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THE NATIONAL CAPITAL

AND OTHER STATISTICAL STUDIES

BY

SIR JOSIAH STAMP

G.C.B., G.B.E., F.B.A.

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PREFACE

IN this volume I have included my recent statistical studies and several earlier ones that for particular reasons have a continuing interest, and my chief purpose is to make them more accessible to other workers in the same field, at home and abroad. In most cases they are not reproduced as originally written, but the subjects have been brought down to date by inclusion of statistics for the latest years available, with a great deal of new descriptive matter; some of the "scaffolding" has been omitted, but can be found by the curious or critical in the pages of the *Journal of the Royal Statistical Society*. The opening chapter on the National Capital is quite new so far as the 1935 computations are concerned. In the second chapter the Profits Index has been revised and brought down to the present time by the addition of five years to the original tables, and by various comparisons with other indices. In the third, on National Income, more recent work has been incorporated, and in the sixth, on Alcohol, the considerable scientific work done since 1930 has necessitated much additional material. The fourth chapter on the Higher Incomes was so recently written as to require little addition. The fifth on Inheritance, and the seventh on a classification of profits (being the final chapter in the book by my brother, Dr. Dudley Stamp, on the Geography of the British Isles) are practically unchanged. From earlier work, two papers are included. The addendum to the first chapter has been reprinted from the *Economic Journal* by request, because it was the first solution or explanation of a long puzzling confusion between aggregate

wealth and aggregate *individual* wealth. The eighth chapter was a paper to the Royal Statistical Society in 1918 on "Trade Fluctuations and Profits," and is included here to make it more accessible, and for three particular reasons: first, it is the only record of its kind of pre-war profits, systematically examined; second, it is the first application in this country of correlation statistical methods to data in this field; and third, its record of coal profits assumed, immediately afterwards, unexpected practical significance and figured prominently in the work of two Royal Commissions, and is of historic importance because it forms the basis of the "division of the product" of that industry and the most prominent example of its kind, lasting to this day. The study is reproduced as originally given, with the appropriate supplementary matter. (My frequently quoted paper on "The Wealth and Income of the Chief Powers" and that on the statistical aspect of the Capital Levy were included in the volume: *Current Problems in Finance and Government*.)

I make due acknowledgment to the Royal Statistical Society, the Royal Economic Society, and Messrs. Longmans, for permission to make this use of the original contributions.

J. C. STAMP.

Septem^r 1937.

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I
THE NATIONAL CAPITAL

I

THE NATIONAL CAPITAL, 1928 AND 1935 ¹

No real attempt to deal with this question has been made in detail since the war, although the literature upon war wealth and the capital levy from 1918 to 1923 brought forth a number of rough estimates, directed rather to determining the amount that would be involved under schemes of taxation than to the more far-reaching question of the amount of wealth in a more absolute sense, either in these islands or belonging to these islanders. In my Newmarch Lectures of 1920 I set out the reasons why such an estimate was then well-nigh impossible, and even to-day those reasons have not lost all their force. For 1914 I was able to make the estimate, since generally accepted, of £14,300 million, with an extreme margin of doubt of about 13 per cent. But to-day the possibilities of accurate estimation are much more limited. In the first place, the conditions year by year have had nothing like the old or pre-war stability, in interest rates, and in general economic conditions. In the second place, the published income-data upon which to work are given in a much less detailed classification; and in the third, some of the problems of principle, introduced by the special weight of the public debt, and by the facts of rent restriction and housing subsidies, are well-nigh metaphysical in their subtlety and elusiveness.

The figures on which the National Income is estimated are definite for a particular period of time, whereas the National Capital requires not only such a definite time basis,

¹ Incorporating much of the Presidential Address to the Royal Statistical Society, November 1930. Vide *Journal of the Royal Statistical Society*, 1931.

but also an "outlook" for capitalisation of the figures of income. It is obvious that by the time the income figures have become available to us the capitalisation outlook existing during the period to which they actually related may have completely changed. Indeed there has been no point of time since the war when the outlook existing *at the period* over which any particular figures extended has not been completely falsified at the time of availability.

For several years after the war the income figures were seriously affected by the Excess Profits Duty payments, and by post-war inflation and the subsequent slump. The profits for the relatively normal year 1924 could not be dealt with in 1926 on the ideas of 1924, because in 1926 the changes due to the reintroduction of the gold standard and serious industrial troubles had altered the whole outlook. Now the future outlook existing in 1928 cannot easily be applied to the figures of 1928, because 1930 completely changed the rates of interest and other capitalising factors. In the same way the 1935 outlook has much developed in 1937. But at some point or other we must frankly make the attempt, even though the capitalising factors are out of date.

The elimination of Southern Ireland from the figures presents some statistical problems, especially for comparative purposes.

Before the war there was an exciting hunt for a large missing piece of National Capital, between the estimates arrived at by the direct or "Giffen" method and those given indirectly from the data upon estates, with a "Multiplier" computed by Sir Bernard Mallet and Mr. H. C. Strutt. This led to many refinements of the "Multiplier," and much discussion of the effect of *inter vivos* giving. I made some attempt in 1916, in *British Incomes*, to account for the difference, and later in the *Economic Journal*, 1918, in *The Capital Wealth in the Hands of Individuals*,¹ set forth the true reason why there must always be a difference between the two methods, because what they are really attempting to measure is not actually the same thing. So

¹ Partly reproduced in an addendum to this chapter.

long as businesses set aside considerable sums in secret or even in open reserves, an aggregate of the valuation of shares arrived at by Stock Exchange methods (the Estate and Multiplier method) will rarely be the same as a total valuation of the business as a whole, as a going concern (the direct or Giffen method). This factor of difference was given greater precision in the evidence before the War Wealth Taxation Committee in 1920. We are now in a position to consider what gap between them is a reasonable one, and the different totals can be brought into the area of reasonable mutual support rather than of incessant challenge and cynical mutual destruction. The arithmetical data for a new computation of the "Multiplier" with the latest death-rates in the different age groups and in different social classes are not available, though Messrs. Daniels and Campion have made computations for recent years. Moreover, the ground has been covered recently in Mr. J. C. Wedgwood's *Economics of Inheritance*.

Mr. Wedgwood's calculation of the "Multiplier" was 34 for 1924, but he raised it to 37 to allow for different death-rates in the upper and middle classes, and applying it to 1925-6 values reached a figure of £18,000 million (including an estimate of £1000 million for those under the Estate Duty limit). "This figure of course includes War Loan and excludes communal possessions, and is not comparable with estimates of the value of concrete capital possessed communally and individually by the inhabitants of Britain." The Estates passing in 1928-9 were £525 million against £456.3 million in 1925-6, so that Mr. Wedgwood's figure brought up to 1928, *pro rata*, would be £20,050 million with a lower limit, if his correction of the arithmetically ascertained multiplier is not justified by facts, of £18,500 million. These figures apply only to Great Britain and do *not* include Northern Ireland.

