

## THEORY OF INTERNATIONAL VALUES

### III<sup>1</sup>

THE theories stated in two preceding articles are now to be sustained by, or maintained against, the authority of the principal writers on the subject. They may be divided into two classes, (I.) English and (II.) Continental; a division almost coincident with that between those who have not, and those who have employed mathematical methods.

I. (1) *Ricardo*.—Foremost in the first class is the founder of the theory,

Quo nihil majus generatur ipso,  
Nec viget quidquam simile aut secundum.

The incomparable vigour of Ricardo's chapter on foreign trade has not been approached by any of his successors. The main propositions of the theory—the principle of comparative cost (M'Culloch's edition, p. 77), the change in the quantities and prices of commodities consequent upon foreign trade (p. 73, *cf.* p. 80 *sub finem*), the difference in the value of money in different countries (p. 79 *et sqq.*), are stated by Ricardo more briefly, and perhaps more clearly, than by J. S. Mill. Mill seems to have the advantage only in one respect; his recognition of the case in which an impediment to trade may be beneficial—or an improvement prejudicial—to one of the countries. It may be observed that the circumstance on which this property depends, the demand in the other country being 'increased in a greater proportion than the cheapness,' to use Mill's phrase (*Pol. Econ.* xviii. § 5), did not escape Ricardo (p. 73, par. 2).

The only scruples which the chapter may excite are removed by recollecting Ricardo's peculiar phraseology: the sense in which he employs the terms 'value,'<sup>2</sup> and 'wages' or 'real wages,'<sup>3</sup> and

<sup>1</sup> See *Econ. Journal*, 1894, March and September.

<sup>2</sup> *Cf.* Ricardo, *Pol. Econ.*, ch. xx.

<sup>3</sup> *Cf.* Ricardo, p. 82, par. 2.

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his elliptical use of *either* capital or labour where we might expect *both*. These explanations apply to the following passages:—

We should have no greater value if, by the discovery of new markets, we obtained double the quantity of foreign goods in exchange for a given quantity of ours (p. 72).

The country may have 'greater skill' and 'better machinery' used in the manufacture of exportable commodities; yet 'the rate of profits will probably differ but little'; wages, or the real reward of the labourer, may be the same in both (p. 81).

If capital freely flowed towards those countries where it could be most profitably employed, there could be no difference in the rate of profit, and no other difference in the real or labour price of commodities than the additional quantity of labour required to convey them to the various markets where they were to be sold' (p. 77).

(2) *J. S. Mill*.—Mill's contributions to the subject are contained in his stupendous chapter on *International Values* (*Pol. Econ.* Book III. ch. xviii.), the chapters on the *Distribution of the Precious Metals*, and the *Competition of different Countries in the same Market* (*ibid.* chs. xxi. xxv.) and the sections treating of *the effects produced on international exchange by duties on exports and imports* (Book V. ch. iv. § 6), and the *Doctrine of Protection to Native Industry* (Book V. ch. x. § 1); and the corresponding passages in the *Unsettled Questions*.

Mill's exposition of the general theory is still unsurpassed. He presents clearly all the leading features: the distinction between international and home trade (Bk. III. ch. 2, last par.), the former requiring us to 'fall back upon an antecedent<sup>1</sup> law, that of supply and demand (*ibid.* ch. xviii. § 1);' the sense of 'cost' in which 'a country gets a commodity cheaper when it obtains a greater quantity of the commodity with the same expenditure of labour and capital' (*ibid.* § 9); the peculiarity that international values are not 'in the ratio' (*ibid.* and *cf.* ch. xvi. § 1) of cost in that sense; but that a variation of cost in that sense will be attended with a variation—though not in general an equal variation—in international value (Book III. ch. xviii. § 5). The additions and corrections which Mill's work has received will be noticed in the course of the following more detailed review.

Mill begins by considering the establishment of a trade between two nations. His classical illustration—the exchange of English cloth for German linen—has been much imitated, but little improved. The opening of a trade, which is considered

<sup>1</sup> *Cf.* Book III. ch. xvi. § 1. The term 'anterior' in this passage, of which Jevons complains (*Theory*, p. 215, 2nd ed.) fits well that conception of the distinction which has been adopted in this study (see Part I. par. 1).

in the first four sections of the great chapter, being a change of the kind which we have designated as simple or continuous<sup>1</sup> does not differ essentially from the facilitation of (an already established) trade which is considered in the fifth section. The latter case may indeed be regarded as the more general since it comprehends both the case in which the facilitation is beneficial to both countries, the case to which the opening of trade presumably belongs,<sup>2</sup> and also the case in which the facilitation is prejudicial to one party.

Mill is, I think, the first—indeed almost the only—economist who has stated the latter proposition. The statement would have been more complete if he had explicitly affirmed the converse proposition that an impediment to trade may be beneficial to one party.<sup>3</sup>

It would have been well too if Mill in his chapters on International Values, and on the Competition of Different Countries (Book III. chs. xviii., xxv.), had treated the cost of production in each country not as constant, but as varying with the quantity produced—as his successors<sup>4</sup> have done. The deficiency however is partly made up in the chapter on Taxes on Commodities (Book V.), where, with special reference to international trade, it is pointed out that ‘duties on the produce of land or of mines might be so high as to diminish materially the demand for the produce, and compel the abandonment of some of the inferior qualities of land or mines. Supposing this to be the effect, the consumers, both in the country itself and in those which dealt with it, would obtain the produce at smaller cost’ (§ 6).<sup>5</sup>

It is a more serious complaint that Mill takes as the measure of the advantage which a country derives from trade, the increase in the international value of its exports.<sup>6</sup> He thus confounds

<sup>1</sup> *Ante*, pp. 426, 436.

<sup>2</sup> The state of null trade, represented by the ‘origin’ at which the supply and demand curves intersect, is in general a position of unstable equilibrium, that is of minimum advantage; advantage less for both parties than that which is incident to the proximate intersection of the curves, which is in general a position of maximum advantage.

<sup>3</sup> *Ante*, p. 429.

<sup>4</sup> *E.g.* Mangoldt, Fawcett, Bastable.

<sup>5</sup> Compare Ricardo’s theory that ‘by a continued bounty on the exportation of corn there would be created a tendency to a permanent rise in the price of corn’ (M’Culloch’s edition, p. 188). Compare also the observation made by Mill with respect to taxes considered generally, that a tax, by checking the demand for a commodity, may prevent what we should now call the law of increasing returns from coming into operation (Mill, Book V. ch. 4, § 2, *sub finem*).

<sup>6</sup> Cournot’s objection on this score is serious if Mill is held to mean—what he certainly suggests—that England’s share of the total gain is in the ratio of (17 minus

'final' with integral utility; ignoring the principle of 'consumer's rent.'<sup>1</sup> However, it may be admitted that his definition is adequate to the purposes for which it is used. Where he says that the whole or none, or more or less, of the advantage will accrue to a certain country, it is generally true I think, not only in his sense, but in the more correct sense.

The splendid edifice of theory constructed in the first five sections is not improved by the superstructure of later date which forms the latter part of the chapter. This second story does not carry us much higher. What seems at first sight to be an addition will be found, I think, also in the first part; I mean what Cournot calls the 'reflux' of capital and labour; the sort of change which occurs when Germany has obtained cloth from England 'with only seven-eighths of the labour and capital which she previously expended in supplying herself with cloth, and may expend the remainder in increasing her own consumption of linen or any other commodity' (ch. xviii. § 8, first paragraph). But the statement in the original part (§ 5, penultimate paragraph) is equally accurate: 'In the case supposed the consumers of Germany have had part of their incomes set at liberty by the increased cheapness of linen which they may indeed expend in increasing their consumption of that article, but which they may likewise expend in other articles.' (Cf. *ibid.*, last paragraph.)

In short, I agree with Prof. Bastable<sup>2</sup> in regarding the superstructure as 'laborious and confusing.'<sup>3</sup> The last epithet seems

15) to (20 minus 15); 20 and 15 (yards of linen in exchange for 10 of cloth) being the limits fixed by the respective costs of production, and 17 the value actually set up. (See ch. xviii. ante-penultimate section, *et passim*.) But Mill need not, I think, be held to that precise statement; and then Cournot's objection amounts to no more than this: that there is a certain asymmetry and inelegance in expressing the share of the total gain in terms of the commodity purchased by one of the parties ('linen').

Cournot's objection is partly directed against the expression of the gain of one party as a *percentage*—*e.g.* the gain of England as 20 per cent., if before the trade she obtained 15 of linen, and after the trade 18 for the same quantity of cloth. Has Mill employed such a percentage in the passage quoted in the next note?

<sup>1</sup> Cf. Book V. ch. x. § 1, par. 5. 'The amount of national loss is measured by the excess of the price at which the commodity is produced over that at which it could be imported.' Cf. Jevons' *Theory*, ch. iv., on the gain by exchange.

<sup>2</sup> *Internat. Trade*, p. 29, note.

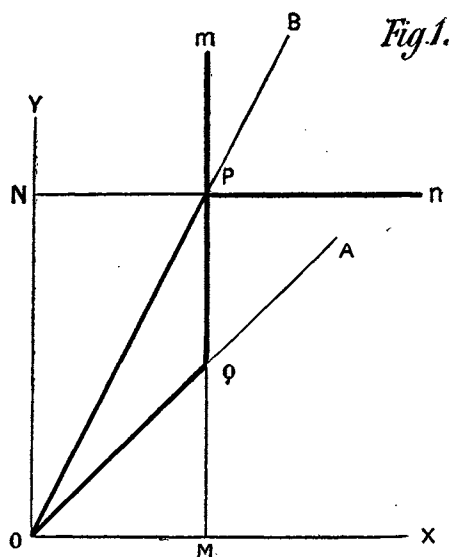
<sup>3</sup> The following interpretation of this difficult supplement may be useful.

