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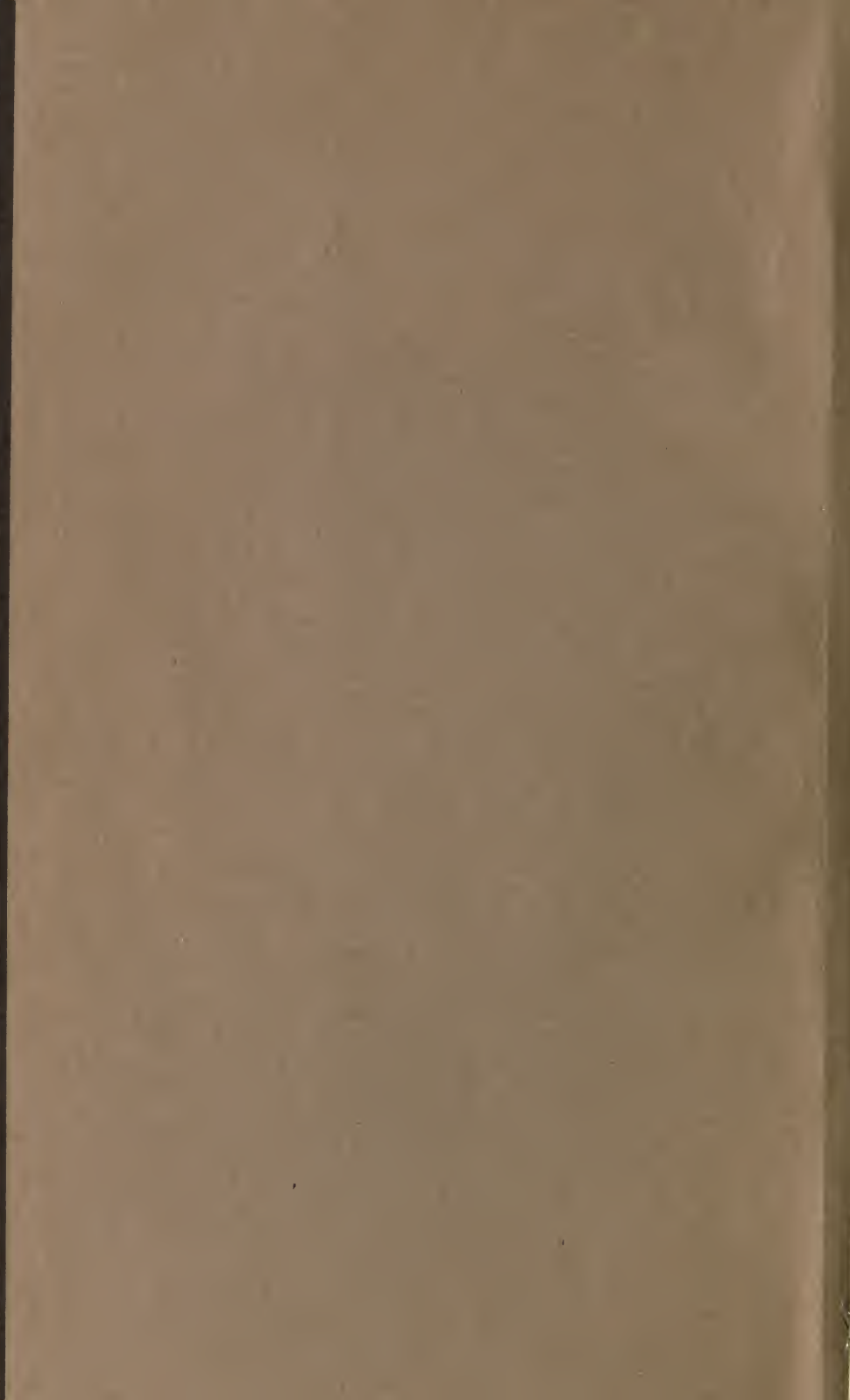


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# CURRENCY AND FINANCE

IN TIME OF WAR

A LECTURE

BY

F. Y. EDGEWORTH, M.A.

FELLOW OF ALL SOULS

PROFESSOR OF POLITICAL ECONOMY IN THE UNIVERSITY OF OXFORD

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## CURRENCY AND FINANCE IN TIME OF WAR

I. The obligation attached to the Chair of Political Economy, to 'deliver from time to time a public lecture', seems onerous to the present occupant of the chair. To one who has principally been employed in cultivating the more abstract portions of the science it is not easy to gather from that field fruits ready for consumption by those who are generally more interested about results than methods.

The difficulty is increased in time of war, partly because more is then expected of the economist. In quiet times the Art of Political Economy consists largely in abnegating art; playing the rôle of the wise physician who when consulted by one who has nothing much the matter with him has the courage to advise doing nothing. But in the fever of war time the easy course of *laissez faire* is evidently inadmissible.

In one respect, indeed, theory shows to advantage in times of disturbance. It is prepared for occurrences which appear paradoxical to the practical man. For example, theorists had contemplated the possibility that, if gold were extruded by the abundance of paper-money in different countries, gold might fall below the level of notes in some countries; as is now the case in Sweden.

But if in this respect theory comes to the front in

troublesome times, in another respect it is at a disadvantage. A great part, perhaps the most useful part, of economic truth requires time for its verification. It is true only 'in the long run'. It is not available in periods of emergency and crisis. Accordingly in such times our study is more than usually below the ideal standard of a deductive science. We have more than usually to resort to mental processes which, as Aristotle would say, do not involve general reasoning so much as acquired insight and shrewd judgment.

But even if the practical syllogism were applicable in all its perfection, it could not be applied by the academic student, for this simple reason that he lacks the minor premisses. The Government do not publish the relevant particulars. For instance, the nature of the transactions through which Treasury notes pass out of the hands of the Government is not, I believe, known outside official circles.

Altogether I cannot hope to realize the model of a public lecture, at once interesting and instructive, set by some of my colleagues. Perhaps the principal outcome of the following observations will be to strengthen the presumption that economic theory is a necessary (though not a sufficient) qualification for the direction of economic policy. With this somewhat humble hope I proceed to consider certain parts of the economic system which are prominent in war time, namely *money*, those sinews of war which become strained and swollen in the course of a severe struggle, and the much required nutriment of those sinews—*loans* and *taxes*.

II. What is money? To answer this question Sidgwick would employ the Platonic method of searching for a definition. One important result of the investigation is to bring out the distinction between money in

a general sense, including cheques and other instruments of credit, and the species which is not only a medium of exchange, but also has the property of finality in the discharge of debts. 'Money proper' this pre-eminent species may be called.

On the definition of money depends the significance of the celebrated theory which connects the quantity of money with the level of prices. This so-called 'quantity theory' is almost a truism if money is used in the widest sense possible; it is not always true if the term is used in its narrowest sense.

Let us follow Professor Irving Fisher in stating the theory in the form of an equation :

$$P = \frac{MV + M'V'}{T} .$$

In this equation  $M$  and  $M'$  denote respectively the quantity of 'money proper' in circulation and the amount of credit money in existence, say with sufficient accuracy, at least with respect to this country and America, 'deposits' in banks—that huge volume of ideal money which is as it were circulated and made to effect payments by means of cheques. The interpretation of the other symbols in the equation is not so simple.  $V$  and  $V'$  denote respectively the velocity of money proper and that of credit money. But what does the velocity of money mean? The two highest authorities on the subject, J. S. Mill and Professor Irving Fisher, differ as to the definition of this term. Following the latter, I define velocity of money as the number of exchanges effected by a unit of money—a particular dollar or pound—in a unit of time, a week for instance. The velocity of money is thus equivalent to the rate of its *turnover*. We say a merchant turns over his stock in a week when he parts with and replenishes his stock in that time. If

on an average he has constantly seven bales of any commodity in stock, while one is sold every day, he turns over his stock in seven days. The expression is applicable to any other kind of *steady flow*. The length  $AB$  may equally well represent a refreshment bar at which there are constantly seven customers refreshing themselves. If (on an average) one enters at  $A$  and one issues at  $B$  every five minutes, the personnel of the customers will be entirely changed every thirty-five minutes. The bar  $AB$  need not be a straight line; it may be curved in suchwise that the entrance  $A$  coincides with the exit  $B$ . But indeed the customers are not confined to one line (straight or curved); they may flit about from table to table and feed in different storeys.



*Pascuntur passim*, as Virgil says of the bees. But Virgil was mistaken in conceiving that the bees, after going forth in the morning, do not return from their pasture till the evening. They have a much more rapid *turn-over*. Some statistics which I have obtained with respect to an allied species may be used to illustrate this statement. I trust that these entomological illustrations will not appear irrelevant. There is, indeed, precedent for seeking economic edification from the operations of the industrious bee. But I can hardly expect an equally favourable reception for the predatory wasp. The latter species, however, as it happens, furnish a good illustration of the phenomenon now under consideration. The working members of this species present an image of monetary circulation as they issue from their nest and, after having gone through



the operation of foraging, again enter into the nest. For example, one fine morning I sat down before a nest and observed that there was a steady flow outwards of  $13\frac{1}{3}$  per minute—200 per quarter of an hour; and an equal, and equally steady, flow inward. Now the point which I wish to bring out is this: that, though it was impossible to mark each yellow insect as it issued so as to time the return of that individual—any more than you would be able, having earmarked a sovereign, to observe how often after leaving your hands it effected a purchase—still it is within the competence of statistics to determine the average time which an individual takes to perform an operation. In fact, in the example given it was only necessary to ascertain the total number permanently outside the nest, a number kept constant by a steady addition and steady subtraction of about 40 every three minutes, or  $13\frac{1}{3}$  per minute. A rude kind of census showed that number to be 740. Accordingly for the time taken by an individual on a voyage we have 740 divided by  $13\frac{1}{3} = 56$  minutes nearly. Analogously Professor Irving Fisher requested the members of his class to observe how many dollars each kept on an average in his pockets; and how many he expended in the year. The former number being \$10, the latter \$660, it followed that the turnover of the dollar for the class under observation was effected in the sixty-sixth part of the year, or in less than a week.