British Government securities account for 13½ per cent. of wealth passing, and therefore the elimination of this pseudo-wealth reduces the figures to £17,300 million (lower limit, £16,000 million).

In writing upon the National Capital in 1921 I set out

the following uses to which estimates of the National Wealth and Income could be put :

1. Tests of " progress " by way of comparisons between different years, to show the accumulation of capital ; tests of the distribution of wealth, according to the form or embodiment which wealth takes ; of the effects of changes in the rate of interest or in the value of money.

2. Tests of the relative " prosperity " or resources of different nations or communities, either as a whole or per head of the population, and in relation to their national debts.

3. Comparisons of income with capital and property.

4. Considerations of the distribution of wealth according to individual fortunes, and changes in that distribution.

5. Consideration of the applicability and yield of schemes of taxation, *e.g.* the capital levy.

6. Questions relating to war indemnities.

I then dealt with the different considerations arising on these different uses, and I may repeat the distinctions between the two chief definitions of National Wealth : " The wealth of a country may mean *either* the value of the objects found within its boundaries, *or* the wealth of the inhabitants, including their foreign possessions, and excluding wealth within the country held by people abroad. The confusion between these two ideas has played havoc with discussions on such subjects as the ' Taxable Capacity of Ireland.' It is the latter sense—the wealth of the inhabitants—that is mainly under consideration. That aspect is foremost when questions of taxation are prominent, but there are matters, such as the inalienable wealth of a country in a geographical sense (for warlike purposes) for which the former is important. A colony capitalised from the home country may be poor judged by the wealth of its inhabitants, but rich in its resources and the actual yield within its borders."

I then took up the estimate for 1914 given in *British Incomes and Property*, £14,319 million, $\pm$ £1867 m., and examined the reasons for differences between this and other

estimates that had been made for that year. And I referred to the re-examination in 1918 in the *Economic Journal* from quite a different angle, that of wealth available in the hands of individuals, in corroboration. I criticised adversely the rough estimates made by Mr. Crammond and Lord Arnold of £24,000 million for post-war wealth, made by pushing up an unsatisfactory pre-war estimate by the change in the price level, and then adding the whole war debt. My own conclusion for 1920-1 after giving all the defects in material and difficulties of principle then existing, when "values" were changing most rapidly, was as follows: "While I prefer to give no estimate of capital wealth at the present time, for the reasons stated, I should like to add that, in my judgment, it cannot exceed £19 to 20,000 million, and is probably much less.

"The aggregate of individual wealth has moved from £11,000 million in 1914 to about £15,000 million at June 1920. Of course these are merely expressed in money values—the increase in real or intrinsic values is certainly almost negligible."

The question of the inclusion of the National Debt, except as income in the hands of individual holders, has always been recognised as a difficult matter. With the magnitude of the debt to-day the difficulty has not become less, but the importance of facing it has become greater. Giffen thought the effect of capitalising the whole of Schedule "C" would be to reckon the debt "twice over":

The National Debt is a mortgage upon the aggregate fortune of the country. As we may assume it to be practically all held at home, we may reckon up our whole estate without deducting the debt, whereas we should have to deduct it if it were held by foreigners; but while we do not deduct the debt from the total of our estate, neither can we add it without falling into error.

At a later date he modified this view:

Of course, to each individual holding a portion of the National Debt, the holding is property. . . . On the whole the reason assigned is a good one. But I should not censure very much anyone who included the debt as a part of the capital of the community . . . the money expression of all the other capital

of the community is less than it would otherwise be by the amount of the debt . . . if there were no debt, lands, houses, etc. would exchange for rather more than they now do. The debt in this view represents a certain distribution of part of the capital of the country, and we do not get a complete view of the capital unless we include it.

It must necessarily become of importance when we compare our figures with those of other countries or with those of other periods for our own country, and different people have made different computations. In 1914 I followed the practice of deducting the debt from the value of national and local property. After having included the income in the hands of individuals, my comment on it in *British Incomes* was on the following lines: "If we raised money individually for war, by borrowing from persons with loanable resources, on the security of our possessions, the position would be that there would be an annual interest charge upon our incomes, *from which we should deduct tax*, and the recipients would have no 'income' to return for taxation. Thus the capitalisation of our property values would cover the capital of the lenders. If the capital lent had not been blown away in shot and shell, it would be represented by additional capital, goods, and permanent expenditure, which would come into the national valuation, but, as it has disappeared, no such additional capital appears. So if a nation's savings are accumulating at the rate of £300,000,000 per annum, and a war breaks out which is just financed by these savings for three years, the total valuation should remain constant for those years. It would remain constant by the method indicated. But in fact we do not pay this interest as such—we pay taxes—and to capitalise the interest received out of those taxes is to add to the national valuation where there is no real addition; *unless the value of all incomes* (or the number of years' purchase) *has, pro tanto, fallen*, the result will be too great. Giffen rather suggested as his view that such a depression in value exists. If our values were settled by a foreigner, with catallactic brain, seeking an income in Britain or elsewhere, the existence of this non-beneficial or onerous

charge would lower his estimation of possibilities here relatively to countries with no such burden, other things being equal ; but as most eligible competitors would have similar drawbacks the difficulty is minimised. However, values are mainly determined by internal competitive considerations, and although a differential burden upon ownership of capital with no burden upon earnings might alter their relative positions, the fact that *this burden* is fairly distributed on both classes with no possibility of shifting leaves the relative values unaltered. Values as a whole, however, might change relatively to the general price medium, gold ; but, even there, credit facilities have such a much larger bearing upon that issue that a depression could be easily offset by a more highly developed credit system. " Altogether it appears probable that any effect of a long-standing debt, like in character and amount to those generally found, would be, if existent, in the direction of depressed values, but certainly not *pro tanto* with the debt involved. It is therefore duplicating values almost to the entire extent to add Consols to the full fee simple value of national property." I went on to point out, however, that the National Debt was a mortgage upon earned income and upon unearned income, both being subject to tax for the payment of interest, and suggested that it might only be necessary to reduce the value of real property by the proportion of the debts secured thereon instead of by the whole debt. On the whole, I still adhere to the principles I then laid down.

But so long as the taxation raised from consumption, wages, salaries and non-capitalisable items leaves no margin over the expenditure which may be regarded as directly benefiting these sources rather than capital assets, then it is convenient to consider that the repayments of mortgage and even the interest thereon are charged upon capital assets. Viewed in another way, if repayments of debt are wholly covered by the yield from estate duties, then the theoretical " spread " over all classes of earning-power is of less importance.

When we are discussing National Income the difficulty is

not so great, because we can consider the volume of material goods as a "flow" during the year, and reflect that the debt charge merely alters its ownership and does not increase the quantity of goods. We can, therefore, as was done by Dr. Bowley and myself, express the total in two forms, one of which for certain calculations includes the individual incomes from interest and pensions, while the other excludes them. One American writer has, however, elected to consider that the debts and debt charges are wealth and income respectively in an absolute sense, inasmuch as they have created an "asset" of security due to the war, but my answer to this is that the security or asset created has no relation whatever to the duration of the war, and to its cost, and, moreover, that the security is reflected in an enhanced multiplier, that is, a general lower rate of interest applicable to all other incomes, which increases their capital value. To add in the cost of the war is, therefore, to duplicate the value, or make an excessive aggregate.