We begin by supposing (A) that 'in both countries any given increase of cheapness produces an exactly proportional increase of consumption, or in other words that . . . the [real] cost incurred for the sake of obtaining it is always the same' (sec. 2, par. 2).

A (1). In the first case considered (*Ib.*, par. 3) England expends in procuring linen, whatever its rate of exchange with cloth, the cost of producing a million yards of cloth. Before the trade, England obtained a million yards of linen for

particularly deserved by a certain passage leading to what I have called the second story: where Mill notices the phenomenon of multiple equilibrium, and says: 'It is conceivable that the conditions might be equally satisfied by every numerical rate which could be supposed.' This statement appears somewhat inconsistent with the conception of an equation which Mill has

that cost; after the trade, she will not be induced to undergo a greater cost for any amount of linen. The conditions are represented in Fig. 1, where the horizontal  $O X$  denotes yards of cloth, the perpendicular  $O Y$  yards of linen. The cost of producing cloth and linen in England being the same, the indifference curve of England is the line  $O A$  making with  $O X$  an angle of which the tangent is unity (*ante*). The demand curve indicated by thick lines is a part of the indifference-curve, viz.  $O Q$ , and a part of the ordinate through  $M$ , from  $Q$  to infinity;  $O M$  representing



*Fig. 1.*

a million yards of cloth. For at the rate of one of linen to one of cloth any point on  $O Q$  may be a point of equilibrium. At that rate England takes 1,000,000 linen in return for the labour-cost by which 1,000,000 cloth are or might be produced; and it is indifferent to England whether she procures that 1,000,000 of linen by producing it all, or by producing any part and obtaining the rest in exchange for cloth, or by obtaining the whole in exchange for cloth. Thus  $O Q$  is part of the demand-curve. At the rate of exchange of more than one of linen to one of cloth England is ready to take in return for  $O M$  of cloth any amount greater than  $M Q$  of linen. Thus  $Q m$  is the continuation of the demand-curve. By parity  $O B$  is the indifference-curve of Germany,  $O N$  being =  $2 O M$ . Also  $O P$  and  $P n$  form the demand-curve of Germany. Accordingly the point of equilibrium is at  $P$ , on the indifference-curve of Germany; which corresponds to Mill's conclusion.

A (2). In the next case (*Ib.*, par. 4) 'the cloth which Germany had heretofore required was 800,000 yards only, equivalent at the German cost of production to 1,600,000 yards of linen.' This case is represented by Fig. 2 where  $O N = 1,600,000$ ; and the demand-curve of Germany is now  $O S S n$ , while the demand-curve of

elsewhere (*Political Economy*, Book III. ch. 2, § 3, and review of Thornton, *Dissertations*, iv.) so well applied to the phenomenon of Supply and Demand. However, suppose that the intersections of the curves are very frequent and close together (as may well be when both are inelastic: *ante*, p. 430, fig. 4, diagram 4), the case supposed by Mill virtually, if not theoretically, comes into existence. It should be added that Mill has done nothing in his later sections to remove that sort of indeterminateness which does occur in the actual case of plural, though definite, positions of equilibrium—not to speak of that sort of indeterminateness

England is as before O Q, Q m. These curves intersecting at R, 'the international values will thus be 100 cloth for 160 linen.'

A (3). In the next case it is supposed that 'the million yards of cloth which

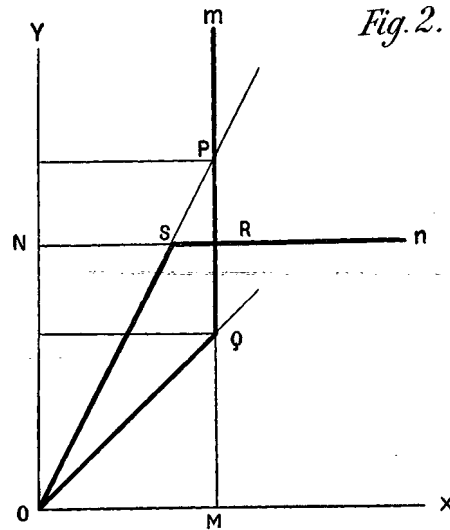


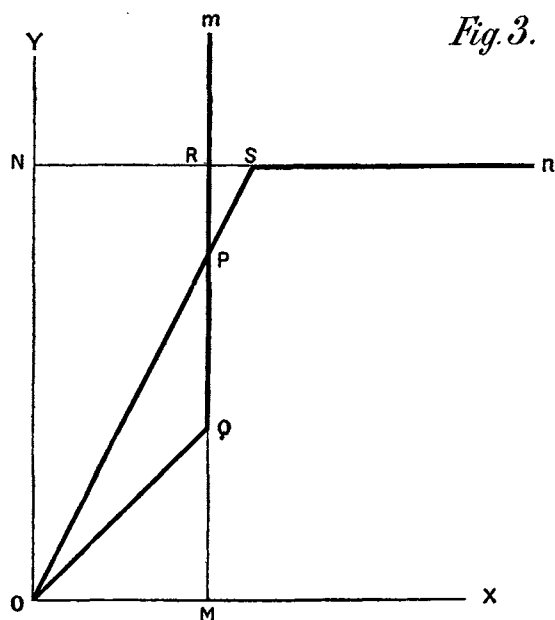
Fig. 2.

England can make will not satisfy the whole of Germany's pre-existing demand; that demand being (let us suppose) for 1,200,000 yards' (the case put in the note to sec. 7, and by reference to that section included under the first head, our A). This case is represented by Fig. 3, where O N is twice 1,200,000, and accordingly the German demand-curve is O S, S n; while the English demand-curve is as before O Q, Q m. Accordingly the point of intersection being at Q, Germany will purchase a million yards of cloth from England for two million of linen, and will lay out the remainder of the cost, which by hypothesis is constant, in producing for herself 300,000 yards of cloth.

It may be asked, might not Germany, as she gains no advantage by purchasing the million yards of cloth, prefer to produce them herself. The answer to this question, which might equally be asked with respect to case 1, is that O, the position of null trade, is not a point of stable equilibrium. Suppose for the moment that all the 1,200,000 yards of cloth were produced in Germany while the linen consumed in England was produced there. It would be for the interest of some of the pro-

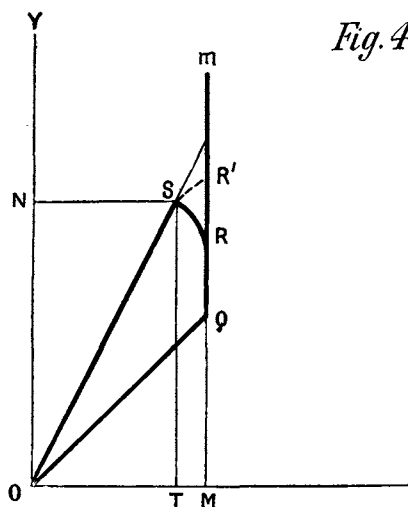
which would occur in the case of that *neutral* equilibrium which he imagines.

ducers in Germany and some of those in England to change the direction of their productive forces and exchange German-made linen for English-made cloth on any



*Fig. 3.*

terms intermediate between one of cloth to one of linen, and one of cloth to two of linen. This process would go on up to the point at which England exports 1,000,000



*Fig. 4.*

yards of cloth ; in exchange for which the Germans will be forced by competition to give 2,000,000 yards of linen, just gaining no advantage by the trade. Mangoldt's

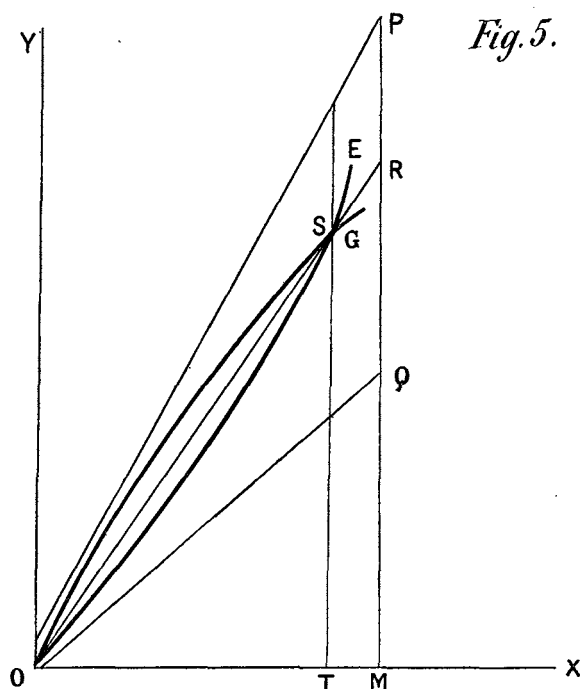


The chapter on the Distribution of the Precious Metals requires no comment.

In the first section of the Chapter on Competition (Book III. ch. 25), the lenient judgment which Mill expresses appears to explanation of the action of competition in such a case is good. *Grundriss*, 2nd edition, Appendix.

I submit that this solution is more correct than that of Mill, who virtually alters the data when he supposes a *larger* supply of cloth than the by hypothesis constant 1,000,000 yards to be evoked (note to sec. 7). In doing so he abandons the first head which we have called A.

B. We go on now to the class of cases in which the demand is not supposed proportional to the cheapness (sec. 8). This class may be subdivided into two cases:—



(1) where 'the proportionality of demand to cheapness holds good in one country, but not in the other, (2) where it 'does not hold good in either country' (*loc. cit.* par. 3, first sentence).