That pretty study was only a prolusion to Professor Fisher's more important investigations. I need mention only his calculations respecting the *dotted* symbols. He estimates  $M'$ , the amount of deposits in American banks, as (the equivalent in dollars of) some £1,300,000,000; a sum comparable with the aggregate deposits in our principal banks before the war, since the outbreak of which

they have increased by some fifty per cent.  $M'V'$  was given by the number of cheques drawn on the banks and, as we may say, paid out of their deposits. That amount was £200,000,000 daily—a sum not accurately representing a quantity of commodities purchased, but swollen by the speculative re-sale of some commodities and other Stock Exchange practices. There results for the time of turnover a little less than seven days. Our diagram will serve equally well to represent seven batches of entomological units, each batch numbering about 100 individuals, turning over in less than an hour; or seven batches of monetary units, each batch numbering 200,000,000 pounds, turning over in about a week. So much as to the *numerator* of the fraction on the right side of the above-written equation. It might be called for short  $F$ , representing the *flow* of money :

$$F = MV + M'V'.$$

Turning now to the *denominator*  $T$ , we should have no difficulty in defining it if there were only one kind of commodity sold by one kind of measure, say a pound avoirdupois or a ton. Then  $T$  would mean the number of pounds or tons sold per year (or other unit of time) *multiplied by* the number of times that each unit of commodity on an average changes hands by sale and re-sale. Thus  $P, = \frac{F}{T}$ , would be the price of a ton (or other unit) of commodity. But, commodities not being all of one kind, how can we sum up, in order to form  $T$ , tons of hay, and pounds of beef, acreage of estates, and tickets to concerts! We can only do so adequately through the use of an instrument furnished by the *Calculus of Probabilities*—an *Index-number*. 'Index-numbers', well says Dr. Bowley, 'are used to measure



the change in some quantity which we cannot observe directly, which we know to have a definite influence on many other quantities which we can so observe, tending to increase all or diminish all. . . .’ There is a mysticism proper to the subject in this description of the quantity behind the index-number. It is like the idea of substance according to Locke. A ‘supposed but unknown support’ of our sensations is postulated. But ‘of this supposed something we have no clear distinct idea at all’; only an ‘obscure and relative idea’.

The obscurity of the conception with which we have to do may be somewhat relieved by considering its relativity. Let it be noticed that the principal use of an index-number is to ‘measure the change in some quantity—’, as Dr. Bowley says. What we seek is not so much  $P$ , the average price or price-level at a given time, as the relation or ratio between what  $P$  is at one time, say  $P_1$  at time  $t_1$  to what it was at another time, say  $P_0$  at time  $t_0$ . We have then

$$\frac{P_1}{P_0} = \frac{F_1}{T_1} \text{ divided by } \frac{F_0}{T_0}.$$

Whence 
$$\frac{P_1}{P_0} = \frac{F_1}{F_0} \text{ divided by } \frac{T_1}{T_0}.$$

Now the ratio  $\frac{T_1}{T_0}$  depends upon a great number of different ratios, each expressing the relation between the quantities of an article sold at the times  $t_0$  and  $t_1$ . Let  $q_0$  be the number of tons of hay sold at the time  $t_0$ ,  $q_1$  the number at the time  $t_1$ ;  $q'_0$  the number of concert tickets sold at the first epoch,  $q'$  at the second; and so on, through a whole range of commodities and services. We have thus a set of ratios

$$\frac{q_1}{q_0}, \frac{q'_1}{q'_0}, \frac{q''_1}{q''_0} \dots;$$

by striking an average of which we obtain the approximate value of  $\frac{T_1}{T_0}$ . The average should be of the kind called 'weighted'; the weights being proportioned to the number of times that each commodity changes hands by purchase, and to its importance in other respects for the purpose intended. The calculation is analogous to that by which Giffen measured the *volume*—as distinguished from the value—of foreign trade.

III. I am not concerned with the details of Professor Fisher's calculation. I employ the beautiful method which he has constructed only to test the accuracy of the statements which attribute inflation to the state of our currency at present. Inflation has been well defined (in the *Economist*) as 'an increase of currency more rapid than the increase in the production of goods'; in the words of Tooke an increase in 'the quantity of the circulating medium in its relation to the ordinary amount of revenue and trade of commodities and labour to be circulated'. Accordingly, in order to prove the existence of inflation, it seems necessary to prove an increase in  $M$  and  $M'$  in our formula, or at least in one of them, *out of proportion* to that of  $T$ . But this has not been, perhaps cannot be, done. The quantity  $M$  is unknown, or at least unpublished. For though the total of Treasury notes in circulation is published, yet it is not stated what proportion of them enters into the circulation as distinguished from use as the reserve of banks. And very little, I think, is known about the coefficients  $V$  and  $V'$ . What if the increase in general prices should be partly due to an increase in the velocity of money consequent on changed methods of business. The hypothesis of some increase of velocity has the countenance of Professor Foxwell's authority. In his impor-

tant address to the Institute of Actuaries last May he said that he was 'inclined to think the pressure caused by war did make the sixpence more nimble than it otherwise would be'; that there was 'even in notes a more rapid circulation'. Thus the ratio of  $F_1$  to  $F_0$  is imperfectly ascertained. The ratio of  $T_1$  to  $T_0$  is even more indeterminate. With the enormous change in the character of goods, the immense increase in munitions ordered by Government, there must have occurred great change in that *velocity*, or circulation of goods, which enters into  $T$ . Apart from this circumstance the mere changes in the quantity and quality of the goods produced are unfavourable to the computation of  $T$ . There has occurred an enormous increase in the products required for war; some diminution in the products consumed by the civil population. Thus the ratio  $\frac{T_1}{T_0}$  is probably made up of two sets of ratios, the one greatly above unity, the other below it. But the use of an average formed from constituents which are separable into two distinct groups with widely different means is precarious. There is wanting the character of Probabilities which attaches to numerous homogeneous independently varying elements. Altogether it seems that inflation in the strict and scientific sense of the term is not established. We must be content with the fact, without assigning the reason, of the rise of prices.

The fact is evidenced by the accompanying statistics, which I adduce not only on account of their intrinsic interest, but also in illustration of the principles of Probabilities which I have employed or implied in the preceding paragraphs. In the first aspect it will be noticed that prices by the end of last year had almost



risen to the double of what they were just before the war; as evidenced by the index-numbers both of the Economist and the Statist. That of the Economist alone is available for the end of October 1917, showing a rise in the general price-level to 259.1, more than twice the figure for the end of June 1914. The close correspondence of the different index-numbers is remarkable, considering how discrepant are the data employed to measure the change in the value of money. For example, in the compilation of the Statist no account is taken of an article so important as *Tobacco*, which figures among the items on which the other two index-numbers are based. Again, the Board of Trade index-number takes account of the *quantity* of each article used, whereas the other two are content with taking averages of the various prices.

The claim to have gone below the facts so as to decide whether money is responsible rather than goods for the separation between them which has occurred involves a finer issue than is commonly discerned. If money and goods have been advancing together, as it were moving abreast for a time, and then one distances the other, it is a nice question whether the occurrence of the interval is due to the acceleration of the one or the retardation of the other. If they have been running evenly neck and neck, the data may exist for the decision of the issue. But suppose that at a certain stage, the course changing its character, the two begin to flounder among craters and quagmires. The distinction between velocity and acceleration becoming obliterated, it might be difficult to affirm more than the fact of precedence. However, if we observe the rider who is in advance to apply spur and whip, and a start forward always to follow that application, it is reasonable to regard that

TABLE I

Index-numbers derived from I The Economist, and II The Statist, showing the price-level at the end of December 1916 and at the end of June 1914, referred to the period 1901-5 as base.

	End of June 1914					End of December 1916							
	1901-5	Cereals and Meat	Other foods	Textiles	Minerals	Miscellaneous	Total	Cereals and Meat	Other foods	Textiles	Minerals	Miscellaneous	Total
I	100	113	115	123	118	110	116	259	184.5	225	206	222.5	223
II	100	110.5	111	122	115	119	116	237	204	228	189	221	220.5

TABLE II

Index-numbers derived from I The Economist, II The Statist, III The Board of Trade, showing the price-level for the year 1916 and for the first half of 1914, referred to the period 1901-5 as base.

	First half of year 1914					Year 1916					
	1901-5	Food and Drink	Textiles	Minerals	Miscellaneous	Total	Food and Drink	Textiles	Minerals	Miscellaneous	Total
I	100	114.5	125.5	121	112.5	117.5	191	176.5	211	204	196.4
II	100	111	126	120.5	118	118	191.5	195.5	187.5	196.5	180
III	100	113.5	133	115	118	117	187.5	177.5	222	227.5	192

action of his as the cause of his advance. But it may not be the only or the principal cause.

