

[5] Of course supposing the tax not to exceed the rent.

of his entire ground rent will lower his terms until ground rent all round has been, if it can be, reduced to the full extent of the tax.

Upon this or some adjacent less extreme hypothesis, we may account for the opinion of some distinguished writers that the tax on house rent in the long run tends to be mostly borne by the ground landlord. Thus, too, we may perhaps explain what otherwise may seem inexplicable—why the successors of Ricardo should attempt to allocate a certain portion of the house rent to the ground rent.

Thus M'Culloch :—

" Were the supply of houses easily diminished and increased, a tax on their rents would fall wholly on the occupiers and ground landlords, and be divided between them in the proportion which the profit of the capital required to build them bears to the rent of the ground on which they stand." [1]

So J. S. Mill :—[2]

" A tax of so much per cent. on the gross rent falls on both these portions [ground rent and building rent]. . . . The incidence, however, of these two portions of the tax must be considered separately.

" As much of it as is a tax on building rent must ultimately fall on the consumer, in other words the occupier." [3]

So Professor Sidgwick distinguishes " the portion of the tax which is paid for the value of the house itself " and the " portion that falls on the ground rent." [4]

Now on our present hypothesis (γ) these statements would be true in a particular case, namely, when the tax was equal to the original ground rent plus the constant building rent.[5] In that case the effects of the tax would be exactly as Mill and M'Culloch lay it down. And it was, perhaps, natural to regard this case as typical; at any rate, when the consumer's demand is supposed perfectly inelastic, when our (a) as well as (γ) is present. In that sub-case the true solution, I submit, is that the division of the burden between the occupier and the ground landlord is indeterminate. But the divisions suggested by M'Culloch and Mill are plausible.

The consonance of this incident (γ) with authoritative *dicta*

[1] *Taxation and Funding*, Part I. chap. i. § 2.

[2] As against Mill's precise apportionment, Mr. Sidney Webb's contention that " the freeholder. . . has no fixed point of resistance " (*Town Holdings Commission*, 1890, Q. 42–44) is just. His " large jump in value " from agricultural to building land, is not necessary for this conclusion.

[3] *Pol. Econ.* Book V. chap. iii. § 6.

[4] *Principles of Political Economy*, Book III. chap. viii. § 8.

[5] In the spirit of the classical writers we may here suppose the cost of building constant, even though the supply of buildings should be reduced.

moves me to suppose its existence. A house is naturally thought of by Jevons as an instance of an "indivisible" commodity which forms an exception to the general theory of value.[1] And yet, though a house is indivisible, residential accommodation is not. There may be many "mansions" not only in the archaic sense, but in that which is applicable to the modern "flats." "Increments of villa accommodation," in Professor Marshall's phrase, may be added up to the point [2] where the price just measures both the marginal cost and the marginal utility of an increment. In short, the law of value for house accommodation is (for long periods) essentially the same for house accommodation as for corn. It might be all very well for Adam Smith, who held that "in the price of corn . . . one part pays the rent of the landlord," [3] to say that "the rent of a house may be distinguished into two parts,[4] . . . the building rent and the ground rent." But what have we to do with such apportionment of price, or tax, we who have received the doctrine of Ricardo that "rent does not and cannot enter in the least degree as a component of price"; the doctrine of Professor Marshall that "ground rent does not enter into the expenses of manufacture," on an understanding "exactly parallel to that which has to be supplied in order to make Ricardo's doctrine true, when applied to agriculture?" [5]

Dwelling houses, then, belonging to the general category of consumable products, as the highest authorities are agreed,[6] the taxation of such houses obeys the general laws of the taxation of products which have been enunciated above as pertaining to long periods (3); [7] abstracting the peculiarities of the "leasehold system" which have been allowed for with reference to short periods (2).

[1] *Theory*, chap. iv.

[2] "The cases in which a man has to live in a house of a size widely different from that which he prefers, because there is none other available," are exceptional (*Principles of Economics*, Book V., p. 593, note, 3rd edition.)

[3] *Wealth of Nations*, Book I.

[4] *Ibid.* Book V. chap. i.

[5] See the whole passage relating to the margin of building, in *Principles of Economics*, Book V.

[6] Thus Mr. Goschen in his *Draft Report on Local Taxation* : "The inhabitant of the house . . . is in reality the consumer of the commodity produced by the builder" (*Local Taxation*, p. 164). So Prof. Bastable regards "houses as a particular manufactured commodity" (*Public Finance*, p. 371, 2nd ed.). *Cp.* Mr. Pierson, *Leerboek*, 2nd ed. p. 146.

[7] Above, p. 63. I am confirmed in this view by finding myself able to agree with all that Professor Bastable has said on this subject (*Public Finance*, Book IV. chap. ii. § 5). I concur with his criticism of Professor Seligman that "he seems to give too little weight to the forces that shift taxation on the ground owner."