B (1). The first case under this head, in which 'the demand of England for linen is exactly proportional to the cheapness, but that of Germany for cloth, not proportional,' is represented by Fig. 4. where the German demand-curve is the line of indifference at least up to the point where it meets a perpendicular through the point T,  $OT = 800,000$ , as 'she required 800,000 cloth at a cost equivalent to 1,600,000 linen' (*loc. cit.*). After the point S the demand-curve must leave the straight line as it strikes  $Mm$  at the point R,  $MR = 1,400,000$ .

Another variety of this case is represented by the dotted curve line intersecting  $OM$  at point  $R'$   $MR' = 1,700,000$  (sec. 8 par. 2).

The alternative suggested by Mill 'or else tempt England to part with some of the cloth she previously consumed at home' is not proper to case B (1).

B (2). This case is represented by two ordinary demand-curves, Fig. 5, which 'by

imply one at least of the following propositions: (1) The rise of a competitor may diminish the value without diminishing the quantity of a country's exports (*ibid.* last paragraph). (2) A diminution in the quantity of exports does no great harm to producers.

The first proposition, I think, cannot be maintained in the light of the reasoning in Part II. respecting competition.<sup>1</sup> The second proposition may perhaps be maintained on certain abstract assumptions. But on the concrete supposition that the weaker producers<sup>2</sup> of the exported articles may be driven out of their occupation by a fall in price, and may not be able to find an equally good occupation elsewhere, the proposition cannot be maintained.

Mill goes on to argue (*ibid.*, §§ 2 and 4) that low wages when common to all branches of industry cannot be one of those causes which enable one country to undersell another. The argument is sound if low wages are understood in the Ricardian sense of a small proportion of the joint product; which is Mill's meaning. But the argument is not sound, I think, if low wages are understood in the sense of low real remuneration received by the labourer per unit of produce;<sup>3</sup> *ceteris paribus*, and in particular not assuming any elevation in the similarly reckoned remuneration of the capitalist-employing class—a very natural meaning to attach to the term. Mill's employment in this connexion of the Ricardian dogma that 'general low wages do not cause low prices, nor high wages high prices within the country itself' is questionable (§ 4, par. 2). The Ricardian assumption that the labour-value of money (the efforts and sacrifices required to procure a unit of gold) is constant is not very proper to the mere accident' (sec. 8, par 3) may meet on the line O R making with O M an angle of which the tangent = 1.6 (the ratio of the total cost of linen to that of cloth) at the point S, of which the abscissa is O T = 900,000; 'if England only wants linen to the amount of nine tenths of 1,600,000 (1,440,000), and Germany only 900,000 of cloth' (*loc. cit.*).

'In any other case the equation of international demand would require a different adjustment of international values' the general case—the comprehension of which is not much facilitated by the particular suppositions hitherto entertained.

With reference to the interpretation of these sections of Mill, I ought to repeat that I have had the advantage of reading Professor Marshall's unpublished papers, referred to with grateful acknowledgment in my *Mathematical Part*, *ante*, p. 443.

<sup>1</sup> *Ante*, p. 439.

<sup>2</sup> *Ante*, p. 46.

<sup>3</sup> Wages in this sense is, or is proportional to, wages in the sense in which the term is employed by Mill in the classical passage at the end of his chapter on Profits (*viz.*; the real remuneration of the labourer per unit of time, *loc. cit.*, par. 2) *divided by* 'efficiency' as defined in that section (*viz.*, the amount of work done per unit of time).

case of International Trade.<sup>1</sup> It is quite conceivable, if the inhabitants of a country, or a large section of them, are willing to do as much for less remuneration, reckoned in commodities, that the same efforts and sacrifices will procure less gold in the world's market. Accordingly general prices will fall in that country; and in particular the price of exports; thus the country will be able to undersell others where higher wages (in one, and not the least natural, sense of the term) prevail.

In the section on the effects produced on international exchange by duties on exports and imports (Book v. ch. 4) Mill employs a principle which was noticed above as omitted in his first chapter: the converse of the proposition that an improvement in the production of exports may be prejudicial to a country. For when he concludes (*loc. cit.*<sup>2</sup> par. 4) that by an export tax in certain cases 'England will gain not only the whole amount of the duty but more,' is not this 'more' attributable to the tax *quâ* impediment? If the tax were intercepted as a transit duty, or otherwise,<sup>3</sup> this *plus* would still accrue to the exporting country. The case considered is that which corresponds to Fig. 4 (2) and (4) in our Part II.

The difference above pointed out between the results of a tax on exports and one on imports<sup>4</sup> may seem not to have altogether escaped Mill. For, while in the case of exports the taxing country may gain 'not only the whole amount of the duty, but more,' in the case of imports we read (fifth of the paragraphs relating to imports) 'taxes on imports are partly paid by foreigners.'

In the following section (People's Edition, p. 515*b*) there is a little inaccuracy. It is not true that 'a tax on rare and high-priced wines will fall wholly on the growers, or rather on the owners of the vineyards.' If the tax is specific the price will be raised by the monopolist.<sup>5</sup>

In the section on Protectionism some of the expressions in the 7th paragraph<sup>6</sup> seem appropriate to the case which I have considered in Part I.: that of a country for whose exports there is an urgent demand in foreign countries benefiting itself by an import tax.<sup>7</sup>

On the famous passage about 'infant industries' I have nothing to add to what has been said by Professor Sidgwick as to the removal of a barrier, so to speak, blocking the initiation of

<sup>1</sup> Professor J. S. Nicholson, in his masterly article on 'Wages' in the *Encyclopædia Britannica* (vol. xxiv., p. 309*a*), hints at this exception to the Ricardian principle.

<sup>2</sup> There is a misprint in the fifth sentence of this paragraph. For 'so great' read 'a greater.'

<sup>3</sup> *Ante*, p. 41.

<sup>4</sup> *Ante*, p. 435.

<sup>5</sup> Marshall, *Principles*, v. 13, 4.

<sup>6</sup> People's Edition, p. 554*b*.

<sup>7</sup> Part I. p. 46, and Part II. p. 435.

an industry,<sup>1</sup> by Professor Marshall as to the possibility of bringing into play the law of increasing returns,<sup>2</sup> by an ingeniously devised system of Protection, and by other eminent economists, in particular Professor Taussig<sup>3</sup> and General Walker.<sup>4</sup>

In conclusion I subscribe to the elevated Utilitarianism which inspires several passages in this section. I trust that Mill has not exaggerated the readiness of the nations to follow an example of commercial disinterestedness—as he has elsewhere certainly exaggerated their readiness to abandon war. ‘Wars,’ says the sanguine philanthropist, ‘are now usually confined, in almost every country, to those distant and outlying possessions at which it comes into contact with savages.’<sup>5</sup> Perhaps ‘collective churlishness’ (Book V. ch. 10, § 1) in commercial relations will die as hard as war.

(3) *Cairnes*.—Cairnes’ principal contribution to the subject is his recognition of the part played by ‘non-competing groups within a nation.’<sup>6</sup> Mill indeed had discerned the existence of such groups;<sup>7</sup> but he made less use of them than might have been expected, even with respect to domestic trade.<sup>8</sup>

Cairnes has also restated the fundamental distinction between foreign and domestic trade at great length and with added clearness; but without I think substantially adding to, or taking from Mill.<sup>9</sup>

On the nicer points of theory Cairnes falls behind his predecessor. He does not seem fully to have apprehended the effect of an improvement in the production of an exported article. In the case of ‘a great improvement . . . in the manufacture of woollen goods in England’ he concludes that ‘English labourers,’ so far as they were consumers of foreign goods procured through an exchange for woollens, would ‘obtain those commodities more cheaply.’<sup>10</sup> This conclusion is erroneous if ‘cheapness’ is defined with reference to some fixed standard, such as labour-cost, for it has been shown that the effect of an improvement in the production of an export might be to make the terms on which

<sup>1</sup> *Pol. Econ.*, Book III. ch. 5.   <sup>2</sup> Address to Section F, British Association, 1890.

<sup>3</sup> *Tariff History of the United States*.   <sup>4</sup> *Quart. Jour. of Economics*, April, 1890.

<sup>5</sup> Book IV. ch. 1, § 2.

<sup>6</sup> *Leading Principles*, Part III. ch. 2, § 1, p. 386. The subject is well treated by Prof. Bastable in his *Theory of International Trade*, ch. 6.

<sup>7</sup> As pointed out by Prof. Marshall in his masterly article on Mill’s *Theory of Value*, *Fortnightly Review*, 1876.

<sup>8</sup> Compare Prof. Sidgwick, *Principles of Political Economy*, Book II. ch. 2, § 9. See, however, Mill, Book III. ch. 4, § 4.

<sup>9</sup> Compare Prof. Marshall, *loc. cit. sub finem*.

<sup>10</sup> *Leading Principles*, Part III. ch. 2, § 5, pp. 404–7.

imports are obtained worse.<sup>1</sup> Cairnes' statements are accurate only on the supposition that alteration in the supply of woollen goods makes no difference in international value. It is only on this interpretation that we can understand his conclusion, 'the wages of English labourers measured in woollen goods would rise in proportion as the cost of those goods had fallen' (p. 407). This is true of a *small* country, whose influence on international values may be neglected; but is not true in general.

On the important practical question what is the effect of low wages upon the trade of a country, Cairnes is even more open to criticism than Mill. Putting the case of wheat imported into Victoria from South Australia or South America, Cairnes argues 'inasmuch as a rise or fall in the rate of wages [in Australia] has no effect on the comparative quantities of labour required for the production of different commodities, it is evident that if the received theory be true this circumstance must be incapable of altering in any way the course of foreign trade' (p. 390 top, *cf.* p. 393, par. 2).