These allegorically hinted doubts are to be borne in mind when it is argued that the increase of prices since the outbreak of the war has been caused by the continually increased issue of Treasury notes. A particularly brilliant argument has lately been put forward by Professor J. S. Nicholson at the last meeting of the Statistical Society. Tabulating the issues of Treasury notes during each quarter of a year since the beginning of the war, he shows that each such issue is followed by a corresponding—correspondingly great or small—increase in the index-numbers which represent the level of prices. I exhibit the series of note issues, with their dates, on the left side of the first table here presented; and on the right side an index-number for each *following* quarter. These index-numbers are not exactly those given by Professor Nicholson, but are calculated by combining the two index-numbers which he has employed, namely, that of the Economist and that of the Statist (Sauerbeck's continued), after first *pushing up* the latter so as to bring it to the same base as the Economist's index-number, viz. 1901-5. In the second table I exhibit the *increments* from quarter to quarter of the two compared magnitudes: the amount of Treasury notes in each quarter, and index-numbers for the following quarter. For example, the increment of the notes in the last quarter of 1914 over the amount existing in the preceding quarter was £8,000,000; the corresponding increment in the index-number for the first quarter of 1915 was 16 per cent., and so forth. There is observable a certain consilience between the magnitude of the former increment and that of the latter. The same degree of correlation would not be manifested—on the



TABLE III

Comparison between the increase of currency-notes at each quarter and the rise of the price-level in the following quarter.

Currency-notes				Index-numbers			
d	c	b	a	a	$\beta$	$\gamma$	$\delta$
Date of column a	Deviation from mean increase	Increase of Currency-notes	Average Currency-notes	Average Index-number	Increase of Index-number	Deviation from mean increase	Date of column a
1914 Aug.-S.			27	127			1914 iv
1914 iv	- 4.5	8	35	143	16	+ 4.25	1915 i
1915 i	- 10.5	2	37	151.5	8.5	- 3.25	1915 ii
1915 ii	- 4.5	8	45	151.5	0	- 11.75	1915 iii
1915 iii	+ 0.5	13	58	161	9.5	- 2.25	1915 iv
1915 iv	+ 22.5	35	93	180.5	19.5	+ 7.75	1916 i
1916 i	- 2.5	9	102	192	11.5	- 0.25	1916 ii
1916 ii	+ 4.5	17	119	193.5	1.5	- 10.25	1916 iii
1916 iii	- 2.5	10	129	214.5	21	+ 9.25	1916 iv
1916 iv	+ 0.5	12	141	233	18.5	+ 6.75	1917 i
		114			106		
		12.5 (nearly)			11.75 (nearly)		

contrary there would appear a certain repugnance—between the two series if we altered the table by pushing up the column on the left so as to compare the respective increments for the *same* quarter. This table, which should be considered in connexion with the diagrams presented by Professor Nicholson, points to the increase of Treasury notes as a cause of the increase of general prices. Or perhaps it is safer to employ a category which modern statisticians prefer to that of causation, and to conclude that there is a *correlation* between the issue of currency-notes in one quarter and the rise of general prices in the next quarter. That conclusion is not at variance with the judgment of other monetary experts that the rise of prices is largely due to causes other than monetary, such as the obstruction of supply; provided that they consent to add that the rise could not well have occurred without a corresponding increase in 'F' (if 'T' has not decreased).

If this proviso is granted, it may be left to the metaphysicians to determine to what extent a *conditio sine quâ non* forms part of the *cause* of a phenomenon. The question of practical interest is whether it was wise of the Government to issue currency-notes in such quantities as they have done. The debate on this question is perhaps destined to be as interminable as the controversy regarding the management of the Bank of England during the Napoleonic war; about which Tooke, writing in the late 'forties of last century, could say: 'After all the discussion the topic has undergone during the half century which has elapsed . . . it presents as wide a field as ever of debateable ground.'

But there is this great difference between our case and that which our ancestors had to deal with, that our currency is not depreciated with respect to gold. If, as

Ricardo insisted, that kind of depreciation is the test of over-issue, how are we guilty of excess? To restrict our currency would tend to raise its value above that of gold. This kind of appreciation has actually been effected in Denmark by the refusal to give notes in exchange for gold. But such a refusal is unthinkable in this country. As Professor Foxwell told the Actuaries, 'Unless they were prepared to resort to what he might call Scandinavian methods and bring about a local appreciation of gold in their own country (which was impossible and undesirable), the rise of prices was beyond the control of any one country; they could only check it by cutting themselves off from the gold standard, which was just what they did not want to do.'

In these circumstances, what would have been the effect of not assisting our currency to expand? It is dangerous to draw inferences when one is imperfectly acquainted with the relevant facts; for instance, the degree in which gold is marketable in different parts of the world. Theoretically at least it is tenable that—on suppositions as to the relation between gold and our currency not known to be false—the advantage accruing to us from a certain check to the rise of prices would not be counterbalanced by the disadvantage which we would have incurred by withholding from our Government the means of making necessary purchases without hitch.

While asking those who follow these observations to think it possible that our Government have not been much mistaken in their dealings with Treasury notes, I desire to avoid misconstruction by expressing complete agreement with Professor Nicholson and other high authorities as to the evils and dangers of paper-money issued without limit. The cautious extension of the

currency, for special reasons shown, in certain supposed circumstances, is to be emphatically distinguished from the drastic simplicity of the Inflationist's recipe. The protest is the more necessary in that we have still with us those whose sovereign remedy is the unlimited issue of 'soft' money. There still survive currency-doctors whose science is on a par with that of the practitioner under whom Gil Blas served; except that while he invariably bled the patient, the panacea of the modern Sangrado is to *add* to the circulation.

✓ IV. From *inflation* it is an easy transition to national *loans*, since these if not carefully managed lead to inflation. A clear, but somewhat trenchant writer, Mr. Pethwick Lawrence, lays it down that 'Inflation is inherent in the flotation of a loan for purposes other than the construction of material reproductive capital'. Upon this it may be observed that the alternative of defraying the entire expenses of war by taxation would probably (a) involve much borrowing on the part of some taxpayers from fellow-citizens in order to meet the sudden enormous demands of the tax-collector. And (b) the existence of these debts would lead to that artificial increase of deposits, that 'inflation of credit', which Mr. Pethwick Lawrence has described so clearly. It may be observed that the first of these premisses (a) is conceded by Macculloch when supporting a thesis similar to that of Mr. Pethwick Lawrence; the second premiss (b) is conceded by Mr. Pethwick Lawrence himself.

The inflation consequent on private borrowing might, indeed, not be so extensive as in the case of national loans. But there are other evils besides inflation to be taken into account when in a more general view we consider the issue *Loans versus Taxes*. It is well said



by one who inclines to the side of taxation, who recommends beginning with loans and getting on to taxes: 'A tax so excessive in amount [27 per cent. of the national income] precipitated without warning upon established industries, would have encroached upon working profit, weakened the incentive to labour, broken the mainspring of activity, and disorganized the mechanism of production.'

The just mean between the extremes which are described as 'Taxes only' and 'Loans only' is to be determined by a comparison of conflicting authorities and considerations. The authority of Adam Smith and the other classical economists who denounced Loans would count for much, but that their judgment is based upon a disputable conception as to the nature of a public loan. As I have argued in a former Lecture, there is no close analogy between the danger and detriment in which private debts are apt to involve the individual debtor and the burden to the nation of a debt contracted by the nation as a whole to one section thereof. The conception which negatives this analogy is generally, I think, but by no means universally, regarded as the correct view by contemporary economists. But this correction of the older writers does not carry us far in the direction of Loans. The modern view is held by contemporary experts consistently with strong recommendations of taxation in preference to borrowing. The decision seems to turn largely on a matter about which the academic student cannot speak with authority, namely, what has been called 'the psychology of taxation', the temperament of the people on whom the financier is operating. Doubtless different prescriptions—different proportions in which the two doses enter into the mixture—are adapted to the tem-

peraments of different nationalities. The Editor of the *Economist* may be quite right in urging that a larger share than now of our expenditure on the war should be defrayed by taxes; while Professor Seligman quite rightly moderates the self-denying zeal of Congress and gravitates to a mean position distant from that extreme which he calls 'Taxation only'. A popular American writer with some plausibility explains French Finance by the reluctance of the thrifty Frenchman to part with his money in the way of taxation; more ready to give his life than his money in the cause of his country. In fine Dietzel, acutest of German economists, may not have been far wrong when, writing in 1812, he took up the extreme position of Loans only; if we suppose that the dangers of that position are at a minimum in Germany. The citizens might be so docile that the Government could go on borrowing without loss of credit, without having to offer extravagant interest; and the Government might be so economical as not to part lightly with the resources which it obtained easily. But in judging of German Finance it must be remembered that the condition above attributed to a war loan, namely, 'for purposes other than the construction of material capital', is not in general accepted by the German financiers. They are—or were till lately—apt to regard war as an investment, an outlay to be more than compensated by an indemnity or other material acquisition.