A practical corollary is that a tax on ground rent hurts the ground landlord more, and the occupier less, than *ceteris paribus* a tax on the occupation-rent, in the long-run; [1] theoretically even, and apart from friction (*a fortiori*, of course, when we restore the concrete circumstance that taxes are very apt to rest where they strike[2]).

In this argument no use has been made of the circumstance that all the leases do not fall in simultaneously. But it will be found that this concrete circumstance does not invalidate the broad conclusion of pure theory, that there is an essential distinction between the effect of a tax on ground rent, and that of a tax on occupation-rent. To fix the ideas, we might suppose occupation leases to be on an average for seven years, ground leases for seventy years. Thus every year on an average the leases of a seventh part of the houses in any given urban area would fall in; and in a tenth of these cases the ground leases would also fall in, and the sites would be offered to capitalist-builders; supposing as a first approximation that the duration of the ground lease coincides with that of the house. Upon this supposition a tax on ground rent would as before fall entirely on the landlord; a tax on occupation-rent would not in general have that effect. The effect of the latter kind of tax would not indeed be exactly the same in the concrete case of rotation and the imaginary case of simultaneous bargains.

But the differences between the abstract and concrete cases will not, I think, repay examination. I am already sensible indeed that the investigation of economic forces which require some seventy years to work themselves out may seem to have been prolonged beyond the limits of applied theory. I submit, however, that the argument is not so abstract, the reasoning is not deduced through so artificial a chain of remote consequences as

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[1] The reluctance on the part of common-sense and even of trained intelligence to accept the theory here maintained, that there is an essential difference between the effects of a tax on ground-rent and a tax of occupation-rent, may be accounted for by the tacit assumption that the amount of building is given and constant, irrespectively of the tax. Consider, for instance, the remarkably clear statements of Mr. Clements in his evidence before the Town Holdings Commission (Q. 1,969).

The argument which he illustrated by the example of a particular actual house (Q. 1,970) tacitly assumes that the amount of house accommodation demanded by the occupier is constant, whether or not the occupier pays an *ad valorem* tax. (See notes).

For other direct contradictions of the theory here advanced see *Town Holdings Committee*, 1887, Q. 3,360; 1888, Q. 2,736, 2,837, 4,446, 9,357 *et passim ;* or put the question to any practical man.

[2] Prof. Thorold Rogers advocated this view very strongly in his evidence before the Town Holdings Commission.

at least one of the clasical theorems of taxation which are stil accepted by economists;[1] I mean Senior's doctrine of tithes. In this argument, as interpreted by Mill, the links seem to be as follows: rise in the price of agricultural wages, rise in profits, check to accumulation, check to the production of food, check to the growth of population, check to the rise of rent; comparatively to the checks which would have occurred in the absence of the tax. But it is not my design to determine the limits of applied theory, or to uniformly cover with examples the field so demarcated. I aim only, at least in this first article, at a restatement, with slight modifications, of the classical laws of incidence, and a partial exemplification of the restated theory.

It will be understood that the application of the theory in this section has been adapted to the typical case propounded; modifications of statement would be required by the circumstances that there may be not only one, but several lessees between the ground landlord A, and the occupier C; that the duration of a house may exceed the period of the building lease; that the transfer of accommodation may be effected by sale or "feu," instead of lease; that houses may be used for business, as well as for habitation; that the ground landlord may act as a capitalist; that rates may differ in different parts of the same town; that house accomodation in different towns forms "rival" commodities; and many other incidents more or less important in practice.

From the point of view of pure theory the following modifications are more interesting. Perhaps the investments which are open as an alternative to an intending builder are not indefinitely extensive in comparison with the house-building industry —at any rate for periods not indefinitely long. The effect of mobility would then be to have connected our island B, not with a vast continent, but only with another island.[2] The joint island might then form a "nation" of capitalists, virtually appertaining to our first section, rather than the present one, obliged to submit in consequence of the house-tax to some permanent reduction in profits.[3]

Again, the building industry may be affected by the law of increasing returns, the operation of which we have next to consider.

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[1] *E.g.* Bastable, *Public Finance*, and Seligman, *Shifting and Incidence.*

[2] Above, p. 56.

[3] This sort of intermediate case between perfect mobility and immobility is treated by Professor Pantaleoni in his highly original *Traslazione dei Tributi.*

Ab. The old distinction between increasing and constant (or decreasing) cost presents difficulties to the newer analysis. For if any producer can continually increase his supply at a constant or diminished cost, there appears no general reason why he should not, cutting out his competitors, supply the entire market.[1] The classical conception of constant cost presupposes a limit to the production of each individual. The newer idea of expenditure pushed up to the margin of profitableness, in a *régime* of competition, implies the law of increased cost.[2] The law of diminishing costs, as Cournot argues, is only intelligible on the supposition of monopoly.[3]

How then can the law of diminishing cost co-exist with competition? How can a larger offer go with a smaller price? How can the supply-curves of the kind which Professor Marshall has made familiar be ever conceived as *descending* ?