Now that we have expenditure on such a terrific scale to account for, we must ask seriously whether the general capitalisation process of British profits is not seriously affected by the existence of heavy taxation for the debt. If it is, then the capitalised value of our assets in general is lower than it would otherwise be; but I do not think that we can trace with any certainty that this is the fact by comparison with France, Germany and the United States. Obviously, however, the case can be reduced to an absurdity, for if the tax was even heavier, the profits prior to taxation could not be capitalisable on so high a figure as now. The sale of our assets to the independent foreigner would undoubtedly amortise the burden. This may, perhaps, show itself in the reluctance of a foreigner to buy an English investment bearing the heavy income tax, except that we disguise it under the grievance of double taxation. But inasmuch as this is a mere piecemeal consideration, and the purchaser of the whole of Great Britain does not, *de facto*, exist, the balance of convenience is not to try to quantify such an elusive factor; it means a

hypothetical increase in the rate of interest used for capitalising. The matter is perhaps seen a little more clearly in perspective if we consider the case of a town very heavily rating its property and using the money (a) to pay the interest on the cost of a communal building, or (b) to pay heavy doles with no tangible result. If we were, from outside, paying a sum of money for such a town, we should, at any rate, during the period while the interest and sinking fund were being raised through the rates, add in the value of the town property created and deduct the outstanding debt, and we should assume that the extent to which the values of property in general were depressed by the excessive rates charged was offset by the extent to which those *values were enhanced through the usefulness* to them of the buildings, etc. When, however, the whole debt was paid off and the rates reduced, the valuation of the new assets would remain the same, but the purchase price of the town would have increased. But this matter may be analysed further.

The Effect of Public Expenditure, and of Public Borrowings, upon Non-Public Values

1. If a man restricts consumption and saves £100, he may buy a piano, or put central heating in his house, or a bacon-cutting machine in his shop, or acquire a founder's share in a club. But instead of this, with his neighbours he may build a concert hall, or light the streets, or put up a public market and abattoir, or a municipal golf links or town hall. In the first group, the piano is a new wealth-entity, retaining its independent value because it is transportable to any market and not dependent for its preservation as wealth on having raised the value of the house in which it stands. But the concert hall depends, for keeping its own value, upon the same community owning it, and it has no transferable market value, but the amenity may add a little to the values of all the houses in the town, and, therefore, taking into the valuation its "object value" at cost, and also those added values or "influence" values,

gives too high a total result. The central heating adds, *pro tanto*, to the value of the house in which it is put ; it has no separate value whatever. Probably in the same way, all the houses are worth more to sell by reason of the street-lighting expenditure, and to count it separately is to duplicate values seriously. The bacon-cutting machine increases the selling value of the business, and it is probable that the public market for auction has some reflex influence on the businesses that can use it, possibly to the full extent. The private expenditure on a club-house retains its value as wealth almost entirely at the club, and influences the value of the residences very little. Similarly, the value of a town hall is unlikely to be fully reflected in the enhanced values of the general property, though a golf links may well be. One may consider that, if an estate is laid out with such amenities, the loss on the site value of land not utilised and the actual outlay may both be made good to the proprietors by the added property values. It will be seen, therefore, that property values and business values may reflect anything from a very slight proportion up to the whole of the communal investment cost, so that the addition of the actual cost of the asset itself tends to make gross aggregate values of private and public property, taken together, more than the absolute truth. The extent of their "influence values" depends upon time and custom. When communal expenditure represents not merely amenities, but positive necessities, which are much more cheaply supplied by common than by individual action, then the absence of such expenditure (drains, good road approaches) may *subtract* far more from general property and business values in the aggregate than the cost of them. There should be the greatest hesitation, therefore, in adding in to the total separately the cost or even scrap values of old-time and thoroughly assimilated communal necessities. The cost of a beautiful monument, or a finer town hall, is probably never reflected in other general values. But it is a lasting object of civic pride and pleasure and as much entitled to count in national wealth as a statuette in your hall. An object of art does not forfeit its right to count

in the total merely because it is in public ownership instead of private.

2. Let us now introduce the factor of borrowed money. The individual, instead of saving for himself, gets a loan from a distant relative. This makes no difference whatever to the object valued, or to its influence on other correlated values. Nor does it introduce any other items into the account. For the valuation is an objective one, and this loan really divides the ownership of the valuation between two people. Debts and loans as such are not separately valued. But if the money was borrowed from an uncle in Australia, then a British asset has come into existence without any British saving, and an item has to be added to the deduction for capital in Britain owned abroad, thus in effect cancelling the specific addition of the object value but not cancelling the influence values.

But if the town borrows money, the public loan created will figure in the assets of the individual lenders, in addition to any object value and any influence values, but under our method it should be deducted from the gross total as a communal debt, and thus give the same result as the above. When the individual borrower saves and pays his British creditor, no figures whatever in the valuation are changed unless the creditor creates a new asset with the repayment. Then the gross total rises. If he repays his Australian relative, no valuation of assets changes, but the gross total alters because of the reduced deduction. When the public borrower pays off, the gross total remains *exactly the same*, for some new asset comes in, and the loan holding disappears, but the net total rises because public debt is reduced.

3. The situation in (2) is modified slightly where repayment is made gradually over a period of years because the existence of the liability means compulsory saving through taxes and rates, which may, by psychology, depress "influence values" more than the influence of the object or asset raises them. In the case of very wise and tangible communal expenditure this is unlikely. Moreover, the additions to "influence values" represent a capitalisation

of effects for, say, eighteen or twenty years, whereas the liability to repayment, which is a subtraction from "influence values," is spread over perhaps forty.

But past expenditure on war may have hardly any plus "influence value" (that kind of security being different from police or legal security), and there is nothing objective in the assets. There is the loan asset (being the value of certain income in the hands of individuals, or forming part of profits), and this swells the gross total, but it is cancelled by the deduction in getting at the net. The whole debt, however, does not necessarily depress influence values by the full amount, for it might be paid annually wholly out of wages through a consumption tax.

4. The conclusion is that our method of dealing with communal expenditure tends to swell the gross totals unduly by an unknown amount, and our treatment of communal debt tends to reduce the relative net total unduly, but whether one influence completely offsets the other so that the *absolute net* is unduly high or low is quite indeterminate. But an absolute determination is not of great moment for most purposes. With a constant method, comparability is in no way affected by these doubtful points in method.

Sources of Material (vide Appendix I)

The first basis of the direct valuation is, of course, the income brought under assessment to Income Tax by the Inland Revenue Department, and I take the report for the year ending 31st March 1929, and the last published report for the year ended 31st March 1936. The assessments are those made in 1927-8 and 1934-5, and although they include some assessments made for previous years, assessments relating to these years are made for some years later, and, broadly speaking, the assessments made *in* a tax year tend to approximate to those *for* a tax year.