V. Taxes may be considered as both complementary and supplementary to loans; an alternative in the present, and a consequence in the future when interest has to be met. It would be interesting, if time permitted, to enumerate the particular new or revived taxes which the exigencies of war—or of neutrality—are evoking. For instance, there has been proposed in Holland an



impost which as far as I know is quite new, a tax on *Christian names* (I presume, not retrospective). The tax on *hats* proposed by Mr. McKenna (and subsequently withdrawn), being a customs duty, is not identical with the tax imposed by Pitt and administered by the department in which Wordsworth held an office. 'I shall think of him oft when I buy a new hat', wrote Lord Byron. Another of Pitt's taxes, that on maidservants, has recently been suggested by a very eminent English economist. The tax, if limited, as he proposes, to families with more than one servant, would not be open to objection on the score of discouraging matrimonial establishments, as Pitt's opponents pretended. We read (in the Parliamentary Report for 1785) that 'Mr. Drake considered the tax on females in a serious light as tending to increase the profligacy of the times'.

Mr. Drake went on to propose as an alternative a tax on 'men-milliners'; upon a principle which in these days might perhaps be employed to defend the tax against which he protested. I mean the diversion from civil uses of commodities and services which are specially useful for the purposes of war. The rules for the application of this principle are presumably much the same as those which Professor Pigou has illustrated with respect to private economy in relation to war finance. As relevant to the matter in hand may be instanced his advice: 'If our nursery-maid is an indifferent nursery-maid, but likely to prove a genius in making munitions, we should dismiss her.'

This principle may act as a slight set-back to the tendency which has been in operation for many years towards a smaller proportion of *indirect*, as compared with *direct*, taxation. It is long since Gladstone avowed himself 'perfectly impartial' between the two forms.

In a somewhat flippant metaphor he represented the Chancellor of the Exchequer as paying addresses to 'two attractive sisters . . . differing only as sisters may differ . . . as where there is some agreeable variety of manner, the one being more free and open, the other somewhat more shy and retiring'—presumably 'free and open' corresponding to 'direct'. The Chancellor's state of feeling may be compared to that of the youth in Scott's *Pirate* who was for long equally attracted by the two beautiful and beautifully contrasted sisters, one of whom is described as of a 'retiring disposition'. The affections of the Chancellor of the Exchequer, like those of Mordaunt, ultimately settled on the less retiring, the more free and open, of the sisters.

This change in the character of taxation was promoted by the conversion of financiers to the doctrine of progressive taxation from the old simple creed of taxation in proportion to income. The conversion has followed from first principles according to which the rule for distributing the burden of taxation is to be sought in the subjective feeling, the 'sacrifice', of the tax-payer. This is not the occasion on which to examine the subtle schisms into which this doctrine splits. Suffice it to point out that the controversy countenances the view of those who think that *welfare* or *utility* in a subjective sense is amenable to laws of *quantity*. Common sense must be impressed by observing that two of the most sensible and practical—as well able and distinguished—economists that have adorned their respective countries, Pierson and Professor Seligman, have accepted the principle that taxation is ideally distributed when each tax-payer forgoes—not an *equal amount* of satisfaction—but an *equal percentage* of the total utility which he derives from his possessions.

Among the most recent contributions to this inquiry should be noticed Dr. Marshall's employment with reference to war finance of the principle that 'the hurt [the "personal hurt"] caused by obtaining £1,000 of additional revenue by means of levies of £20 from each of fifty incomes of £200 is unquestionably greater than that caused by taking it from a single income of £10,000'. Dr. Marshall is of course aware of and guards against the discouragement of saving by a too drastic impost upon wealth.

That danger is perhaps less than ordinarily to be apprehended in the case of some kinds of war-tax for a reason which Professor Pigou has thus pointed out: 'The expectation of a regular tax of fifteen shillings in the pound on incomes of above £5,000 would go far to prevent people from bringing such incomes into existence. But the objection is *not* valid as regards special taxes levied on an exceptional occasion for the purpose of financing an unprecedented war. Such taxes do not carry an expectation of continuance, and do not therefore react upon saving and work in the way that taxes levied in the ordinary course might be expected to do.' Here once more the 'psychology of taxation' must be taken into account. The exception to the normal action of a tax as a deterrent seems most likely to occur in the case of an impost that is really unique, not only unprecedented, but unlikely to occur within a lifetime; such as the project of Ricardo to extinguish the national debt by one heroic act of abnegation. But in a long war requiring repeated levies of taxation it is to be expected that the normal motives of the economic man will recur; '*modis inolescere miris*' is the character of his habits. It is noteworthy that Macculloch has defended the plan of paying for war altogether out of present taxation—



against the objection that it would be unfair to the professional classes—on the very ground that it would be foreseen and would act normally on economic motives. 'Wars are calamities to which every people must always be liable; and if it were once known that the supplies required to defray their expense were to be raised within the year, by an equal income-tax, the chances of being subjected to this tax would most certainly enter into the calculations of professional men; and the rate of their natural or necessary wages would be regulated accordingly.' Macculloch's argument as to the shifting of the tax is no doubt extravagantly deductive; but there may well be a portion of truth in his premiss that the war-tax would be foreseen and act upon motives.

VI. Separate treatment is required for a particular kind of tax, import duties imposed for purposes other than revenue. Here our thesis that training in economic theory is a necessary qualification for the direction of economic policy is peculiarly valid. So fallacious are appearances in this matter; so subtle the influence of interests other than that of the community. As Dr. Marshall has lately written, 'a policy which will confer a considerable benefit on each of a compact group of traders or producers will often be made to appear in the interest of the nation; because the hurt wrought by it, though very much greater in the aggregate than the gain resulting from it, is so widely diffused that no set of people are moved to devote mind, time, and energy to making a special study of it.' If the advocates of such a policy are perfectly sincere and public spirited,—if 'a policy that makes for their peculiar profit is invested in their eyes with a deceptive glamour'—so much more dangerous is their subtle influence. Could not the educated public see to it that a voice in such matters

should be exercised by those who are likely to be free from fallacy and deceptive glamour and are otherwise qualified ; in particular some of the younger economists who have taken part in administration during the war ? Expert guidance will be all the more required if it should be necessary to resort to some degree of Protection—in the technical sense—in order to obtain protection—in a true and reasonable sense—from hostile manœuvres, organized malignant ‘dumping’, and so-called ‘peaceful penetration’. How should we like to have our war policy directed by those who in the phrase of a leading German Professor regarded war as ‘a holy thing—the holiest thing on earth’ ? To have our trade policy directed by those who regard an import duty as a holy thing would be similarly objectionable. The illustration, however, suggests that there is an opposite evil—intransigent free trade analogous to unseasonable pacifism. But the withers of economists, as distinct from politicians, are I think unwrung in this respect. ‘It is not by trained economists’, said Professor Marshall (in 1901), ‘that the defence of free trade is based on absolute *a priori* reasoning. On the contrary it is based on a study of details.’ He has admitted that in the early part of the nineteenth century Protection might have been beneficial to the young industries of America. There are free traders who think that during the period of reconstruction after the war some protection may be required. They do not shrink from cautiously administering a dangerous drug to a convalescent, though they are not prepared to make the medicine of the republic its daily food. If, as Dr. Marshall now admits, some measure of protective policy to secure necessary food supplies may have to be accepted by way of insurance, that admission is quite of a piece with the principles

which he and those who think with him have all along professed. To have resorted to the said protective policy before there was need of such insurance would have been as unreasonable as to burden merchant ships with appliances against submarines in the peaceful days of Queen Victoria. The cost to which the economist has continually pointed does not cease to be a cost because it is incurred as an insurance. With regard to preferences and commercial treaties it is not to be denied that the monopolistic combination of some countries to the exclusion of others may, under certain circumstances, enure to the material gain of the combining parties. But how far it is politic to seek this gain—with the consequences of possibly promoting amity among the countries included, and probably provoking the hostility of those excluded—this question lies in the domain of politics rather than in that of economics. It is not as an economist, but in the spirit of a soldier, that the heroic Professor Kettle speaks when he protests against sacrificing honour to trade—when in the last chapter of his remarkable book, and so to speak with his dying words, he denounces ‘the attempt . . . to encumber purely military issues with a whole new economic regime,’ to transform what began as a war for honour into a war for trade. I may without irrelevance quote also as a model for our conduct the exhortation which the eminent American economist, Professor Taussig, has addressed to the Tariff Commission of which he is Chairman, the Commission appointed by the Government of the United States. His weighty words are: ‘We enter the war in no spirit of exploitation for ourselves or for others; and we shall join at its close in no policy of exploitation. We shall not devise for ourselves discrimination or unequal commercial privileges. We shall



regret the grant of unequal privilege to other nations, not merely because such grants may be injurious to ourselves, but because they are inconsistent with that lasting peace which we hope to promote between the nations. If we adopt defensive commercial legislation of our own it will be with the design of maintaining it strictly as defensive, not as a means of aggression or control.'

An equally high note is struck by another distinguished American economist, Professor J. B. Clark, when he shows that restrictions upon trade might be employed for the purpose of promoting international peace. Embargo would be part of the 'economic force' which the League to enforce peace is pledged to bring to bear upon recalcitrant members. The 'Greater Entente', in the just phrase of Professor Clark, which is formed by the conjunction of his country with the European Allies, is already employing action of the kind contemplated. I regret that I cannot pursue this subject further now. For no topic connected with Political Economy better deserves the attention of the educated public than the methods which the study may suggest for the promotion of international peace.