Now, as Cairnes fully perceives that comparative cost does not 'determine,' but only 'controls' value (*Leading Principles*, p. 423), does not fix 'a point about which values move, but a circle within which they move' (*ibid.* p. 424)—an area corresponding to that intercepted between O T and O S, in our Fig. 6 (p. 623) on the abstract supposition of cost of production not varying with quantity—it might have occurred to him that, even though 'a fall in the rate of wages has no effect on the comparative quantities of labour required for the production of different commodities,' yet, if the Australian workers became disposed to give the same quantity of work in return for less commodities, the point of equilibrium might be displaced to a position such that the Australian goods would become cheaper on the international market. This conclusion does not depend upon the imaginary supposition of fixed costs of production.<sup>2</sup>

A similar criticism applies to Cairnes' solution of the following problem: 'Suppose a fall of wages to take place in some leading branch of English manufacture—say Sheffield cutlery—. . . accompanied by a corresponding change over the whole field of English industry . . . what would be the effect of this on the external trade of England?'

<sup>1</sup> *Ante* p. 429, where it is shown that the effect of the change might be to push back the position of equilibrium along the supposed unaltered demand and supply curve; that is, to make the gain in respect of utility less for the exporting nation.

<sup>2</sup> As in the case described, *ante*, p. 46.

The answers given to the problem which is presented by 'supposing the fall in wages not to extend beyond the group of trades in effective competition with the principal industries of Sheffield' (p. 397) seem rather loose from the mathematical point of view. Consider for instance the second of the cases distinguished on p. 397, 'the demand of foreign countries for Sheffield wares' not increased in proportion to their increased cheapness. The answer that there is no answer—'what the exact character of this readjustment would be it is impossible *à priori* to say'—appears to be inaccurate. The case would seem to be that which is represented by our A B C D E f G H I variety (2) and (4). Accordingly the exporting country will be damnified<sup>1</sup> by the alteration in the terms of trade.

The only defence which can be made is that by a fall of wages Cairnes means only a diminution in the proportion of the national dividend accruing to the wage-earner; not, as it is natural in this connection to understand the term, the diminution in the absolute amount of commodities which the wage-earner obtains per piece.<sup>2</sup> But, as already argued with reference to Mill, this Ricardian definition, however applicable to the case of an isolated country where the labour-cost of money may be assumed to be constant, is less inappropriate to a country affected by international trade, with respect to which the Ricardian proposition, 'high wages do not make high prices' (invoked by Cairnes, p. 390), is deceptive. Cairnes' statement thus defined no doubt is true; but it is misleading in the absence of a more explicit enunciation of that definition.

It will be understood of course that this criticism of details does not touch Cairnes' main contention against popular fallacies on the subject of low wages. The extreme difficulty of our science is illustrated by the reflection that not only are first appearances and common sense—what Cairnes calls 'the com-

<sup>1</sup> It is curious that in his Australian and Sheffield examples Cairnes seems to refer principally to that aspect of the problem which may present least practical interest, namely, what would be the effect of a lowered rate of wages upon the country in which they are lowered, abstracting from competition in foreign trade. However, his answer that there is no effect is to be understood as applying to the two more practical questions, (1) what would be the effect on a country dealing with the one in which the wages are lowered; *e.g.* is America prejudiced by the prevalence of pauper labour in the countries with which she trades? (2) what would be the effect of lowered wages in the country in which they are lowered with respect to foreign competition; *e.g.* does, or might, England by lowering wages obtain an advantage over America in dealing with a third country?

<sup>2</sup> To interpret 'wages' in this connection as *day-wages* is of course out of the question. This sense belongs to the 'commercial view of the subject' dissipated by Cairnes.

mercial view of the subject'—altogether wide of the mark, but even the corrections of the economist require themselves to be corrected. The writer of these criticisms does not flatter himself that they form any exception to this rule.

(4) *Professor Sidgwick*.—The new theory of international values which Professor Sidgwick has propounded in his *Principles of Political Economy*, Book II. chap. 3, appears to be tenable upon an assumption which, with respect to modern trade, is plausible, namely that the difference in 'the aggregate of utilities obtainable by similar sacrifices in different localities' (*Ibid.* § 3, par. 1, 2nd ed.) is not much greater than might be accounted for by the cost of transport. If we assume that any greater difference in the level of advantage would be annihilated by a flow of population (*loc. cit.*), Professor Sidgwick rightly considers that 'an essential part of the reason why a special theoretic treatment has to be applied to the products of international trade is that a double cost of carriage has here to be taken into account' (*Ibid.* § 3, par. 2).

The problem which Professor Sidgwick solves might thus be reached, as I understand. First, abstract cost of transport, and let it 'not' be 'assumed that labour and capital do not move freely between the trading countries.' This is the case of ordinary domestic trade. Now introduce a barrier which it requires a certain cost of transport to surmount; Professor Sidgwick applies the general theory of international trade to determine how values would be affected in this particular case.

Putting this or some similar construction on Professor Sidgwick's theory, I accept the positive part of it as true, and perhaps pertinent to a great part of modern trade. But I am unable to accept the negative part of the doctrine, namely that Mill's theory is erroneous, 'unless we further suppose that after the trade is established, there is no product *common* to the trading countries, a supposition manifestly extravagant' in the case considered (*Ibid.* § 2, par. 2).

In directing hostile criticism against Professor Sidgwick I feel like a certain attacking party described by Thucydides who, though they had the Lacedemonians at a disadvantage in the island of Sphacteria, yet were oppressed and cowed—literally enslaved—by the prestige of their adversaries.<sup>1</sup> But, like the Athenians on that occasion, I have numbers on my side—not only Mill and all his followers with respect to the general issue, but also at the

<sup>1</sup> 'ἀνέβαινον τῇ γνώμῃ δεδουλωμένοι ὡς ἐπὶ Λακεδαιμονίους' (Thucyd. Book IV. ch. 3, 4).

particular point on which Professor Sidgwick takes his stand, the case of a common commodity, the weighty support of Mangoldt.

Professor Sidgwick argues in the light of a well-chosen example that, if there is a common product, the theory breaks down.

‘For [taking Mill’s case of England exchanging cloth for the wine of Spain] let us suppose that there is at least one other commodity—say corn—which is produced both in England and in Spain. According to Mill’s general theory of value, discussed in the preceding chapter, the relative values of cloth and corn in England must be determined by their comparative costs of production; and, again, the relative values of wine and corn in Spain must be determined in the same way. But if we suppose cost of carriage to be eliminated, there is no reason why the value either of wine or cloth should be altered by exportation; hence the values of both wine and cloth relatively to corn, and therefore relatively to each other, must be as much determined by cost of production as the values of home commodities are’ (*Principles*, Book II. § 2, 2nd edition, p. 207).

It appears to me that an injudicious line of attack upon this theory has been adopted by Professor Bastable<sup>1</sup> when he disputes the possibility of there being a product common to both countries—cost of transport having been abstracted—except upon the supposition that the cost of producing the commodities varies with the amount produced. It is quite conceivable that, even on the abstract hypothesis of constant costs of production and no cost of transport, there should be a common product. It is quite legitimate to suppose with Mangoldt,<sup>2</sup> two countries, I. and II. dealing in three commodities, A, B, C; whereof A is produced only in country I., B is produced only in country II., while C is produced in both countries—exported from II., and imported into I. One might even regard this phenomenon as normal, on the plausible hypothesis that there are an indefinite number of articles of trade, with every variety of cost of production.<sup>3</sup> Professor Sidgwick therefore is quite justified in regarding the absence of the phenomenon as ‘rarely likely to be realized in fact.’<sup>4</sup> It is quite open to him to select this ground on which to fight out the issue.

Joining issue with him on the proposition above quoted—

the values of both wine and cloth relatively to corn, and therefore relatively to each other, must be as much determined by cost of production as the values of home commodities are,

I submit that the word ‘determine’ might here be used in one of two senses: either to mean that value varies proportion-

<sup>1</sup> *International Trade*, Appendix C. ‘Hermathena, 1889.

<sup>2</sup> See the description of his views below, p 632.

<sup>3</sup> Below, p. 634.

<sup>4</sup> *Loc. cit.* 1st edition.



ately to cost; or that value varies with, but not in proportion to cost.<sup>1</sup> For example, the first sense is to be understood when Professor Sidgwick, referring on an earlier page of his book to domestic trade, speaks of 'the Ricardian theory of the determination of value by cost of production';<sup>2</sup> the second sense is to be understood when it is observed by the present writer a few paragraphs below that 'the international market is determinate.'<sup>3</sup>

The first sense, according to which the proposition under consideration contradicts the received theory of international value,<sup>4</sup> might have been expected here. But it is expressly disowned by Professor Sidgwick when he says, 'It does not of course follow that the wine and cloth will exchange for each other in proportion to their respective costs.'<sup>5</sup>

In the second sense the proposition under consideration does not contradict the received theory. For it is part of that theory that international values are affected by cost in some way, though not in the same simple way as domestic values. For example, one of the propositions in the fifth section of Mill's classical chapter is that a change in the cost of production of a commodity will in a certain case be attended with a less than proportionate change in its international value. The principal object of our Parts I. and II. is to 'determine' the changes in international value which are consequent upon changes in cost of production, including under cost taxation. In the second sense then the proposition is true; but it does not convict Mill of error. Yet this is the sense in which Professor Sidgwick seems to employ the proposition. But I hesitate to attribute an *ignoratio elenchi* to the greatest living master of dialectics.

A more certainly valuable contribution to the subject is made in the chapter on Protection; to which our first and second parts are indebted.<sup>6</sup> In this chapter the distinction between the

<sup>1</sup> I have endeavoured to distinguish the two meanings in the article on Exchange Value in *Palgrave's Dictionary of Political Economy*. The distinction is quite clearly indicated by Mill (*Pol. Econ.*, Book III. ch. 18, § 9 and § 5).

<sup>2</sup> *Principles*, Book II. ch. 2, § 9.

<sup>3</sup> Below, p. 622, par. 5.