I am not overloading this chapter with the details of all the computations, or with minor considerations which have already been dealt with at length elsewhere. Moreover, the

treatment is broad, inasmuch as it is idle to burden it with meticulous points in certain parts, the exactness of which is lost in relation to the large approximations which alone are attainable in other parts of the field. Most of the space is given to considerations of principle which are introduced into the valuation procedure for the first time.

Real Property

For the houses assessed under Schedule A we have two sets of statistics divided for the three areas, (a) the annual values of 1927-8 and (b) the new property first assessed in 1928. The gross figures are first taken, reduced by the items of repairs and the reductions and discharges, and we reach net figures of £224 million for England and Wales, 19.1 for Scotland and N. Ireland. The multipliers used for getting the gross capital values are taken as the average number of years' purchase for freeholds in England (Table 16), 17.5 and 21.7 for copyholds in Scotland, applied to the net values, give us a total value of £4350 million, or with the new houses built in the year 1928, £4450 million.¹ The figures arrived at by using the gross figures (less overcharges) are materially less, though for technical reasons are to be preferred. Now these results are markedly low judged by any test of the comparative cost of houses before the war, and at the present time for middle-class property, so I deliberately choose the higher figure, especially since the multipliers are low according to tests by Building Society valuations. The gross total in 1914 was £232.6 million (to include the whole of Ireland), and the multiplier 17.4, so that the values have risen by about 60 per cent., but the combined multiplier for the net is reduced to just below 17. But the difference between gross and net for 1927 is much greater than before, owing to the very high cost of repairs as a proportion of annual value. Weekly property is largely subject to rent restriction, and with high rates of interest in 1927, the capital value to purchase

¹ These figures differ a little from those originally given through corrections I owe to Mr. D. Barber and Mr. H. Campion.

was kept very low. The very large houses sell at low rates and their liability to remain empty is considerable. Business premises are not materially advanced in amounts in the Schedule A assessment, but inasmuch as any residue of value merely goes to swell the profits under Schedule D, any loss of value here is made up elsewhere. The treatment of restrictions and subsidies is now doubtful. The economic effect of restriction was examined by me at some length a few years ago in *Current Problems in Finance and Government*, p. 114, and I concluded: "The restriction of rents is a transference of wealth, but it is in a measure a transference of wealth to the community as a whole at the expense of the landlord classes. The idea that the wage-earner is enjoying something that has been filched from the property owner must be considerably modified." The bearing of this upon capital values is that if the income from rents here restricted gives a restricted capital value, the unseen enhancement of other people's incomes elsewhere, when capitalised, tends to balance the deficiency. In so far as it is an enhancement of non-capitalised earned incomes, it of course fails to come out at other points in the wealth valuation; the purchasing power of the worker may indeed be increased thereby for other things, but this increase only takes the place of the purchasing power which the house-owner would have exercised, and there is no *net* addition to purchase of goods *other* than house service, and, therefore, no increased trade profits. The best way of putting it is that a large number of people have small unseen additions of beneficial occupation to their incomes that represent the difference in actual and potential rent which is visible immediately, when, on a change of tenancy, houses are decontrolled. These unseen items are not capitalised. The subsidies represent perhaps a contribution to cost which is not to be permanently reflected in capital values, although if the price of building had remained as high as when the majority of post-war houses were put up, the rents paid on subsidised houses would have been low enough to allow of a hidden beneficial occupation to the tenants in the same way. Meanwhile much of the public

debt remains which has allowed this condition to exist, and if it is treated as capital in the hands of lenders and deducted again as a communal debt, with no corresponding physical asset, we shall virtually have taken the line that the subsidy itself has added nothing to the national wealth.

On the whole, I am disposed to think that house property, including all buildings, except farm buildings and such buildings as railway property, should be put at a figure of £4650 million.

Coming now to land (which includes farm buildings and farm houses, tithe rent charges, woodlands and sporting rights), there is a gross total of £51 million, the figures for Great Britain having advanced upon 1913-14 by only about 12 per cent. This is reduced to approximately £45.5 m. for actual assessment and £38 m. after allowing for repairs. The multipliers are 17 and $21\frac{1}{2}$ respectively, but the margin between the freehold gross and net annual values to which these figures apply is different from the margin between gross and net for income tax, since it includes, besides repairs, tithe and all kinds of other charges. The application of 17 to the gross gives £773½ million, and the *net* multiplier, suitably modified for these different conditions, does not give a very divergent result. But it is doubtful whether this method brings out enough for the values of undeveloped sites, and I put the total accordingly at £950 m. $\pm$ 75. (The greater figure of 1914 is accounted for by the substantial agricultural land values of the Irish Free State then included, and by the much higher multiplier due to the lower general rates of interest. The astonishing variations in the number of years' purchase and the resultant capital values at different times in the past eighty years are commented upon in detail in *British Incomes*, p. 381, etc.)

The value of *farmers'* capital is discussed in *British Incomes*, and I have taken a conservative figure now in £450 m. $\pm$ 40, having regard to the 1928 level of prices. (*The Agricultural Output of England and Wales*, 1925, gave £815 m. for the land and £365 m. for the farmers' capital.)

Following a similar procedure for 1935, the gross assess-

ment for houses is £459.9 m., and deducting £97.9 m. for repairs, etc., and £56.8 m. for reductions and overcharges, the net figure is £305.1 m. Capitalised at 16.2 y.p. for England, and slightly higher for Scotland, this gives £5030 m. For 1928 I raised this product by £225 m. for the reasons given, and should now maintain most of this difference, making £5250 m. This result is consistent with the seven years' *additions* in new building. The statistics of the estimated total cost of house building for which plans were approved show a total of £350 million, and in *recent* years these have covered approximately half the total building undertaken in the country. Putting the total at £650 million, and adding for industrial building during a period of little activity, and then deducting for property destroyed, we can account consistently for the difference between the two valuations, assuming that property did not *greatly* change in capital values in the period. Mr. Colin Clark's estimate of capital outlay in housebuilding, 1928-34 inclusive, is £670 million.¹

Lands at £49.1 m. gross were £31.7 m. net, and at 21.7 years' purchase were valued at £687.7 m. on current rentals as then assessed. But the values in undeveloped sites, and also in the beneficial occupation in excess of actual assessed rents due to the new agricultural policy have both to be considered, and I am disposed to think the total must be rather more than in 1928, say £975 m. $\pm$ 75. Similarly, an addition of the order of 5 per cent. (which on balance is adequate) to farmers' capital would make £475 m. $\pm$ 50.

Trading Profits Assessed under Schedule D

It is at this point we meet with the largest single mass of the national wealth. Many of the old details are lacking, notably the division into Joint Stock Companies and private businesses, which greatly helped pre-war computations; but certain new features give some assistance. The chief figures are (in million £):

¹ *National Income and Outlay*, p. 193.