## NOTES

### SECTION I

PAGE 4. I suppose Political Economy to have in general the character of the Aristotelian *φρόνησις*, of the kind which deals with public interests (cp. *Nicomachean Ethics*, Bk. vi, ch. 8, par. 1-3, and ch. v, *Περικλέα καὶ τοὺς τοιοῦτους φρονίμους οἰόμεθα εἶναι . . . εἶναι δὲ τοιοῦτους ἡγούμεθα τοὺς οἰκονομικούς*). Perhaps the more abstract theory of economics, that which involves mathematical conceptions, has features congenial to the Aristotelian *σοφία* (*περιττὰ μὲν καὶ θαυμαστὰ καὶ χαλεπὰ καὶ δαιμονία εἰδέναι αὐτοὺς [τοὺς σοφοὺς] φασιν, ἄχρηστα δέ, ibid. ch. 7*). The practical science of Political Economy sometimes employs explicit reasoning from general principles (*ibid.*, ch. 8, par. 7); often commands assent to 'undemonstrated judgments' in virtue of a certain acquired insight (*διὰ τὸ ἔχειν ἐκ τῆς ἐμπειρίας ὄμμα, ibid. ch. 11, par. 6*). In times of emergency and crisis I think that resort must be had more than usually to mental processes which do not involve reasoning from general propositions; such as *ἀγχίνοια*, which is a kind of *εὐστοχία* (*ἀνευ τε γὰρ λόγου καὶ ταχύ τι ἢ εὐστοχία, ibid. ch. 9, par. 2*). But I maintain, and the consideration of some problems presented by Currency and Finance in war time will I hope confirm the thesis, that the mere *δεινότης* (*ibid.*) of the clever politician is not adequate to deal with such problems. There is required the insight acquired by economic discipline.

### SECTION II

PAGE 4. Sidgwick suggests the use of the Platonic method in the chapter on the definition and measure of value in his *Principles of Political Economy* (Book I, ch. ii, § 1); and applies it to the definition of money in a later chapter (Book II, ch. iv). His nomenclature is not the same as that of Professor

Irving Fisher. But they agree in distinguishing on much the same grounds (Sidgwick, *loc. cit.*; Irving Fisher, *Purchasing Power of Money*, ch. ii, § 1), within the genus 'money' in the wide sense, or 'currency'; a nucleus which I have called 'money proper' in agreement with Professor Pigou (*Wealth and Welfare*, Part IV, ch. iv, § 4).

If money is understood in the widest possible sense, including possibly bills of exchange (Sidgwick, *loc. cit.*, § 3, paragraph last but one; Anderson, *Value of Money*, p. 289), the quantity theory of money would become almost an identical proposition, as is sometimes said disparagingly; yet not altogether, since an inferential element and the hazard of induction would still be involved in the comparison of the 'volume of trade' at different epochs (cp. below, note to page 9). To *explain and account for* the observed rise of prices in the early years of this century by the equation of exchange would be a legitimate, interesting, and important achievement of induction aided by the calculus of probabilities; even though the theory could not be employed for the purpose of prediction, for instance as to the consequences of an increase in the world's supply of gold.

Inferences of the latter kind are, I admit, more hazardous. The presumption that, if we increase the amount of gold in the banks, credit will be increased in the same proportion is open to Professor Nicholson's remark that 'the strengthening of the foundations does not of itself raise the superstructure' (*The Rise of Prices*, Quarterly Review, 1912). His polemic and that of Professor Anderson (*loc. cit.*) against the assumed stability of ratios have force. But I think that much of Professor Fisher's construction will be found to remain standing when it is considered that the stability of the coefficients  $V$  the velocity of money, and  $k$  the ratio of  $M'$  (deposits) to  $M$  (money proper in circulation) and of other ratios is not postulated as to 'transitional' short periods, nor yet, if I rightly interpret, as against secular changes—in very long, as opposed to merely normal, periods (cp. Irving Fisher, *op. cit.*, p. 166, 'if a nation grows richer *per capita*, the velocity of circulation will increase'; p. 162—referring to ch. xii—'statistically . . . the ratio  $M'/M$  has changed from 3.1 to 4.1 in fourteen years').

The quantity theory in the narrow primitive sense in which change of  $P$  is predicated of change in  $M$  only (abstracting or ignoring  $M'$ ) retains some probability for normal periods such as I suppose Professor Pigou to have in view when he says: 'For the most part . . . such variations as occur in the supply of money arise out of variations in the supply of money proper. Furthermore they are in general proportioned to these variations. For, when the quantity of money proper available for bank reserves and circulation together is halved, both the quantity of money proper and the quantity of bank money that is called into circulation by a given demand price will also be halved' (*Wealth and Welfare*, Part V, ch. iv, § 11). This statement does not apply to 'temporary' variations as pointed out in a subsequent passage (§ 13); nor, as I presume, to very long periods. Even as to normal periods in an ordinary sense the statement just quoted must be admitted, I think, to be somewhat bold and trenchant. We may say of it what Mill says with regard to a statement of Ricardo's, that 'it contains sufficient truth to render it admissible for the purposes of abstract science'. The statement has, I think, the kind of Probability for which Professor Pigou has accepted the designation 'unverified', the most probable statement that we can make, yet not necessarily very probable (cp. *Wealth and Welfare*, pp. 47, 61, 454).

PAGE 5. With reference to 'rapidity of circulation', Mill says: 'The essential point is not how often the same money changes hands in a given time, but how often it changes in order to perform a given amount of traffic. We must compare the number of purchases made by the money in a given time not with the time itself, but with the goods sold in that time.' As I interpret, Mill's *rapidity*, or *efficiency* as he suggests calling it, say  $E$ , =  $\frac{V}{[T]}$ , where  $[T]$  is the unit in which (our)  $T$  is measured, that is the number of times that a unit of money changes hands in order to purchase a unit of goods during a unit of time. Say  $T = N[T]$ ,

$$P = \frac{MV}{T} = \frac{MV}{N[T]} = \frac{M}{N} E.$$



This definition is consonant with Mill's propositions concerning his coefficient. Thus he says, that 'the quantity of money in circulation is equal to the money value of all the goods sold, divided by the number which expresses the rapidity of circulation' (*loc. cit.*, par. 1). That is, in our notation,  $M = T \times N \div E$ , which follows from the proposition stated above. Again, Mill says (*loc. cit.*): 'The amount of goods and transactions being the same, the value of money is inversely as its quantity multiplied by what is called the rapidity of circulation.' This proposition, too, holds good if we understand the hypothesis to signify that  $T$  and  $E$  remain the same while the quantity of money is changed. Take, for example, Mill's illustration: 'If the money in circulation is 100,000*l.* and each piece changes hands by the purchase of goods ten times in a month, the sales of goods for money which take place every month must amount on the average to 1,000,000*l.*' Let that be the state of things at an initial epoch (*loc. cit.*, par. 2). Then  $E = 10$ , whatever the unit of goods may be. Suppose, for instance, that the unit of goods is a ton, worth at the initial epoch £2. Then  $N = 500,000$ . And  $E$  the number of times that a unit of money changes hands by the sale of a ton = 10. For it takes two pounds to effect the sale of a ton. And 500,000 such sales are effected with 100,000 pieces;  $2 \times 500,000 \div 100,000 = 10$ . If now at a later epoch the quantity of money becomes doubled, while  $T$  and  $E$  remain the same, according to the theory the price of a ton becomes £4, which is consistent with the data. For, since it now takes *four* pounds to effect the sale of a ton, and since as before there are 500,000 tons sold, while there are now 200,000 pounds in circulation, by parity of reasoning  $E = 4 \times 500,000 \div 200,000 = 10$ , as before. But in the case supposed an interpretation clause is necessary to render appropriate the 'circumlocution' which Mill gives in the context as the definition of rapidity or efficiency, namely 'the average number of purchases made by each piece in order to effect a given pecuniary amount of transactions' (*loc. cit.*, end of par. 3). When we are considering changed quantity of money attended with change of price, we must understand by 'a given pecuniary amount of transactions' not a constant

amount of money employed in purchases (e.g. 1,000,000 in the example given), but constancy in the amount of goods which would have been sold for that sum *at the initial epoch*. The use of the 'old prices' to measure change in quantity is a familiar feature of the index-numbers invented by Bourne and Giffen, which will be referred to in a subsequent note. There is much to be said for Mill's definition. But its use requires great care, and I am not sure that it has an advantage over Professor Fisher's familiar and easily understood nomenclature.

Jevons too seems not to have made an improvement by his use of the term *efficiency*. 'By the efficiency of the currency', he says (*Money*, p. 336), 'we mean the average number of exchanges effected by each piece of money in a unit of time such as a year.' The term 'velocity' seems more proper to denote *number per unit of time*.

PAGE 7. The entomological statistics which have been adduced to illustrate monetary circulation will be found among the *Supplementary Notes* in the Journal of the Royal Statistical Society for 1896, p. 529. Statistics *in eodem genere* are given in an earlier article in the same volume of that journal on *Unprogressive Communities*, p. 258; among *Miscellaneous applications to the Calculus of Possibilities* in the said journal for 1897, p. 696; and in a paper on *Statistical Observations on Wasps and Bees* in *Biometrika*, vol. v.