<sup>4</sup> It may be observed that the supposed product common to both countries, far from evidencing the truth of the proposition under consideration—as the turn of Prof. Sidgwick's sentence might suggest—is properly employed by Mangoldt as the very type and measure of that difference in the productivity of the two countries from which follows the truth of the received theory, the falsity of the proposition in the first sense. See the example cited below (p. 632), where the (real) costs of producing C, the common product in the respective countries, are in the ratio 3 : 4.

<sup>5</sup> Note to p. 207, second edition, and text of p. 218, first edition.

<sup>6</sup> *Ante*, pp. 49, 439.

good of one country and of all (§ 1); the proof that a country may by an import tax benefit itself in the way of revenue while it protects native industries (§ 2), and that a large section of a community may be injured by free trade (§ 3) appear especially masterly.

(5) *Professor C. F. Bastable*.—Professor Bastable's 'attempt to restate, in a more complete form, the doctrines of the classical English school'<sup>1</sup> on International trade, has been attended with a large measure of success. The classical or Ricardian method admits of completion on two opposite sides; two contrasted deficiencies may be attributed to it.<sup>2</sup> On the one hand, it appears not to go to the root of matters. It is as if an astronomer should content himself with the proposition, 'Planets move in ellipses,' without ascending to the first principles of dynamics. Such a one might be at a loss when he comes to deal with certain comets. On the other hand, the proposition that planets move in ellipses might be a useless abstraction in a conceivable cosmos where the existence of a disturbing medium caused the theory to lag very much behind the fact.

It appears to me that Professor Bastable's completion of the classical method in the latter direction is quite complete. He has fully learnt the lessons of caution which have been taught by his great countrymen, Leslie and Ingram. He never forgets that the 'hypotheses' of economics 'are unreal, or at all events incomplete.' He has avoided the more dangerous extreme, the Charybdis of over-abstraction.

But I am not so sure that he has kept clear of Scylla; and I shall attempt to indicate some instances in which deduction from first principles would lead to conclusions different from his.

It is a little misleading to compare the trade between two nations, supposed to be the only two in existence, to the 'terms of an exchange between isolated individuals.'<sup>3</sup> The suggestion that the terms are indeterminate in the former case in the same sense as the latter appears to be theoretically indefensible. The usual assumptions being made that there is a large number of competing dealers on each side, the rate of exchange is to be regarded as determinate in the international market as well as in the home market. Accordingly, the analogy of monopoly

<sup>1</sup> *International Trade*, Preface.

<sup>2</sup> Some of the following sentences are taken from a review of Prof. Bastable's work by the present writer, which appeared in the *Academy* for May 21, 1887.

<sup>3</sup> *International Trade*, pp. 14, 40, 41, &c. But see p. 28.

and combination should, I think, be sparingly applied to international trade.<sup>1</sup>

The introduction of the idea of monopoly adds difficulty to a passage in the chapter on the 'Theory of International Values,' which in the absence of<sup>2</sup> mathematical representation I am unable to interpret with confidence. The writer appears to suppose that the part played by utility would be different if, to use Mill's familiar example, the comparative cost of production in England were not 10 of cloth to 15 of linen, but 10 of cloth

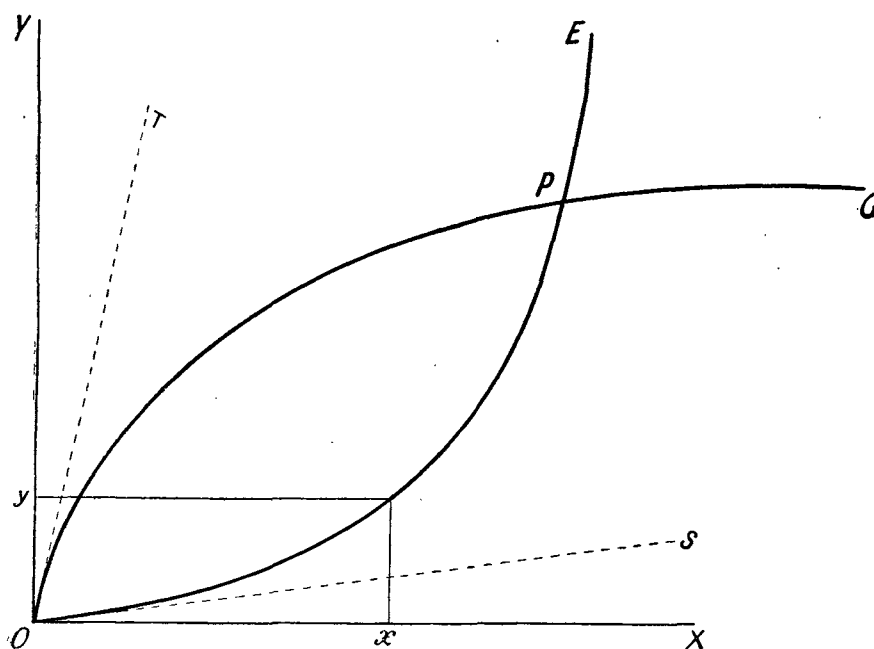


FIG. 6.

to less than 10; *e.g.*, 1 of linen. I cannot regard this distinction as essential. In both cases the curve of indifference is represented by a straight line, the costs of production being supposed constant. Thus OT in the figure, the tangent of TOX being 2, represents those states of trade in which Germany would be no better off than if there had been no foreign trade; the cost of producing linen comparatively with that of producing cloth in Germany

<sup>1</sup> The use of the term monopoly in a sense not involving the attribute *indeterminateness* is allowable (*e.g. International Trade*, p. 115, note. Cf. *ante*, p. 43, par. 1). It is tenable, too, that transactions between two countries, though determinate, are less steady than where these are competing nations.

<sup>2</sup> p. 37.

being as 10 to 20. Similarly OS in the figure, the tangent of SOX being  $\frac{1}{10}$ , and the cost of the production of linen comparatively with that of cloth in England being as 10 to 1, represents those states of trade in which England would be no better off than if there were no foreign trade. The determination of the point of equilibrium involves what may be called 'the comparative utility of the commodities x and y to the consumers in B' [our 'England']; in the same sense, I think, whether 'B is able to produce y at the amount of 15 per unit of productive power . . . [15 of linen at the same cost of 10 of cloth] or can only win from its own resources a very small amount, say 1 y for each unit' [1 of linen at the same cost as 10 of cloth].

I do not understand the difficulty raised by Cournot<sup>1</sup> to which Professor Bastable makes reply in the passage just referred to in quite the same sense as Professor Bastable. Cournot's difficulty is only, I think, that which Professor Bastable considers at his p. 44: the difficulty of understanding Mill's rule for the division of the gain by trade. As I have already pointed out,<sup>2</sup> Cournot hits an inaccuracy on a very plausible interpretation of Mill; on any interpretation, an inelegancy. I do not understand Professor Bastable's reply at the latter passage<sup>3</sup> to Cournot.

The relation of import to export duties is another point with respect to which the Ricardian and the mathematical methods lead to somewhat different results. The 'kind of symmetry,' the 'parallelism,' which Professor Bastable predicates in his paper on *The Incidents and Effects of Import and Export Duties*, is not in conformity with the propositions which I have attempted to prove.<sup>4</sup> The symmetry in the action of the two kinds of taxes leads, according to Professor Bastable, to a marked discrepancy in their results. For 'the essential point of difference is that the export duty affects a limited area of production, the import one a limited area of consumption;' <sup>5</sup> and since, as a matter of fact, the area of production is much more frequently limited than the area of consumption,<sup>6</sup> 'it would therefore appear that it is almost impossible to tax foreigners by the instrumentality of duties on imports.' This conclusion is at variance with that which has been above deduced from first principles. Provided that the area of pro-

<sup>1</sup> *Principes de la théorie des richesses*, 1863, pp. 344, 345.

<sup>2</sup> Above, p. 609.

<sup>3</sup> *International Trade*, p. 44, note.

<sup>4</sup> See *ante*, pp. 434, 435.

<sup>5</sup> *Incidents and Effects*, p. 4, note.

<sup>6</sup> *International Trade*, p. 114 and context.

duction is limited,<sup>1</sup> it is not so much matter which instrumentality is adopted.

B. We come now to the category of foreigners, which, as already observed, is nearly coincident with that of mathematicians.

(1) *Cournot*.—The lesson of caution in dealing with a subject and method so difficult is taught by no example more impressively than by that of Cournot. This superior intelligence, equipped with the most scientific apparatus, seems not only to have slipped at several steps, but even to have taken a wholly wrong direction. He has not only committed errors in formal reasoning, but also has missed general conceptions appropriate to the subject.

Of several paradoxes which occur in that part of the *Principes Mathématiques* which more immediately relates to International Trade,<sup>2</sup> perhaps the first is among the few that are not open to suspicion. This is the proposition that, when a communication is opened between two markets, previously separated by a barrier, the total quantity produced of any commodity which now begins to be exported from one market and imported to the other will not necessarily be increased. For if a flow sets in from market A to market B, the production of the commodity in A must be increased, and its price in that market heightened—the law of decreasing returns prevailing; while in B the price will be lowered, and the quantity produced in that country will be diminished. The increase of the production in A may not compensate the decrease in B; when the demand in A is very inelastic, and the rise in the cost of production with the amount produced very steep, while the contrary properties are true of B (Art. 68).

A similar proposition is true of the total value of the product (Art. 69).

The conditions under which these propositions are true are well expressed by Cournot's symbols, in which  $\Omega_a(p)$  = the amount offered by the producers in A at the price p, and  $F_a(p)$  means the amount demanded by the consumers in A; with similar interpretations of  $\Omega_b(p)$ ,  $F_b(p)$ . Thus, before the communication,

$$\Omega_a(p_a) = F_a(p_a);$$

$p_a$  being the price of the article in the market A; and, after the communication, if the commodity is exported from A to B,  $\epsilon$  being

<sup>1</sup> *Ante*, p. 46.