THE NATIONAL CAPITAL, 1928 AND 1935 19

	England.	Scotland.	N. Ireland.	Total.
Manufacturing Productions and Mining Industries .	425·43	43·28	4·06	472·77
Distribution, Transport and Communications (excluding Railways)	412·46	38·90	5·54	456·90
	837·89	82·18	9·60	929·67
Deduct Wear and Tear .	64·96	6·74	0·78	72·48
	772·93	75·44	8·82	857·19
Deduct for Retail and small businesses not run by limited companies . .	.	.	.	250
				607
Deduct also—proportion of over-charges	.	.	.	127
				127
Net sum to be capitalised	.	.	.	<u>£480 m.</u>

Before proceeding to deal with this by reference to Stock Exchange valuations, it will be well to look at its "share" composition. For this purpose I use the large sample published quarterly in the *Economist*, under the title "Industrial Profits," and that most closely approximating to the assessed profits in question is the total of the accounts published in the year to June 1928.

The sample has the following total capital :

Debenture . . .	£402·18 m. paying	5·1 %
Preference . . .	602·01 „ „	5·5 %
Ordinary . . .	998·72 „ „	10·5 %
	2002·91	

The total profits are divided :

Debenture Interest	£20·51 m.
Preference „	32·88 „
Ordinary „	104·64 „
To Reserve „	35·82 „
	£193·86 „

which equals 9·68 per cent. on the whole capital. If the sample of shipping and tramways is taken out, it is almost exactly 10 per cent. Nothing can be done with this as a

multiplier, however, since it refers entirely to the yield on normal and subscribed capital, and does not indicate the market value capitalisation.

The assessed profits will on this basis be divided thus :

Debenture Interest	.	.	.	.	£51 m.
Preference	„	.	.	.	81 „
Ordinary	„	.	.	.	259 „
To Reserve	„	.	.	.	89 „
					£480 „

But if we remember that the assessed profits do not include the annual value of all property and the income from outside securities which often represent the reserve funds, while both of these come into the sample profits, it is probable that the debenture interest would nearly be met by these two sources. If the total is better divided :

Preference	.	.	.	.	£91 m.
Ordinary	.	.	.	.	289 „
To Reserve	.	.	.	.	100 „
					£480 „

In order to determine the multiplier for this main group for commercial and industrial profits, I have taken Stock Exchange lists of quoted securities during 1928 and classified them according to yields under the main headings of debentures, cumulative preference and preferred shares, and ordinary shares, in a large and haphazard sample. I have also, for the purpose of closer inspection, divided them into those where the issue of stock is under a million pounds, and those where it is a million pounds or over. I have carried the sample sufficiently far to get reasonable statistical regularity, and the table below shows that in each case the mode of the larger class is a definite percentage yield below the mode of the smaller class, no doubt due to great negotiability of the larger stock, greater publicity, and probably also to more definitely known reserves and future potentialities of the large concerns. In each case the weighted average is not very different from the mode.

Debentures show a weighted average in the smaller class of just under 5.9 and in the larger class of 6. The cumulative preference shares yield in the smaller is 6.66 and in the larger 6.1, or, taken together, 6.56; in the ordinary stock, over 7 for the small and only 5.1 for the large, due to a disproportionate number in the lowest yielding stocks, and in these presumably future prospects were the main factor in price. The average for the ordinary shares over all is about 6.7 per cent.

Yield per Cent. on Price.	Debentures.		Cum. Preference and Pref Shares.		Ordinary Shares.		
	Under 1 m. £.	1 m. £ and over.	Under 1 m. £.	1 m. £ and over	Under 1 m. £.	1 m. £ and over.	Total.
Up to 4 . . .	—	—	4	1	17	12	29
Over 4 to 4 ¹⁰ . .	2	—	—	—	11	5	16
„ 4 ¹⁰ to 5 . . .	7	—	2	2	17	14	31
„ 5 to 5 ¹⁰ . . .	38	11	19	12	15	8	23
„ 5 ¹⁰ to 6 . . .	42	7	49	10	18	6	24
„ 6 to 6 ¹⁰ . . .	17	6	58	8	18	14	32
„ 6 ¹⁰ to 7 . . .	14	4	56	6	33	4	37
„ 7 to 7 ¹⁰ . . .	5	1	25	7	22	4	26
„ 7 ¹⁰ to 8 . . .	5	1	21	1	30	1	31
„ 8 to 8 ¹⁰ . . .	1	—	8	2	17	3	20
„ 8 ¹⁰ to 9 . . .	1	—	7	1	16	—	16
„ 9 to 9 ¹⁰ . . .	—	—	9	—	16	—	16
„ 9 ¹⁰ to 10 . . .	—	—	3	—	12	—	12
„ 10 to 10 ¹⁰ . . .	—	—	1	—	4	—	4
„ 10 ¹⁰ to 11 . . .	—	—	—	—	2	—	2
„ 11 to 11 ¹⁰ . . .	—	—	2	—	2	—	2
„ 11 ¹⁰ to 12 . . .	—	—	—	—	1	—	1
„ 12 to 12 ¹⁰ . . .	1	—	1	—	1	—	1
	133	30	265	50	252	71	323

Now it must be remembered that these multipliers cannot be applied simply to the aggregate profits as now divided, for two reasons. In the first place, as already indicated, the aggregate profits assessed under Schedule D exclude two of the most secure elements, viz. the business premises assessed under Schedule A and the business reserves invested in securities outside. These two items together will be very considerable and go far to meet the lowest yield classification of debenture interest, which is about one-fifth of the whole. The proportion of the assessed profits, therefore, to be dealt

with by the lowest multiplier is very small. In the second place, the assessed profits include the whole of the sums put to reserve in the year, and to these no multiplier at all can be attached, though they enter into the Stock Exchange values of the ordinary shares, and, of course, to some extent of the preference. As a result of these considerations we can either apply these multipliers direct to the appropriate portions of the assessed profits, or we can adjust the multiplier and make it appropriate to the whole of the assessed profits—two ways of doing the same thing. In the one case we make the following multiplications :

$$£91 \text{ m.} \times 15.3 \text{ y.p. and } £289 \text{ m.} \times 14.9 \text{ y.p.}$$

and in the other we adjust the total multiplier as follows :

$$11.88 \text{ y.p.}$$

They bring out the Stock Exchange value of these assessed profits to £5700 m. $\pm$ 225.

The next group is the Retail Distribution (part of the general item of £456.9 m.). This is taken at £250 m. as an estimate which I form on my old acquaintance with the existing proportions, and the net figure, after deducting a proportion of the overcharges, is £210 m. This I should divide as to individuals and firms £160 m., and as to companies £50 m. The £50 m. is capitalised on the same basis as the other businesses, say £600 m. The £160 m. is represented by an enormous number of people, probably upwards of half a million, with a very small amount of capital each, for the major part of each assessment represents personal earnings. The Giffen method was to capitalise at fifteen years' purchase one-fifth of the profits, and I should put the capital at about £350 m., making £950 m. $\pm$ 100 in all for this group.