Let us in the spirit of the preceding note represent the *rapidity* of the circulation as the relation between a certain unit of work done (the analogue of goods sold) and the number of journeys made (the analogue of purchases made by a monetary unit) in the performance of that work. The quantity of work may be considered as varying with the weight of the load brought home, and the degree of resistance or other kind of trouble required in collecting a load (for instance a load of liquid honey is procured with much less effort than a fragment hewn from a block of dried sweets. Cp. *loc. cit.*, 1896, p. 259). The variations in the quantities which correspond to the monetary coefficients *V, T, P, M*—say *v, t, p, m*—are suited to illustrate the changes in the Equation of Exchange which

probably takes place in the course of a long war during which different economic equilibria are set up and last each for a short period. It is observed that  $v$ , the rate of turnover, is markedly higher in the early morning and late evening than in the middle of the day. It was 56 minutes in the instance adduced (relating to hours after 10 A.M.), 36 minutes in another instance, and so on. Whereas in the midday instance, periods near sunrise or sunset, about 15 minutes was the usual time. If we make the tenable assumption that the work done at all hours is proportioned to the time occupied by a journey, then the efficiency is greater at the very early and the very late hours. The awkwardness of using the term efficiency where, from the point of view of mechanics, we might expect the predication of *inefficiency* (more journeys being required to produce the same result), is paralleled by the infelicity of attributing greater 'efficiency' to money when its purchasing power is diminished. The entomological allegory is not adapted to illustrate the 'passiveness' of  $P$ , the location of the cause of change with some other of the coefficients, in particular  $M$ , rather than  $P$ . It has been suggested to me by a distinguished entomologist that the shortness of the late evening excursions may be accounted for by an instinct which forbids going far from home, or entering on a job which requires a long time for its execution, at an hour when the coming on of night may be apprehended. If so the *causa causans* of the change in  $p$  is to be sought in  $p$  itself, or  $v$ , rather in  $m$  relative to  $t$ , a ratio which we have supposed to be constant.

PAGE 9. Dr. Bowley's definition of *index-number* is given in his *Elements of Statistics*. For the suggested metaphysical parallel see Locke, *Essay on the Human Understanding*, Book I, ch. xiii.

PAGE 9. Let  $q_0, q'_0, q''_0 \dots$  be the quantities sold (including re-sales) *per unit of time* at one epoch and  $q_1, q'_1, q''_1 \dots$  the corresponding quantities at another epoch. Then the ratios  $q_1/q_0, q'_1/q'_0, \dots$  are to be combined in a weighted average as thus:

$$\frac{T_1}{T_0} = \frac{\alpha \frac{q_1}{q_0} + \beta \frac{q'_1}{q'_0} + \gamma \frac{q''_1}{q''_0} + \dots}{\alpha + \beta + \gamma + \dots} .$$



If, to begin with, we put for the *weight* of each commodity the value of the quantity sold per unit of time at the initial (or some other basic) epoch,  $p_0, p'_0, p''_0$  being the prices at that epoch, we have

$$\frac{T_1}{T_0} = \frac{q_1 p_0 + q'_1 p'_0 + q''_1 p''_0}{q_0 p_0 + q'_0 p'_0 + q''_0 p''_0};$$

the ratio between the value of the new quantities at the old prices and the old quantities at the old prices. The *first three* of the constituents employed by Professor Fisher in his calculation of  $T$  are thus weighted. But as this weighting does not take account of the frequency with which commodities are resold, it may be proper to multiply each weight by a new coefficient. The set of weights will thus become  $aq_0 p_0, bq'_0 p'_0, cq''_0 p''_0, \dots$ . Put  $ap_0 = A, bp'_0 = B, \dots$ . Then  $T_1/T_0$  may be written

$$\frac{Aq_1 + Bq'_1 + \dots}{Aq_0 + Bq'_0 + \dots}.$$

This form is virtually the same as that used for the two *indicia*, Tons and Letters carried by the Post Office to which Professor Irving Fisher assigns weights not based on amount of sales. It might be advisable to use this form for all the constituents, treating the value of sales ( $qp$ ) where ascertainable as an important element for judging of the weights ( $A, B, \&c.$ ). Also a larger number of *indicia* might be available, perhaps as many as Professor Mortara has used to measure progress (*Giornale degli Economisti*, Feb. 1914. Cp. Benini, *loc. cit.*, Feb. 1892; and Julin, *Journal of the Royal Statistical Society*, vol. lxxiv, 1911, p. 253 *et seq.*).

PAGE 10. Giffen's masterly estimates of the 'increase in the quantity' of foreign trade are contained in the following Parliamentary Papers: 1878-9, C. 2247; 1880, C. 2484; 1881, C. 3079; 1884, C. 445. His methods are discussed in my memorandum on *Measuring variations in the value of the monetary standard*, Report of the British Association for 1889, p. 139. In the fourth section of the same memorandum I notice Mr. S. Bourne's cognate method which has some claims to priority. The fifth section introduces Sir Rawson



Rawson's conception of an average ton (of merchandise), a conception which may assist us to understand the nature of the index-number represented by  $\frac{T_1}{T_0}$ . The 'tons' specified in a former note might be conceived as averages of this kind.

The *quaesitum* in this problem—the thing behind the index-number—may be described as 'something mysterious and almost metaphysical', as I have put it when referring to this problem in order to illustrate the method employed by Mr. George Wood to measure increase in the consumption of goods by the working classes (Journal of the Royal Statistical Society, vol. lxii, 1899, p. 670). Mr. Wood formed an index-number out of fourteen ratios, each given by comparing the quantity of a commodity consumed at one date with the quantity of the same commodity consumed at another date. This construction is of the general kind which I regard as appropriate to the problem now before us. The validity of the method is verified by observing that the results remain approximately the same while very different systems of *weights* are employed for the purpose of averaging the ratios.

PAGE 10. Employing Professor Irving Fisher's Equation of Exchange to test the current conclusions as to the existence of monetary inflation, I am concerned here only with his method, not with his results. I am not concerned to defend him against all the criticisms of his work which have lately been made by Professor Anderson in his highly polemical treatise on *The Value of Money*. I am disposed to concede that the numerator of the fraction used by Professor Fisher to represent the level of prices in America is unduly affected by cheques drawn in the course of speculative sales and loans between brokers; that even if such items are admissible in the numerator, there ought to be items relating to corresponding quantities in the denominator. As I have already admitted, I regard an inference as to the change in the price-level from observation in the change of  $M$  only as more precarious than one that it is based also on the change of  $M'$ . Nor am I prepared to deny Professor Anderson's thesis with respect

to change in the price-level that 'the cause is with the prices'—*sometimes* (*Value of Money*, p. 310). In the pretty example given by Professor Anderson (*loc. cit.*) of the wages of maid-servants reduced by a combination of employers, certainly the lowering of the price-level by lowering the price of maid-service while all other prices (and the quantity of money) remain constant, seems to be caused proximately by the reduction in the velocity of money, and ultimately by the reduction of wages.

I only require the equation of exchanges for the purpose of showing that *sometimes* the change in the price-level is attributable to changes in the quantity (and velocity) of money. I am only concerned to rebut those criticisms which represent the method as so unsound or unworkable as not to be available for that purpose. To this extent I dissent from much of Professor Anderson's criticism on grounds which may be distinguished as (a) Economic and (b) Statistical.

(a) Under the first head I submit that the critic has made too much of the difficulty attending the distinction between 'transitional' and 'normal' periods. It is a difficulty which, as Dr. Marshall has shown, is presented in other branches of economic science; in particular with reference to the fundamental Ricardian theorem that value is proportioned to cost of production. Again a protest is called for against the defiance of received doctrine which Professor Anderson sums up in the following statement: 'The value-curve for the uses of money is not described by the equation  $xy = c$ ' (*op. cit.*, p. 149). I do not mean of course that the formula is fulfilled exactly; but that, broadly speaking, money is intermediate between the two classes which Mill thus distinguished: 'Some things are usually affected in a greater ratio than that of the excess or deficiency, others usually in a less' (Book III, ch. viii, § 2, last par.). For short periods and quaint instances no doubt the *proprium* ascribed by Mill to money does not hold good; but broadly and normally is not Mill's statement true, and for the reason lucidly explained by Mill in the context ('there is always a demand for as much money as can be got' . . . 'the demand consists of everything people have to sell', &c.)?

(b) On statistical grounds I dissent altogether from Professor Anderson's conception of the denominator  $T$ , which represents the volume of trade. 'The contrast', he says, 'between the "money side and the goods side" of the equation is a false one. There is no goods side. Both sides of the equation are money sides.' To Professor Anderson this 'seems the only interpretation (of Professor Fisher's equation) which is intelligible' (*op. cit.*, pp. 161-2). To those who have followed the interpretation above given it will seem perfectly intelligible that there is a 'goods side'. For  $T_1/T_0$  is compounded of elements each one of which is a ratio between *quantities of goods*. In the light of that conception the difficulties raised about adding 'a hundred papers of pins, a hundred diamonds, a hundred tons of copper' (*ibid.*) disappear. More generally it is a matter of complaint that the author does not sufficiently utilize the Theory of Probabilities. Many of the difficulties which he has raised are of a kind which that Theory has surmounted in the parallel case of index-numbers relative to prices. Thus the omission of large tracts of data—or *danda*—the inclusion of which seems recognized by the logic of the subject (*op. cit.*, p. 170), has to be faced and does not prove fatal in the construction of the more familiar head of index-number (cp. *Memorandum on measuring changes in the value of money*, Report of the British Association, 1888, p. 193). The circumstance that we are principally concerned with *ratios* such as  $P_1/P_0$  (above, p. 9) renders the requirements of logic less exacting than Professor Anderson would have us to believe. Again, the difficulty caused by the continual change of weights in  $T$  (*op. cit.*, p. 165) is exactly of the kind which Professor Wesley Mitchell has pointed out in his magisterial report on Index-numbers (Bureau of Labour, No. 173, p. 79), and shown not to be fatal. The index-numbers which I have presented on an earlier page have been adduced not only on account of their intrinsic interest but also illustrating the kind of roughness which is smoothed over by the processes which are the object of Probabilities. Those who are not conversant with that science might make great play with objections founded on the discrepancies in the construction of the said index-numbers.