<sup>2</sup> *Recherches sur les Principes Mathématiques de la théorie des richesses* (1838), ch. x. xi. xii.

the expense of transportation per unit of commodity, and the price in A being changed from  $p_a$  to  $p_a + \delta$ , we have

$$\begin{aligned} & \Omega_a(p_a + \delta) + \Omega_b(p_a + \delta + \epsilon) \\ &= F_a(p_a + \delta) + F_b(p_a + \delta + \epsilon) \end{aligned}$$

(Arts. 67 and 68.)<sup>1</sup>

We have now to enquire whether the quantity denoted by either member of this equation is greater than the corresponding quantity before the communication was opened; whether the following inequality holds:

$$\begin{aligned} & F_a(p_a + \delta) + F_b(p_a + \delta + \epsilon) \\ & > F_a(p_a) + F_b(p_b). \end{aligned}$$

Cournot answers this question in the negative by showing that the inequality does not hold in a particular case: namely, when the original prices,  $p_a$ ,  $p_b$ , differ from each other, and also from the new price in A, by only a small quantity, in which case also the cost of transport,  $\epsilon$ , must be small, since otherwise exportation from A to B would not take place on the removal of the barrier. This reasoning, or that which is based on another particular assumption, viz.  $\delta$  and  $p_b - (p_a + \epsilon)$  small (Art. 68, last par.), is quite correct. But the assumption that  $\epsilon$  should be small leads to an erroneous conclusion in a subsequent problem: to determine the effect of a tax on exports or imports (Art. 70).

If  $p$  is the price of the article in the exporting country before the imposition of the tax  $u$ , and  $p + \delta$  the price after the tax, we have, before the tax,  $\Omega_a(p) + \Omega_b(p + \epsilon) = F_a(p) + F_b(p + \epsilon)$ .<sup>2</sup> And after the tax  $u$  per unit of commodity has been imposed, we have

$$\begin{aligned} & \Omega_a(p + \delta) + \Omega_b(p + \delta + \epsilon + u) \\ &= F_a(p + \delta) + F_b(p + \delta + \epsilon + u). \end{aligned}$$

Cournot now proceeds to draw conclusions from the last equation by expanding and neglecting the powers, not only of  $\delta$  and  $u$ , but also  $\epsilon$ , above the first power. I submit that Cournot's

<sup>1</sup> For  $p_a + \delta$  being the price of the commodity in A, and accordingly the (net) price which the producers in A obtain (not only for that portion of the product which they sell in A, but also) for that portion of their product which they sell in B at a price heightened by the cost of transport  $\epsilon$ , the quantity offered by the producers resident in A at the (net) price  $p_a + \delta$ , together with the quantity offered by the residents in B at the price  $p_a + \delta + \epsilon$ , is equal to the quantity demanded by the residents in A at the price  $p_a + \delta$ , together with the quantity demanded by the residents in B at the price  $p_a + \delta + \epsilon$ .

<sup>2</sup> Compare the last note.

procedure is inelegant and leads him to an erroneous conclusion. The simpler procedure is first to treat  $\delta$  and  $u$  only as small,  $\delta$  being the dependent,  $u$  the independent variable. Thus,

$$\begin{aligned} & \delta(\Omega'_a(p) + \Omega'_b(p + \epsilon) - F'_a(p) - F'_b(p + \epsilon)) \\ & = -u(\Omega'_b(p + \epsilon) - F'_b(p + \epsilon)). \end{aligned}$$

If now  $\epsilon$  be small, we may expand both sides of this equation in powers of  $\epsilon$ , and neglect terms involving powers of  $\epsilon$  above the first, or rather neglect  $\epsilon$  altogether. Whether  $\epsilon$  be small or not, it follows—the law of diminishing returns, as well as that of diminishing utility, prevailing—that  $\delta$  is negative, and less than  $u$ ; or that the price falls in the exporting country and rises in the importing one, contrary to the statement of Cournot (§ 21, par. 1).

I am confirmed in this view by Mr. A. Berry and Mr. C. P. Sanger, who have independently made a similar correction. Mr. Berry writes to me of the corrected reasoning: 'This may be confirmed by the fact *à priori* evident that the disturbance of price,  $\delta$ , must vanish when the tax itself,  $u$ , vanishes. This is the case in our equation, not in Cournot's.'

It is certainly curious to find a wrong belief as to a matter of fact in business resulting from a slip in mathematical analysis!

Mr. Berry has pointed out to me another slip in Art. 90, pp. 183, 184. There a certain advantage which the author ascribes to domestic as compared with foreign trade does not follow from his own premises.

To this I have to add that those premises are very doubtful. I allude to the theory of 'real' as distinguished from 'nominal' revenue. To collate here all the passages in all Cournot's versions which bear on this distinction would occupy too much space. It must suffice to submit as the result of such an examination very carefully performed the opinion that, while Cournot's 'nominal revenue' is much the same as what would now be called the money measure of national wealth, his 'real revenue' signifies, if indeed it is significant, such a measure as that which Mr. Giffen, Mr. Bourne, and others have employed in determining the growth of the quantity of a nation's 'capital,' or foreign trade. Such a measure is obtained by multiplying the quantities of each commodity at the two compared epochs by its price at one of them, the same price being combined with the two quantities, the one at the initial and the one at the final epoch. Consistently with this view Cournot says that if the price of a commodity rises from  $p_0$  to  $p_1$ , corresponding to a diminution of the quantity from

$D_0$  to  $D_1$ , whereas the variation of the nominal revenue is  $D_0p_0 - D_1p_1$ , the loss in real revenue is  $(D_0 - D_1)p_0$ .

I do not indeed pretend to follow the double route by which Cournot, winding his way through additions and subtractions of producers' and consumers' gain and loss,<sup>1</sup> reaches this conclusion (*Principes Mathématiques*, ch. xi., and corresponding passages in the *Principes* of 1863 and the *Revue Sommaire*). Nor can I explain why, upon the interpretation of real revenue here suggested, the loss due to a rise of price should be formulated as  $(D_0 - D_1)$ , multiplied by  $p_0$  rather than  $p_1$ ; except so far as in the method in question there must be always something arbitrary in the selection of the price to be operated with.

However the conception of 'real revenue' may be interpreted, it does not seem appropriate to the problems in hand. According to Cournot the real revenue of a country is diminished by the admission of an additional import through the removal of a restriction on trade. The capital objection to this conclusion is that no account is taken of that sort of advantage coming from cheapness which we should now describe as *Consumer's Rent*. Cournot explicitly makes abstraction of this advantage. He says of it—

Dans l'évaluation de l'accroissement réel du revenu social, causé par la baisse de prix, on ne tient pas compte de l'avantage qui consiste, pour les nouveaux consommateurs de la denrée, à faire un emploi plus à leur goût d'une portion de leurs revenus; parce que cet avantage n'est pas numériquement appréciable.' (Art 81.)

Of the corresponding loss he says:—

'Il s'agit ici d'un de ces rapports d'ordre, et non pas de grandeur, que les nombres peuvent bien indiquer, mais non pas mesurer . . . nos considérations ne portent que sur les choses mesurables. (Art. 77.)

Ce dommage n'est pas mesurable et n'affecte pas directement la richesse nationale, dans l'acception commerciale et mathématique de ce mot.' (Art. 88.)

<sup>1</sup> Prof. Seligman seems to follow Cournot without hesitation. He puts the following case (*Shifting and Incidence of Taxation*, p. 153): 'Suppose that the price of the commodity was originally \$10, at which price 10,000 pieces were sold. Now a tax of \$2 is imposed, all of which is shifted to the consumer. At the new price, however, only 8,000 pieces will be sold.' Manipulating the producers' and consumers' loss in Cournot's fashion, Prof. Seligman reaches the conclusion that 'the diminution in the real revenue = \$20,000.'

As it seems to me, the essential fact is that there has been a diminution of the national wealth to the extent of 2,000 pieces of the taxed commodity. It is arbitrary whether we multiply this 2,000 by 10, the old price, or 12, the new price, with a view of ascertaining (after the manner of Mr. Giffen) the variation in the total quantity of national wealth, provided that, in dealing with other items of national wealth at the two periods, we employ the corresponding prices—either the old prices or the new. Perhaps the best price to operate with would be a mean of the old and new price, in the case before us \$11.



Real revenue being thus defined, the proposition that it is diminished by the liberation of trade may be true, but is not important; as Bertrand urges in an interesting criticism on mathematical economists.<sup>1</sup>

Another objection to Cournot's proposition raised by Prof. Bastable is that it uses money as a measure; whereas the value of money is altered by an alteration in the terms of international trade. It is tenable, however, that Cournot means to restrict his theory to small disturbances of trade, the effect of which on the level of money may be neglected. As far as this objection goes, his reasoning may be as valid as Prof. Marshall's application of Consumer's Rent,<sup>2</sup> or Messrs. Auspitz and Lieben's reasoning as to the effects of a tax or bounty.<sup>3</sup>

Another objection to Cournot's reasoning is that he does not take account of the productive factors which, being displaced by the importation of a commodity which had been produced at home, are turned to the production of some other commodity. Cournot himself has stated this objection, and endeavoured to meet it (Arts. 93 and 86); but I do not feel certain that on this point he gets the better of Hagen, to whom we now proceed.