Finance, Professions and other Profits.—£194.2 m. less £39 m. for reductions = £155 m., of which the proportion for professions is about one-fourth. Finance business should then be about £116 m., capitalised at £1400 m. $\pm$ 100, and the balance for professions, at between one year and a year and a half, since we do not capitalise purely personal

goodwill, = £50 m. This group, therefore, totals to £1450 m. and the total valuation of these three groups of profits, up to this point, is $5700 + 950 + 1450 = £8100 \text{ m.} \pm 425$.

Computations of Business Valuation for 1935

Applying the same principles to the data for 1935, we find the "Net sum to be capitalised" is £312 million (allowing £225 million for small business, and the proportion of overcharges at £120 million).

To get the number of years' purchase, a similar dissection of yields on certain prices at June 1935 has been taken, with the following result :

Yield per Cent. on Price.	Debentures.		Cum. Preference and Pref. Shares.		Ordinary Shares.		
	Under 1 m. £.	1 m. £ and over.	Under 1 m. £.	1 m. £ and over	Under 1 m. £.	1 m. £ and over.	All.
Up to 3 . . .	—	—	—	—	27	12	39
Over 3 to £3, 10s.	120	42	65	52	20	26	46
„ 3, 10s. to £4	—	—	—	—	53	50	103
„ 4 to £4, 10s.	135	19	151	33	77	37	114
„ 4, 10s. to £5	61	16	147	18	79	19	98
„ 5 to £5, 10s.	38	4	64	13	34	10	44
„ 5, 10s. to £6	16	6	59	9	34	9	43
„ 6 to £6, 10s.	14	2	20	8	21	2	23
„ 6, 10s. to £7	12	3	13	2	9	5	14
Above 7 . . .	21	6	37	1	33	5	38
Total . . .	417	98	556	136	387	175	562

It will be seen that the mode for debentures has moved from the £5, 10s. point to £4, 10s. ; for Preference capital from the £6, 10s. point to £4, 10s. ; for Ordinary Shares from about £6, 15s. to £4. The £312 million of assessed profit falls to be divided as follows :

Preference	71
Ordinary	176
To Reserve	65
	<u>£312 m.</u>

This gives £71 m. $\times$ 22 y.p. and £176 m. $\times$ 25 y.p. = £5962 m., say, £6000 $\pm$ 300. The Retail Distribution

figures of profits on similar lines to the 1927 computation is capitalised at £1295, say, £1300 m. $\pm$ 150. The Finance, Professions and other profits, £184 million gross, or £153 million net, also on the same lines, comes to £2300 m. $\pm$ £200 m.

The three groups come to £6000 + £1300 + £2300 = £9600 m. $\pm$ £650.

Unrevealed Values

Now although we have avoided Stock Exchange capital or dividends, and taken actual profits to be multiplied, we have not yet valued the businesses as going concerns, with full inside knowledge, but only according to Stock Exchange knowledge, and with that discounting of the portion of profit not paid out, compared with cash dividends, which goes on in the investor's mind.

In the old days this valuation of profits by Giffen and others proceeded simply by way of a multiplier for all profits without the process of referring it to the test of actual facts which is now incumbent upon us. I do not apologise, therefore, for this detailed variation of time-honoured method.

There is an official note upon this subject of "unrevealed value" in the Appendix to the Report from the Select Committee on Increase of Wealth (War), 1920, p. 255, Memo. No. 5, which deals with it very fully, and the only feature that has been modified since, in my judgment, is the greater extent to which the stock market prices have "picked up" the unrevealed value, owing to the rising public estimation of future capital appreciation, as against immediate cash dividends, under the pressure of high direct taxation, and of Stock Exchange operations as a high-class pastime. This was carried to such a pitch in New York from 1925 to 1929 that it is quite certain in many cases the public put a higher estimation upon share prospects than any purchasing management, taking the whole business and being responsible for earning dividends thereon, would have done, and therefore the margin between aggregate share values and the "going concern" values was all the

other way. In the three actual examples, given in the official note, the excess of assets over market capitalisation, in 1918, of £1,800,000 was £380,000, or 21 per cent. Now these were picked cases to illustrate a principle and not to point to a mode; they are for a year of great instability when the net valuation of assets would most certainly give too favourable a view of goodwill, and included many fixed assets at high purchase prices. I should, therefore, hesitate to put unrevealed value in 1928 at higher than $7\frac{1}{2}$ per cent. That it existed to a material extent I have no doubt whatever, for during the period since the war I have been personally involved in the acquisition or sale of some scores of businesses upon the basis of inside knowledge and accountancy, and have therefore a distinct impression of the order of magnitude of this factor.

Applying this conclusion and adding $7\frac{1}{2}$ per cent. to £7700 m., the total of £8100 m. for these profits becomes £8675 m. $\pm$ 635 for 1928. The next group is Railways in Great Britain and Northern Ireland, and this is capable of very close valuation at Stock Exchange prices (without regard to the immediate profits assessed to tax, £29.2 m., and with no regard to the much higher replacement costs, and the capital value of £1100 m.). I take the mean valuation of April 1927 and March 1928 and find it to be £860 m.

Interest on War Securities not taxed by deduction				
at the source	.	.	.	£96 m.
Interest under Schedule C	.	.	.	151 ..
Total				<u>£247 ..</u>

I have computed the capital value of this interest at the several market prices obtaining in 1927-8 for the different stocks shown in the official abstract, and reach a total of £4866 m. $\pm$ 40.

Dominion and Foreign Securities and possessions. Interest £83.9 m., similarly give a capital value on sample prices of £1290 m. $\pm$ 100. (The total of our foreign investments is of course quite different, much more being included under the main item of Profits.)

Loss and Evasion

It is at this point we should consider also (1) Businesses making continuous recent losses ; (2) Evasion.

(1) In *British Incomes* (chap. vi.) I dealt fully with the losses which were at that time not reflected in the average assessed profits, and the set-offs for them in the assessed profits which were not commercial profits. The net result was then that the gross assessments were 4 per cent. in excess of commercial profit, after taking the losing businesses into account. (There is also valuable official information as to the proportion of losses for post-war years, in the Colwyn Committee's report and Appendix.) Dr. Coates' official tables showed the *turnover* resulting in a loss (on the average of a good and a bad year), as 8 per cent. of the total. Now, if in capitalisation we deal only with the businesses making profits, we appear at first sight to ignore the tangible asset value of losing businesses, including land, buildings, investments, plant, debts, etc., which in the aggregate must be considerable. But in this connection we must remember (a) that the land, buildings and investments are already covered by our valuation elsewhere ; (b) that the Stock Exchange rate of valuation in the share market always allows for a risk of loss—for the rate of interest demanded tends to vary with the riskiness of the class of business—and that generally a great deal of actual specific loss is pooled, by insurance, throughout business (*vide* my Chapter on "Taxation, Risk-taking and the Price Level"¹ ; (c) our Stock Exchange multiplier is therefore lower than it would be if there were no losses in business, but this tends to be compensated by the fact that our aggregate of assessed profit is higher than it would be if we took account of all losses and deducted them first, before capitalisation. The compensation is, however, in my judgment not complete, and I believe that the rate of interest tends to be influenced downwards more by future prospects of profit in promising business than upwards by bygone experiences of losses, especially in staple industries. This is a mere psychological judgment. But I

¹ *Papers on Gold and the Price Level*, Chapter VIII.

am disposed to make a small net addition for the value of unassessed assets of declining or moribund businesses, not covered by the net effect of the two factors of capitalisation.