Commodities so important as *Tobacco, Flax, Zinc, &c.*, are inserted in one (or two) of the index-numbers and omitted from another. Different varieties of the generic commodities are used in the different computations. In one of the index-numbers the items are *weighted*; in the other two not. And yet the results seem fairly good; *consensus*, that test of science, is not wanting.

### SECTION III

PAGE 10. Inflation is defined in the *Economist* for September 1, 1917. The parallel conception is enounced by Tooke in the first volume of his *History of Prices*, p. 154. Compare Nicholson, *Economic Journal*, vol. xxvi (1916), p. 425: 'An increase in the currency in accordance with the growth of wealth, trade, population, &c. is regarded as normal. Inflation means an abnormal increase.' So at the beginning of the paper which he read before the Statistical Society this year, Professor Nicholson briefly describes inflation as 'inordinate'. For other definitions of 'inflation' see the article by Professor Pigou in the *Economic Journal* for December 1917.

PAGE 11. The paper which Professor Foxwell read before the Institute of Actuaries last May is published in the *Insurance Record* on March 30, April 6, and April 13; also in the *Port Magazine* and *Insurance Monitor* for April 7 and 14, 1917.

PAGE 11. After suggesting that the rise of prices during the present war might be partly accounted for by a diminution in the 'velocity' (the frequency of re-sale) of goods, I found an equivalent suggestion made with more cogency and circumstance by Professor Lehfeldt in a paper which I have been privileged to see before its publication in the *Economic Journal*.

PAGE 11. As to the need of the Calculus of Probabilities in order to guarantee the use of a weighted average in cases where the weights are not ascertainable accurately, I may be permitted to cite some observations which I have made with



respect to an index-number for prices, based on consumption, family budgets, and data of that kind. 'This *quaesitum*, it may be thought, does not involve the *Calculus of Probabilities*. Nor would it if we knew the factors (the *quantities* of each commodity to be multiplied on its price) accurately. But in general our faculties attain only vague impressions as to the proper relations. We are sensible that *cotton* is more important than *indigo*; but how much more important we cannot discern accurately, especially if, as usual, different proportions of family or national income are expended on the respective commodities at the compared epochs. The *Calculus of Probabilities* smooths over these gaps in our knowledge. In the concatenation of averages the chain as a whole is stronger than each link' (*On the application of the Calculus of Probabilities to Statistics*, by F. Y. Edgeworth, Bulletin xviii of the International Statistical Institute, 1910, p. 122). I may also refer to what I have said with reference to the absence of the Probability-Calculus, which is conspicuous in Mr. Walsh's 'Measure of Exchange' (*Economic Journal*, vol. xi, 1901, pp. 409, 413). Beside the primary average which he contemplates, constructed with weights supposed to be ascertained, there is available a *secondary* average guaranteed by the *Calculus* in case of the weights being far from accurate, as when they are treated as equal, though the articles weighted differ considerably in their importance.

In the case of *T*, the flow of trade, I think that the property of Probabilities to hide a multitude of inaccuracies is particularly required, considering how uncertain is the relative importance (for the purpose in hand) of the different items.

PAGE 13. In the first Table of Index-numbers relative to prices the first row is taken straight from the *Economist* of January 6. It may be well to remind the reader that each of the *totals* is not a simple, but a weighted average of the five preceding entries. The data for the second row are taken from the index-number of the *Statist* (a continuation of Sauerbeck's statistics), published in the *Journal of the Royal Statistical Society* for March 1917. The index-numbers there given for six different classes of goods, and for the

aggregate, with reference to the period 1868-77, have been reshaped as follows for the sake of comparison with the Economist's index-number, which refer to the period 1901-5. First I have raised the given index-number for each class by the following rule of three: As the index-number given for 1901-5 is to 100, so is the given index-number (referring to 1868-77) to the required index-number (referring to 1901-5). For example, the given index-number for *minerals* at the period 1901-5 is the average of the index-number given for each year of that period. That is,  $\frac{1}{5}(89+82+82+81+87 = 84.2)$ . Accordingly, to find the index-number for *minerals* relative to the period 1901-5 at any assigned epoch, e.g. June 30, 1914, it is proper to divide the given index-number, viz. 96.7, by 84.2, and to multiply the quotient by 100. There results 115, the number given in the table. Likewise the given index-number relative to 1868-77 for the total, being the average of the totals given for the five successive years, is 70. Accordingly, in order to transform to the new base the total number given for any assigned epoch, e.g. for December 31, 1916, 154.3 (*loc. cit.*, p. 294), it is proper to divide the given number by 7. There results 220.5, the number given in the table. It should be noticed that the number for the *total* thus formed is not the simple average of the numbers formed for the several classes. When the numbers pertaining to all the classes have been ascertained, the two pertaining to Animal Food and Vegetable Food have been combined into one (by taking their average) under the new heading *Cereals and Meat* for the purpose of comparison with the index-number of the Economist.

In the second table the numbers in the first row relating to the year 1916 are formed by taking averages of the (twelve) numbers given by the Economist (January 1917) for each month in that year. The numbers for the *totals* given by the Economist, it may be well to repeat, are *weighted* averages of the numbers for the several classes. For the first half of the year 1914 I have taken the average of the two numbers given by the Economist under each head for the first and second quarter respectively of 1914. For the purpose of comparison with the Board of Trade index-number, I have

combined the numbers thus found for *Cereals and Meat* and for *Other Foods* into one, under the new head *Food and Drink*. For example, the number for *Cereals and Meat* is 112.5 for the first half of 1914, and for the same period the number for other foods is 116. Accordingly I have put for the aggregate the simple average, viz. 114 (fractions less than 0.25 being neglected). It would have been more proper to take the *weighted* average of the two numbers, assigning the weight 5 to the first, and 3 to the second. But the result would not be sensibly different. For the second row of Table II, I have reshaped the numbers given by the Statist in the manner already shown; and I have thrown the three entries under *Animal Food, Vegetable Food, Tea, Coffee, and Sugar* into one under the Board of Trade heading, *Food and Drink. Food, Drink, and Tobacco*, the heading in the Board of Trade index-number, would be inappropriate, as *Tobacco* does not enter into Sauerbeck's index-number. The numbers for the third row are obtained from the Labour Gazette for January 1917, by adjustment to the base 1901-5.

PAGE 14. Table III is formed from the penultimate table in the Appendix to Professor Nicholson's paper on *Inflation* in the Journal of the Royal Statistical Society for July 1917. In the columns on the left and right of the central (double) line there are placed respectively the average amount of currency-notes in each quarter and the average index-number for the *following* quarter. The latter entries are obtained by combining the index-number of the Economist with that of the Statist. For this purpose the Statist's number is pushed up, as above explained, so as to refer to the base 1901-5. For example, the Statist's average number for 1915, January, February, March (1915 i), given by Professor Nicholson is 100, which divided by 0.7 gives 142.86. The average of this number and that given by the Economist, viz. 143, is 142.9. The next step is to tabulate the *increase* of currency-notes—and likewise that of the index-number—for each quarter as compared with what it was in the preceding quarter. Thus, whereas the average of the currency-notes was 27 (million sterling) in August-September 1914,



and became 35 for the quarter October, November, December, the increase for that quarter, viz. 1915 iv, is 8. The corresponding increase in the index-number for 1915 i is 16. The next step is to find the *mean* of each of the two columns showing increases, and the *deviations* from the respective means, say  $x$  and  $y$ . These deviations are ranged in the columns headed  $c$  and  $\gamma$ . From these columns, with  $n = 9$ , we form the coefficients in round numbers

$$\sigma_1^2 = \frac{Sx^2}{n} = 77; \quad \sigma_2^2 = \frac{Sy^2}{n} = 52.$$

$$R = \frac{Sxy}{n} = 19.$$

Whence  $r$ , the coefficient of correlation, =  $\frac{R}{\sigma_1\sigma_2} = 0.3$  nearly.

There is thus evidence of positive correlation between the phenomena under consideration—increase of currency-notes and subsequent rise of prices—but not of a very close correspondence; not yet very strong evidence since the determination of the correlation coefficient is liable to a large probable error (cp. Yule, *Theory of Statistics*, p. 352). The hypothesis is at least more probable than that of a causal connexion between the increase of the currency and that of the index-number in the same quarter; for which I find—quite in accordance with Professor Nicholson's theory—a *negative* correlation!

PAGE 16. I do not preach 'State contenti, umana gente, al quia', but rather point to a position intermediate between the  $\delta\tau\iota$  and the  $\delta\iota\acute{o}\tau\iota$ : correlation as understood by Professor Karl Pearson (*Grammar of Science*, ed. 3, p. 177), a category which includes *causation* as a limiting case.