(2) *Hagen*.<sup>4</sup>—The mathematical method is not wielded by Hagen more powerfully in defence of Free Trade than by Cournot against it. Hagen constructs an 'exportation-formula' to represent the gain (or loss) resulting to the national income from a new export (p. 11). This gain consists of three parts: (1) the addition to profits consequent upon the additional production of the exported article; (2) the loss of profits consequent upon the transference of productive factors from other industries to the production of the exported article; (3) the loss to consumers consequent upon the rise of price. This formula appears open to three serious objections: (a) It is assumed that profits in different industries at the same time are a fixed proportion of the expenses of production. This Ricardian assumption may perhaps pass. But not so (b) the ultra-Ricardian neglect of all interests but those of the capitalist; no account being taken, as I understand, of the effect of the supposed change upon wages and rent. Lastly (c), the effect on the consumers' interest is not

<sup>1</sup> *Journal des Savants*, 1883.

<sup>2</sup> See *ECONOMIC JOURNAL*, vol. iv. p. 156. Cf. *Giornale degli Economisti*, September 1894, 'Sulla Consumers' Rent.'

<sup>3</sup> Cf. below, p. 638.

<sup>4</sup> *Die Nothwendigkeit der Handelsfreiheit für das Nationaleinkommen Mathematisch nachgewiesen*, Von Karl Heinrich Hagen, Königsberg, 1844. See article on Hagen in *Palgrave's Dictionary*.

rightly formulated. The price being raised from  $P$  to  $P + p_1$ , and the amount consumed being diminished from  $D$  to  $D - d$ , Hagen puts for the loss of the consumers  $p(D - d)$ . If he had added  $\frac{1}{2} p \times d$ , this would have been an intelligible measure of the loss of consumers' rent; being, in fact, the expression which Dupuit—with as much accuracy perhaps as the subject admits of—has put for what is now called consumers' rent.<sup>1</sup>

From this formula Hagen concludes that export trade may or may not be disadvantageous (p. 14). By parity of reasoning he finds that importation must always be advantageous (p. 16). A small bounty may be attended with a slight gain. It may be questioned whether, in view of the unsoundness of the premises, any value attaches to these deductions.

In conclusion, Hagen joins issue with Cournot on two points corresponding to the second and third term of Hagen's exportation-formula (above). On the question whether the productive factors which are displaced by exportation or importation should be taken into account, Hagen seems to have the better of Cournot.<sup>2</sup> In the matter of consumers' rent it is not easy to say which is most in the wrong, Cournot who ignores, or Hagen who falsifies the theory. Indeed, a similar difficulty affects the comparison between the two authors' whole treatment of International Trade.

(3) *Mangoldt*.<sup>3</sup>—This author leads up to the subject of International Trade by some sections on Exchange (§§ 62—74, 1st edition), in which he represents Demand and Supply by curves very similar to those which are now in vogue. In virtue of these constructions Mangoldt, writing without reference to his predecessors, Cournot, Dupuit, and Gossen, may claim to be one of the independent discoverers of the mathematical theory of Demand and Supply.

In his Appendix (*Anmerkung*) *On the Equation of International Trade* Mangoldt begins by following Mill's supplementary sections,<sup>4</sup> dividing the subject according as the demand for a commodity is, or is not, inversely proportional to its price. Under the first head Mangoldt considers first the case of two variables, and deduces conclusions substantially identical with those of Mill, in usefully varied language. Mangoldt then goes on to the

<sup>1</sup> See article on Dupuit in *Palgrave's Dictionary*.

<sup>2</sup> Cournot has replied in his *Principes* of 1863, Art. 185. Hagen speaks of reviewing Cournot's work as a whole. Does such a review exist?

<sup>3</sup> *Grundriss der Volkswirtschaftslehre*, 1st edition, 1863. 2nd edition (posthumous, edited by F. Kleinwächter), 1871.

<sup>4</sup> Above, p. 609 note.

case of three or more variables. He discerns the general proposition that—cost of production being supposed constant irrespective of quantity, and abstraction being made of cost of transport—if trade is opened between two countries, the commodities previously produced in both countries will now fall into two groups, each produced altogether in one country; the rate of exchange between the members of each group *inter se* corresponding to the cost of production of each commodity (in the country in which it continues to be produced), and the relation between the two groups being determined by the rate of exchange between the produce of a unit of productive force in one country and that of a similarly defined unit in the other country.<sup>1</sup> This simple truth Mangoldt complicates by positing a commodity as it were intermediate between the two groups, which may serve as a measure whereby to ascertain from which of the countries any particular commodity will be exported.

The following construction of our own seems to give the substance of Mangoldt's expositions; it being understood that the substance, as the metaphysicians say, is not a copy of its manifestations. Let us figure the relation between the costs of production of the set of commodities in Country No. I. by a series of points a, b, c, &c., on a right line, any one of which a is obtained by measuring from a fixed origin o, a distance equal to the logarithm of the number of units of productive force which go to the production of a unit of that commodity in Country No. I. Let the natural values of the commodities in Country No. II. be similarly designated by the points a', b', c', &c., measured from o'; o' being taken so that oo' is the logarithm of the number of units of productive force in Country No. II. of which the produce is equivalent in the international market to the produce of a unit of productive force in Country No. I. (log. v, or  $\log. \frac{1}{v}$  in our notation<sup>2</sup>). It appears at once from the figure that, when trade has been established, it is cheaper for Country No. I. to import a', b', and c' than to produce them; and to produce d and e than to export them.

The measure or standard which Mangoldt desiderates would be afforded by the commodity, if the distance between c

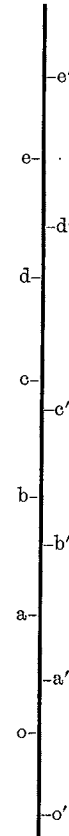


FIG. 7.

<sup>1</sup> The v of our formula *ante*.

<sup>2</sup> *Ante*, p. 441.

and *c'* vanished. That commodity would be on the line between imports and exports; and it would in general be partly produced and partly imported by one and the same country. Mangoldt illustrates this conception by the following example. Let the costs of production of the three commodities A, B, C be in the first country 2, 3, 4 respectively, and in the second country 4, 2, 3 respectively, as shown in the annexed scheme.

|     | A | B | C |
|-----|---|---|---|
| I.  | 2 | 3 | 4 |
| II. | 4 | 2 | 3 |

And let the amounts demanded by each Country before the opening of the trade be as follows:—

|     | A     | B   | C   |
|-----|-------|-----|-----|
| I.  | 1,000 | 800 | 600 |
| II. | 500   | 750 | 600 |

Then by hypothesis (according to the definition of the first class of cases<sup>2</sup>) country No. I. lays out a constant cost of  $1,000 \times 2 = 2,000$  units of her productive force—in procuring commodity A for her own consumption, 800 on B; and so on. Employing this datum, by a tentative process, Mangoldt reaches the conclusion that A will be produced in No. I. only, B will be produced in No. II. only, C will be produced both in No. I. and No. II. Of A there will be produced in No. I. for her own consumption 1,000, for export  $1333\frac{1}{3}$ . Of B there will be produced in No. II. 750 for her own consumption, 900 for export. Of C there will be produced in No. I.  $533\frac{1}{3}$  for her own consumption, and there will be imported  $66\frac{2}{3}$ ; and in No. II. there will be produced 600 for her own consumption, and there will be exported  $66\frac{2}{3}$ . The new values are:—

$$A : B : C :: 2 : 2\frac{2}{3} : 4$$

Here C occupies an intermediate position between exports and imports, as may be verified by remarking that, after the trade has been set up, neither country can gain by either exporting or importing C. For it costs 4 units of productive force in No. I., and 3 in No. II.; and the produce of 4 units of No. I. is equivalent on the international market to the produce of 3 units of No. II., as appears from the fact that after the trade has been opened, A and

<sup>1</sup> Above p. 630, and *cf.* p. 609 note.

B, each the product of two units in the country in which it continues to be produced, are valued at 2 and  $2\frac{2}{3}$  respectively, or in other words exchange at the rate of 8A for 6B.

This theory brings into view an incident which is apt to be masked as long as we confine ourselves to the case of two commodities, the classical 'cloth' and 'linen'—namely, that it is not in general possible to determine *a priori*, from a mere observation of the costs of production in the respective countries before the opening of the trade, which commodities will be imported and which produced at home. 'Comparative cost' cannot be ascertained by simply comparing the costs of different articles in the two countries. Thus if *o'* in the figure be pushed up a little, the distances *o' a'*, *o' b'*, &c., being preserved constant, C will become an export (from country No. I.) instead of an import. But the position of *o'* depends not only on the cost of production in each country, but also on the law of demand in each country for the different commodities.

This incident is illustrated by one of Mangoldt's examples, in which the costs of production of five commodities in the two countries before the trade may be thus represented (p. 218)—

|     | A | B | C | D | E |
|-----|---|---|---|---|---|
| I.  | 4 | 7 | 6 | 8 | 5 |
| II. | 5 | 9 | 3 | 7 | 4 |

Upon a certain hypothesis as to the amount of each commodity demanded by each country (it being recollected that the real cost laid out on each article by each country is supposed to be constant), it is found that A and B are produced only by No. I., C and E only by No. IV., while D—"the measure of the relative productivity of the two countries"—is produced in both. But if the quantities demanded were different, D would be produced only in No. I. (pp. 220-222). From the examples in the textbooks it might have been supposed that D would necessarily have been exported from the second country, and E from the first; since thus the second country could get its E cheaper—namely, at a rate less than  $\frac{4}{7}$  D for one of E; and the first country could get its D cheaper—namely, at a rate less than  $\frac{2}{3}$  E for one of D. But the truth is that in general no conclusion of the kind can be drawn pending the determination of the relation on the international market between the productive powers of the two countries, the ratio which we have designated as *v*. It is as the material embodiment of this relation between quantities of

labour and sacrifice that Mangoldt's conception of a standard commodity is significant.