(2) So far as evasion is concerned, all the evidence (*e.g.* the Royal Commission on Income-Tax, 1920) has been that it became much worse after the war, but the administrative machine has been so much strengthened now to deal with it, that I doubt if it can possibly exceed 15 per cent. over the area in which it can reasonably exist. Now this area is much smaller than is generally supposed and lies mainly in the field where over-capitalisation is lowest. For the vast mass of profits assessed on large companies with audited accounts it can be ignored. It may be taken that the area of the capitalisation to which it applies is not more than one-fifth.

An allowance of 5 per cent. for both these factors is in my judgment ample.

In 1935 the circumstances surrounding unrevealed values were very different, the long depression had squeezed out many hidden reserves, and the market valuations were very full indeed. The addition under this head must be nominal only, say of the order of 2 per cent., bringing the £9600 million up to £9800 million $\pm$ 700.

The valuation of Railways for 1935, at the mean of April 1935 and March 1936, was £865 m.

The Interest on War Securities Deposit Interest, etc., not taxed by deduction at the source	0	£101 m.
Interest under Schedule C	.	162 „
Total	.	£263 „
reaches a capital value of	.	£8100 m. $\pm$ 380

The Dominion and Foreign Securities and Possessions £74 million gross, by a like method give £1400 m. $\pm$ 100.

Our valuation for this section of the national capital has now become, therefore :

	1928.	1935.
(a) General profits	£8,675 m. $\pm$ 635	£9,800 m. $\pm$ 700
(b) Railways	860 m. —	865 m. —
(c) Interest on War Securities, etc.	4,866 m. $\pm$ 40	8,100 m. $\pm$ 380
(d) Dominion and Foreign Securities	1,290 m. $\pm$ 100	1,400 m. $\pm$ 100
Special Allowance on (a) and (d)	475 m. $\pm$ 100	545 m. $\pm$ 100
	<u>£16,166 m. $\pm$ 875</u>	<u>£20,710 m. $\pm$ 1,280</u>

The Income of the Non-Income-tax-paying Classes derived from capital was taken in 1914 as a capital value of £200 m. $\pm$ 50. It must be remembered that in taking all the gross figures in the foregoing estimates we have covered most of the *forms* of investment and savings, and this item is a residual for such things as the stock of *very* small traders, tools, etc. I refer here to Chapter III of the *National Income*, 1924 (Bowley and Stamp), and to the fact that the numbers in this class, owing to the change in the value of money between 1914 and 1928, are much smaller, the effective exemption limit £150 for 1928 being represented by less than £100 then. An estimate of £100 m. capital is the best guess I can suggest, but at this point the national savings certificates should be included, making £475 m. in all for 1928. For 1935 I suggest £440 m., inasmuch as the effective exemption limit ruling the figures adopted is lowered from £135 to £100 from investment income.

Furniture, Motor-cars, Works of Art, etc. (movable property yielding no income). Vide *British Incomes*, p. 400. Estimates based on: (1) the former estimates, increased for population and price level, (2) a ratio to house values, (3) the estate duty valuations and (4) fire insurance, lead me to think the capital will lie between £1300 m. and £1700 m., and I take £1500 m. $\pm$ 200 for 1928 and £1650 m. $\pm$ 250 for 1935.

In the previous estimate there was an item, "Foreign investments not brought into charge." But the *legal* charge now covers income arising abroad but not remitted, and only the question of general evasion—of income-tax, not sur-tax—arises.

Government and Local Property.—This was put by Giffen at £400 m. for 1878 and £500 m. in 1888; by the *Economist* at £630 m. in 1909, and by Money at £450 m. *net* (after deducting the national debt and local loans) in a detailed survey. But both Giffen and Money made double entries when they included profit-making concerns (gasworks, waterworks, etc.) in public ownership. But in so far as some are valuable though not run for profit an estimate is desirable. In *British Incomes* I dealt with the road problem,

and showed that a large part of public expenditure serving specific properties must be taken as valued in the valuation of those properties. Such consideration as I have been up to the present able to give to this section leads me to a figure of £1200 m. $\pm$ 300 for 1928 and £1350 m. $\pm$ 300 for 1935.

Deductions from the Gross Capital Values.—(a) The capital value of profits and interest included in the foregoing but owned by persons abroad. This is estimated at £500 m. $\pm$ 150 (*vide the National Income, 1924, p. 46*). The recent manual by the Institute of International Affairs does not indicate that *on balance* there has been any material change, though the constituents have altered.

(b) Charges to be paid ultimately out of taxation upon the profits capitalised in the foregoing. The total national debt at March 1928 was £7631 m., including £1095 m. external debt, of which £952 m. is the total of the United States loans, which we regarded (as at March 1928) as equated by the reparation settlement with Germany. This makes a net £6679 m. The sums due to us from Dominions and Allies are £2066 m., including Russia £887 m., or net £1179 m. These are in relief of our debt £1179 m., leaving £5500 m.

For 1935 in this respect we have to be realists. The total national debt at March 1935 was £7385 m. as the nominal sum repayable, no credit being taken for the foreign war debts due to us. There arises the point that, having computed as part of the incomes of individuals many of the components of this debt at market values of the stocks and not at the sums borrowed or the sums ultimately repayable, the deduction of the aggregate debt should be a deduction of the same items computed on the same principle. On the other hand, the State cannot refloat its loans at market prices—they are dealings between individuals, and it could only do so by reborrowing from them. On the analogy of an individual debt, the creditor may value the debt up and down with the market value of its yield, or on the goodness and badness of the debtor's general credit position, but the debtor makes no such

changes in his liabilities, which remain at the actual sum to be repaid. I incline to the view that the best convenience is served by following the same course here. It simplifies, too, the problem of the external debt. For 1928, even in the light of 1930, we were able to regard the American debt as offset by the sums due from Russia, France, etc., and German reparations, and that indeed was our declared policy—the “Balfour note.” But to-day the truest realism is to treat the receipts as irrecoverable and the payments as “due” officially in full. I have therefore treated the American debt £897 m. as a deduction from National wealth in *priority* to the internal debt, although for other reasons it is at the moment the less active.

1928.