The better opinion appears to be that such a downward trending *locus* is not to be regarded as a supply-curve in the primary [4] and obvious sense, not as representing the offer which in a given state of industry would be forthcoming at different prices; but as compounded of, or derived from, a series of such primary curves, which Mr. Cunynghame in his path-breaking essay on the subject [5] has called " successive cost curves."

It has happened to some of us to ascend a mountain slope just up to the point where the desire was just compensated by the difficulty, of further progress. Such is the position of the economic man on a primary short-period supply-curve sloping upwards.

Suppose that, as a party of mountaineers press up a steep slope, the opposing crest gives way, and they are carried down by a sort of avalanche, and landed on a new inclined plane. Again they urge their toilsome march upwards; and again, before the crest is reached, they are precipitated on to another ledge

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[1] *Cp.* Marshall's *Principles of Economics*, 2nd and 3rd editions, Book V. ch. xi. *et passim.*

[2] Thus in the luminous illustration which Prof. Marshall has given in note xiv. of the Appendix, 3rd edition, the total outlay of a master-builder, considered as a function of different classes of labour x_1, x_2, and different kinds of raw materials y_1, y_2, &c., and other kinds of variables, must be such that the second term of its expansion fulfils all the conditions of a *maximum* (above, p. 46, note 3) ; otherwise the statements made, *e.g.* on p. 802, par. 2, would not hold good.

The theoretical difficulties connected with the law of increasing returns are frequently referred to by Prof. Marshall in his later editions.

[3] *Principes Mathématiques*, Art. 50, p. 102.

[4] See the reference to the subject in a former article, ECONOMIC JOURNAL, vol. iv. p. 436.

[5] ECONOMIC JOURNAL, vol. ii. p. 41.

below; and so on till they are brought to a stop on some steep and comparatively firm slope. Their path in space, though in reality saw-shaped, might appear to one taking a general view to be a curve-line. Such, perhaps, is the nature of a competitive industry obeying the law of increasing returns : confined for short periods on an ascending supply-curve, extended during long periods down a descending supply-curve.[1]

Suppose that our party, after coming to a stop on a short slope, were to be incited by some fresh stimulus; they might break through another crest and descend through a distance out of all proportion to the exciting cause. Conversely, the imposition of a new burden might have prevented such progress from occurring. It is thus that, in an industrial *régime* of the kind considered, a bounty is apt to lower price,[2] a tax to raise it,[3] to a disproportionate extent.[4]

But, if the law of increasing cost is fulfilled in its natural and obvious sense, if the primary or short-period curves are descending, presumably the case belongs to *Monopoly*, the subject to which we next proceed.

F. Y. EDGEWORTH

[1] The idea of a curve of many branches was propounded by the present writer in his Address to Section F of the British Association (note J), 1889. The date explains one serious omission, that of "external economies," pointed out by Professor Marshall in the *Principles of Economics*.

[2] Marshall, *Principles of Economics*, Book V. chap. xii. § 4.

[3] *Ibid.* Cp. Mill, *Pol. Econ.* Book V. chap. iv. § 2, end.

[4] A tax on a rival might of course act as a bounty ; *e.g.* duty on foreign imports as a bounty to native producers.

Professor Carver's argument (*Yale Review*, Nov. 1896) that, when an import tax is levied on a commodity which is produced at home under the law of increasing returns, the consumers may possibly bear no part of the tax, is not, I think, as he seems to apprehend, "opposed to the best orthodox teaching"; unless orthodoxy be defined very straitly. The argument is used by some of the highest modern authorities, to whom I have referred in a former article [ECONOMIC JOURNAL, 1894, Vol. IV. p. 48]. I don't know that they would accept his reply to the objection that the price —after being lowered in consequence of the tax—"might be, further lowered by removing the tax." "This might be temporarily," says Prof. Carver, "while it is probable that the same prices which kept the price up before the duty was first levied would ultimately bring about the same conditions after it was removed."

LINKED CITATIONS

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[Footnotes]

[1] **The Theory of International Values**
F. Y. Edgeworth
The Economic Journal, Vol. 4, No. 13. (Mar., 1894), pp. 35-50.
Stable URL:
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[4] **The Theory of International Values**
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[2] **Review: [Untitled]**
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[2] **Theory of International Values**
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[4] **Theory of International Values**
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[5] **Some Improvements in Simple Geometrical Methods of Treating Exchange Value, Monopoly, and Rent**
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[4] **The Theory of International Values**
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