But an actual commodity subserving this purpose is not always to be found, as appears from the example which we have just cited, and as Mangoldt himself has pointed out. It may be observed that an actual standard would be forthcoming on one hypothesis—namely, that the volume of trade is split up into an indefinitely large number of items with every variety of cost of production; but in this case the standard commodity, though existent in fact, would probably be insignificant in magnitude.

The results of the abstract problem with which the investigation started are summed up at p. 223 in a set of italicised propositions, which may be read with assent and instruction. The first alone excites some scruple:—

'There come first into international trade those commodities of which the costs of production compared with the costs of production of other commodities in the same land differ most widely from each other, then those for which the difference is next greatest.'

At first sight there seems to be contained here a statement as to the path or process by which the position of equilibrium is reached; whereas the equations of exchange enable us at best to determine the final position, not the steps by which it is reached. What Jevons called the 'Mechanics of Industry' is statical, not dynamical.<sup>1</sup> It appears, however, from the context that the author is aware of this characteristic.<sup>2</sup> The assertion which he makes in the proposition cited relates only to the first step—not to the intermediate path—towards equilibrium; and the affirmation that the first step taken will be the most advantageous one to both parties is tenable.

The simplest case having been discussed, Mangoldt proceeds to restore certain attributes which he began by abstracting.

First let us no longer suppose the quantity demanded to be in inverse proportion to the labour-cost, but to vary with the rate of exchange between exports and imports, according to some more complicated law. The law which Mangoldt specially affects is such that when the rate of exchange or 'price,'  $P$ , is changed to  $Pm$ ,  $m$  being any factor, the quantity demanded,  $N$ , becomes

<sup>1</sup> I have had occasion to defend this view against Professor Walras in the *Revue d'Économie Politique* for January 1891.

<sup>2</sup> 'Die Art und Weise wie sich der process der Vertauschung der Production vollzieht ist an sich gleichgültig' (p. 213), [das] 'das Endergebniss immer das nämliche bleiben wird' (p. 216, last par.)

$r \times \frac{1}{m} N$ ; where  $r$  is an improper fraction, in cases instanced by the author,  $\frac{1}{10}$  and  $\frac{9}{8}$ .<sup>1</sup> Employing this conception, Mangoldt enunciates that condition of equilibrium which would now be described as the intersection of two curves.

He then goes on to consider the phenomenon which would now be described as the multiple intersection of demand and supply curves (pp. 228, 229, and *cf.* § 68). His views on this curious subject are very interesting. He thinks that in general of several possible positions of equilibrium that one tends to be realised which is most favourable to the more *active* of the two nations. But there are stated some probabilities on the other side, which seem not very easy to apprehend (p. 229). It may be observed that Mangoldt, like Mill,<sup>2</sup> supposes neutral equilibrium—the coincidence of the two curves as we may say—to be possible.

So far the cost of production has been assumed to be constant, whatever the amount produced. Mangoldt next supposes (p. 232) the relation between cost and quantity which is now called the law of diminishing returns to prevail, and illustrates the general theory by a particular example, which is rendered more workable by resorting to the simple law of demand at first assumed—namely, that the quantity demanded is in inverse ratio to the cost.

Finally, the cost of transport is taken into consideration (p. 233). Mangoldt propounds the remarkable theory that upon a certain hypothesis the carrying trade between two countries tends to fall to that one which has the smaller absolute productivity (p. 235). The distinction between the 'active' and 'passive' nation which we have already met with in connection with plural equilibrium here recurs (p. 240). Mangoldt illustrates his theories *more suo* by laborious examples. He sums up the section on cost of transport in a series of propositions, among which the following—very freely paraphrased—seem the most remarkable.

(1) The carrying trade between two nations tends to fall into

<sup>1</sup> As I understand, if (as in Cournot's demand curve)  $x$  be the price and  $y$  the corresponding quantity demanded,  $= f(x)$ ; we have  $f(mx) = \frac{r}{m} f(x)$ .

In the particular case where the law applies only to small changes of  $x$ , put  $m = (1 + \alpha)$ ,  $\alpha$  small. Whence  $y + \alpha \frac{dy}{dx} = y - \alpha r y$ .

$$\frac{1}{y} \frac{dy}{dx} = -r. \quad y = Ce^{-rx}$$

<sup>2</sup> Above, p. 610.

the hands of one, a tendency counteracted by what, with reference to abstract theory, may be described as accidental circumstances.

(2) The carrying trade tends to fall into the hands of that nation the volume and weight of whose exports are greatest.

(3) An improvement in productivity tends to deprive a country of a share in the carrying trade.

(4) Improvements in means of production redound in general, and in the abstract, to the good of the importing people only.

These propositions appear to be, not indeed incorrect—as defined and qualified in the context—yet unimportant. Considering, however, the solidity of the rest of Mangoldt's work, it may well be that one specially interested in the problem of the apportionment of the carrying trade would discern more in this last section than the present writer, after taking a reasonable amount of trouble, has been able to find.

(4) *Auspitz and Lieben*.—In that portion of the *Théorie des Preises* which treats of international trade, the subject is enriched with important propositions and embellished with splendid illustrations. Perhaps the most valuable result due to the authors is the general geometrical proof that a nation may benefit itself in certain cases by an import or export tax. The construction by the aid of which they have discerned this theorem more clearly than their predecessors<sup>1</sup> is much the same as that which has been employed in the earlier pages of our mathematical part: down to the introduction of complicated curves corresponding to organic changes in trade.<sup>2</sup> But there is one important difference between even our simpler constructions and theirs: that theirs are restricted to a small part, ours are applicable to the whole volume of trade. Their abscissa represents a real article, one out of the many items in international trade; their ordinate represents money, the marginal utility of which is properly considered as not varying with the amount consumed of a single article. Each of our co-ordinates on the contrary represents not so much actual commodities or money, as an ideal article typical of the total volume of trade; used to suggest conclusions which may be verified by the algebraic analysis proper to the real case of numerous exports or imports.<sup>3</sup> Accordingly their supply- or offer- curve is never *inelastic* in our sense of the term;<sup>4</sup> it continually ascends like the curve O E in the annexed figure; since, if money have a constant utility-value, for a higher price

<sup>1</sup> *Théorie des Preises*, fig. 74.

<sup>2</sup> *Ante*, pp. 426-435.

<sup>3</sup> *Ante*, pp. 424, 442.

<sup>4</sup> *Ante*, pp. 428, 429.



more (or not less) of a product (subject to the law of decreasing returns) will continually be offered. For a converse reason our curve may curl round like the dotted line in the figure. In short, the varieties of curve marked as (3) and (4) in the fourth figure of our Mathematical Part,<sup>1</sup> do not occur in their scheme. Accordingly they are not conducted to a certain proposition which we have typified by the statement that, if Europe had an urgent demand for the produce of the United States, it might be for the interest of the United States to put an import tax on the produce

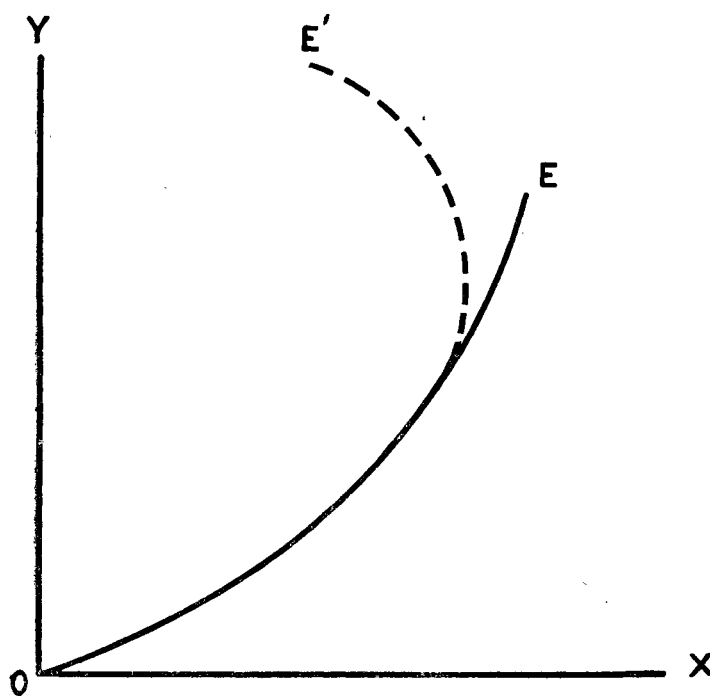


FIG. 8.

of Europe. Now as long as we consider the supply curve for European articles as of the form  $OE$ , an import tax thereon cannot come to much, as the authors observe (*Theorie des Preises*, p. 417). The curling round of the curve is required to express the urgency of the European demand for American produce. While we consider the supply curves of particular articles of the form  $OE$ , we do not get beyond the effect which we have likened to the buffer of a railway carriage being pushed back;<sup>2</sup> to contemplate the movement imparted to the whole train, we

<sup>1</sup> *Ante*, p. 430.<sup>2</sup> *Ante*, p. 46.

require a construction such as that which has been employed by us.

Another difference between our and their constructions is that they seem to confine themselves to the simpler species of curve which we have called *primary* (*ante*, p. 430). With reference to the law of supply and demand thus conceived, they rightly argue that a bounty can never be beneficial to the community as a whole (*Theorie*, p. 425). They miss Professor Marshall's conclusion that a bounty attended with what we have called organic changes, bringing the law of increasing returns into play, may be beneficial.<sup>1</sup>

I trust that this third and concluding part of my study on international value will corroborate the two preceding parts: that the theories enounced in those parts will be at once confirmed by their general agreement, and not discredited by their occasional discrepancy with the principal authorities on the subject. I regret that the negative portion of this result could not be attained without the use of controversy.

F. Y. EDGEWORTH

<sup>1</sup> *Ante*, p. 438.

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