PAGE 16. Professor Anderson raises a nice question when he maintains that 'the first change in the situation may appear in prices themselves', rather than in the quantity and velocity of money (*op. cit.*, p. 126, *et passim*). I should think that the fact might be admitted as a transitional short period phenomenon. I have been told that on a Sunday preceding a certain fair to be held on Monday horse-dealers and their customers get into touch with each other and that prices are



thus sometimes settled before the fair. There is no objection to describing a phenomenon of this kind in the words just quoted from Professor Anderson. The essential point is that prices cannot be *maintained* at a new level without a change in the coefficients of the equation of exchange. That is the answer to be given in the case thus put by Professor Anderson :

‘Assume an island, which produces a staple widely used, whose chief centre of production is outside the island. Assume that this staple, an agricultural product, rises greatly in price, owing to a blight, which promises to be permanent, in the main producing region. The blight does not affect the island, however. Let this product be the main product of our island, which we shall assume to be small. Let the island have communication with the outside world by boat only once in three months. Let it be, however, in constant communication by cable. Word comes by cable of the rise in the price in the staple. The staple at once rises in the island. No new money has come in to cause it. Will this be a rise in the price-level? Will there be compensating reductions in the prices of other things to leave the price-level unchanged? What prices can fall? Not the prices of goods that have been imported to the island, surely. They will rather tend to rise, because everybody on the island will feel richer than before, and will be disposed to buy more freely. Meanwhile, merchants and bankers on the island will be more ready to extend credits than before, so that they will be able to buy more freely. What else can fall?’

The answer which I have given is I think substantially the same as that which is given by the reviewer of Professor Anderson’s book in the *Economist* (September 1); except that he does not lay emphasis on changes in the *velocity* of money, and of goods (above, p. 11 and note).

#### SECTION IV

PAGE 18. Mr. Pethwick Lawrence’s statement as to the relation of national borrowing to inflation occurs in his article on *War Economics* in the *Economic Journal* for 1915 (cp.

Sprague, *Economic Journal*, March 1917, p. 5, and the *Economist*, *passim*). Mr. Pethwick Lawrence's admission that private debt would have the same effect occurs in the discussion on Professor Nicholson's paper reported in the *Journal of the Royal Statistical Society* for July 1917, p. 501. Macculloch's cheerful anticipation of an increase of private borrowing is expressed in the *Edinburgh Review* for October 1823. Leroy Beaulieu expects that consequence, but with apprehension (*Science des Finances*, vol. ii, p. 288, ed. 7), referring to the proposal to pay off the indemnity after the Franco-German War by one huge impost.

PAGE 19. The views of Professor Seligman and of Professor Henry Adams as to the issue between loans and taxes are referred to in the *Economic Journal* for September 1917. See also the June number of that journal, p. 301.

PAGE 19. The doctrine of the older economists as to the nature of an internal public loan is disputed in my *Lecture on the Cost of War* (Oxford University Press, 1915). An important exception to the agreement of contemporary economists on this matter is made by the judgments which Mr. Henry Higgs has recently expressed in his *National Economy*. He takes Mr. Hartley Withers to task for saying with respect to 'loans raised at home' that 'the interest on them is raised from the taxpayers and paid back to the taxpayers, and the nation as a whole is none the poorer'. He dissents on similar grounds from the *Economist*, and likewise from the *Statist* when it says: 'The effect of the great debt the country was now creating would merely be to transfer spending power from the whole community to the people who subscribed the loans.' 'These arguments', Mr. Higgs objects, 'tacitly assume that if Government had not been compelled to make the expenditure which has driven it into the loan market, the home investor would have derived no profit from his capital.' It is certainly very natural to attribute this tacit assumption to the views in question, since they really were associated with that assumption when first presented by Melon and other paradoxical writers. And Mr. Higgs

is certainly right in denouncing that assumption and its practical consequences in the strongest terms. But perhaps he is hasty in attributing that assumption to writers who use expressions like those which he has quoted. I for one have accepted the similar expressions of Macaulay and the first Sir Robert Peel, upon the distinct understanding that they imply no *arrière-pensée* of the kind now in question (*Cost of War*, p. 12). 'If', I add, 'assent to old Sir Robert's dictum [that the public debt is from ourselves to ourselves and so forth] is taken to imply that there is no practical difference between a loan contracted for the purpose of manufacturing shells and a loan conducing to productive industry, by all means let us avoid the Charybdis of bottomless extravagance and incline rather to the not very monstrous Scylla of inexact conceptions' (*op. cit.*, p. 13). 'To minimize the diminution of capital', this I have described as the criterion for determining the proper balance between loans and taxes. My withers certainly are unwrung; and I think the same may be said of the Statist, and with a certain peculiar propriety of the Economist!

For further explanation of what is my own, and, I believe, the prevalent view, I may refer to Professor De Viti-De Marco's contribution to the Theory of Public Debt in his *Saggi di Economia e Finanza* (1898); especially ch. i, § 4, where he makes abstraction of the *natura dell' impiego*, the character of the business undertaken by the State, whether productive or not, and ch. iv, § 1, 'On the erroneous opinion that loans are the cause or the necessary pre-requisite of unproductive national expenditure.' I may also appeal to Professor Pantaleoni's *Imposta e debito* (*Giornale degli Economisti*, July 1891; reprinted in the author's *Scritti vari*). I have not followed the criticisms of these authors by Professor Griziotti in the lengthy articles which he has contributed to the *Giornale* of this year.

PAGE 20. Professor Seligman's views are further developed in a privately printed pamphlet which I have been privileged to see. Against his arguments and high authority are to be set Professor O. Sprague's advocacy of the *Conscription of*



*Income*, the plan of taxes only (in the *Economic Journal* for March 1917). He is at least right when he deprecates the illusion that by borrowing the burden of war costs is shifted from the present to future generations (*loc. cit.*, p. 8), and other misconceptions (p. 6) as to the nature of public loans. And he no doubt strengthens his case by the suggestion—similar to that which has been above cited from Professor Pigou—that in war time taxation on an onerous scale would not have its normal effect in checking production (*loc. cit.*, p. 9).

PAGE 20. Dietzel advocates the policy of loans only in his *Kriegssteuer oder Kriegsanleihe*, 1912. There is a certain similarity between his views and those of his namesake (? relative) who wrote in the 'fifties on *Staatsanleihen* (referred to by Bastable, *Public Finance*).

#### SECTION V.

PAGE 21. It may be just worth remarking that the quip about Wordsworth's office, which appeared in Byron's farcical piece *The Blues* (1823), was an anachronism in so far as the hat-tax was withdrawn—on account of its unproductiveness—by Percival in 1911, some time before Wordsworth was appointed Stamp-distributor.

PAGE 22. The purple passage about direct and indirect taxation occurs in Gladstone's Budget Speech of 1861.

PAGE 22. The various species into which the generic doctrine of sacrifice is divided are discussed by me in the *Economic Journal*, vol. vii (1897), pp. 550 *et seq.*, in the same journal, vol. x (1900), pp. 173 *et seq.*, and in the *Quarterly Journal of Economics* for May 1910, pp. 459 *et seq.*

My authority for attributing the doctrine of *like* sacrifice to Pierson is the treatise of Mr. Cohen Stuart, the leading authority on this branch of the subject. As his *Bijdrage tot . . . progressive Inkomstenbelasting* is not very accessible, the reader may like to be presented with a specimen showing the



significance of *like* or equi-proportional—as distinguished from *equal*—sacrifice. Suppose that there are two persons equally fond of music, but that music is the only recreation of the one while the other has a variety of tastes and enjoyments. Assume that the abstention from a particular concert would occasion the same amount of privation to each of these individuals. Then abstention from the concert involves an *equal* sacrifice to each, but not an *equi-proportional* sacrifice, since the pleasure forgone is a *smaller percentage* of the total amount of satisfaction [the subjective income so to speak] enjoyed by the man who has other enjoyments (*op. cit.*). I suppose that in carrying out this principle the legislature would presume that the man who had a larger income (with no claim for exemption) would have more enjoyments. It would not be necessary to obtain direct evidence, such as was forthcoming in the case of a certain Roman magnate of whom Gibbon records: 'twenty-two acknowledged concubines and a library of sixty-two thousand volumes attested the variety of his inclinations.' A variety of gratified inclinations being presumed, *like* sacrifice, points more decidedly to progression than *equal* sacrifice (Economic Journal, vol. vii (1897), p. 561 note).

PAGE 23. The passages quoted from Professor Pigou's *Economy and Finance of the War* occur at p. 32 and p. 81 of that work. The property of first principles to come to the front in unprecedented circumstances (cp. above, p. 3) is strikingly exhibited by Professor Pigou's recourse in war time to the principle of least sacrifice, which in ordinary times, where normal motives act, is apt to be in abeyance.

PAGE 24. The writings of Dr. Marshall, to which reference is made in this and the following section, are Presidential Address to Section F of the British Association, 1890, reprinted in the Journal of the Royal Statistical Society; *An export duty on Coal*, Economic Journal, vol. xi (1901), p. 266; *Taxation after the War*, one of the Essays in After-war Problems, 1917.

## SECTION VI.

PAGE 26. Professor Taussig's address, from which an extract is here quoted, is referred to in the *Economic Journal* for September 1917. In that context there are printed in full Professor J. B. Clark's observations about a League of Peace.

PAGE 27. In my *Lecture on the Relations of Political Economy to War* (published by the Clarendon Press, Oxford, 1915) it is sought to derive some suggestions for the promotion of international peace from a consideration of the methods which have been employed for the promotion of industrial peace.









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