Summary of Detailed Estimates.		Statistical Approximation.	
	m. £	+	-
Real property—Buildings . . .	4,500	300	200
Land . . .	950	75	75
Farmers' Capital . . .	450	40	40
Profits and Interest . . .	16,170	875	875
Profits below Income-tax level .	475	50	50
Furniture and movable property	1,500	100	300
Government and local property	1,200	300	100
	25,245	1,740	1,640
Less belonging to people abroad	500	150	150
Gross wealth . . .	24,745	1,890	1,790
Deduct Debt charges . . .	6,570	200	200
Net wealth . . .	18,175	2,090	1,990
		say $\frac{2}{3}$ rds	
		± 1,350	

(c) Similar charges which are counted as individual wealth in the hands of the recipients above, but which have to be discharged out of local rates. The local debt was approximately £1070 m. This makes in all £6570 m. ± 200 m. for 1928. For 1935 the corresponding figures are £1480 m. and £8850 m. ± 200 m. There is room for discussion, with a nice balance of argument, whether these valuations should

not also be made on a present price basis, and not a face value basis, inasmuch as a large part has been included as wealth on the latter basis in the gross figures. There is also room for examination whether some of this is not held abroad, and included in the deduction already made, which would increase the net estimate. Or alternatively whether sufficient allowance has been made for total capital including war debt owned abroad.

1935.

Summary of Detailed Estimates.		Statistical Approximation.	
	m. £	+	-
Real property—Buildings	5,250	350	250
Land	975	75	75
Farmers' Capital	475	50	50
Profits and Interest	20,710	1,280	1,280
Profits below Income-tax level	440	100	100
Furniture and movable property	1,650	250	250
Government and local property	1,350	300	300
	30,850	2,405	2,305
Less belonging to people abroad	500	200	100
	30,350	2,605	2,405
Gross wealth			
Deduct Debt charges	8,850	200	200
Net Wealth	21,500	2,805	2,605
		say $\frac{2}{3}$ rds	
		± 1,800	

Accepting the fact that both concepts, gross and net, have their usefulness, which has claim to priority as our chief and general reference when we refer to National Wealth? A simple test will give the answer. If a man stints consumption and saves £1000 it finds its way into a new factory, building or other item in the inventory, and the result is that both gross and net are increased by £1000. If the State compels him to save by taking his £1000 as tax, and pays B, a war-loan holder, £1000 off his loan, then B has to invest it in some new asset, and the appropriate item in the inventory goes up £1000, but the Interest item goes down £1000, and the gross figure is *unmoved*.

But the debt charge is reduced £1000, and so the net wealth goes up £1000. Obviously then the net wealth is sensitive to *all* saving additions, and the gross is not.

Comparisons between 1928 and 1935.—We are driven inevitably to make comparisons between these two valuations, or else to explain why no comparison is possible. They are made for two years which respectively fall almost equidistant on either side of a phenomenal economic depression, treating that as reaching its worst point for the United Kingdom as late in 1931, when “going off the gold standard” was the turning point. But, of course, the way upwards is more gradual than the descent, and by the end of 1934, or during 1935, there was in no sense a recovery of profit-earning or income-making equal to the year 1928, which was itself still rising to 1929: Reference to the figures on page 61 will show that clearly. And yet it appears we had a greater capital wealth in 1935 than in 1928, while our income was smaller. The fall in income is much more than made good by the far-reaching changes in the capitalisation of income, which is sufficiently indicated by the 5 per cent. basis of Government stock, or twenty years’ purchase, in 1928 and the rate of 3 per cent. or less (being thirty-four years’ purchase) which prevailed during 1935–6. There is not, as we have seen, such a wide difference between the multiplier for other forms of wealth, and yet it is great enough, at many points of the valuation, to more than make good the decrease in income. Of course, in the case of the War Loan Conversion, the actual income is reduced without increasing the capital value, but the effect of the operation was to increase capital values all round for unchanged interest payments.

In many senses, therefore, we are certainly not “richer” by the increased valuation. We have merely changed our description of wealth. It is no new phenomenon—I long ago pointed out that stationary “Giffen” valuations over periods of time might mask real advances in well-being,¹ and equally that great increases in the valuation may mask real stagnation. Comparisons of national income over

¹ *British Incomes and Property*, p. 380.

periods of time are useless without consideration of *per capita* income, and even of *per capita* income without consideration of price levels and of unproductive debt-taxation. To these difficulties we add, for capital valuations, the problem of the rate of interest on which capitalisation is based.

It is obvious that the difference between these two valuations, £18,175 m. net and £21,500 m. net, has no direct bearing upon the actual capital saved out of income and added to the capital stock. If all other things were equal, price levels, and interest rates, they should be closely related, but the factors are so divergent that the savings are completely masked. The capital investment in seven years 1929 to 1935 has been computed by Mr. Colin Clark at £1146 millions, the additions in 1931-3 being negligible.¹

But although these valuations may not be directly comparable, each has a relation to tax burdens, to fixed debt, and to distribution, to the estates passing at death, which are relations that may be computed, and these computed relations then become the subject of comparisons which are far from being useless.

Comparison with Valuation by the Estate Multiplier.—In comparing these 1928 figures with any estimate arrived at by the multiplier, we have to deduct from the £24,745 m.—
(a) The evasion allowance and unrevealed values, say £1050 m.
(b) The capital value of charity and corporate properties not coming into the estate duties. The sum "caught" in the income-tax assessments is £38 m., and from this and the Corporation duty I imagine that the capital value not coming into estate duty would approach £1000 m. (c) The entry for Government and local property £1200 m. These total to £3250 m., and reduce the gross figure to £21,495 m. $\pm$ 1350, which includes Northern Ireland, approximately in the ratio 22,076 : 231, and thus the total for Great Britain is about £21,275 m., which falls to be compared with the rough figure of £20,050 m. given on page 5. A detailed examination of the possible reasons for this difference is beyond the limits of this chapter, but inadequate deduction for War Loan held abroad would be the most likely one for a part of it.

¹ *National Income and Outlay*, p. 185.

General Conclusions.—I have not attempted to check the estimate by the inventory method which is so useful in the United States, because the material with us covers so small a part of the whole field.

I think it may be conceded to me that I have not been lacking in boldness in making these attempts. But inasmuch as we have, up to the present, relied upon mere modifications and additions to my original structure of 1914, it may well be urged that, upon rebuilding being necessary, it is "up to me" first of all to attempt it. This initial effort is therefore on the broadest lines, and many of the details cry out for particular research. Further detailed information, criticism or suggestions may be forthcoming, but I have found in the process of going over first approximations for further refinements, that these tend to offset each other, and there is a curious stability about the large totals.

My purpose has been forward-looking rather than retrospective comparison. We may indeed try to allow for the change in price levels since 1914 and the offsetting change in interest, and then deduct 4 per cent. for the figures of the Irish Free State no longer included. It is possible to say broadly that the position for 1928 is not inconsistent with our having spent all our new savings for five years on war, having sold over a quarter of our original foreign investments, and having saved in the eight post-war years 1920-7 at the generally estimated rate of £475 m. per annum. [*E.g.* :

$$(\text{£}14,310 \text{ m.} - 600 - 1000) \times \frac{3\frac{1}{2}}{5} \times \frac{160}{100} + 475 \times 8 = \text{£}18,035 \text{ m.}]$$

It is, however, consistent with other possible components also.

But I am much more concerned to begin afresh with a technique suitable for comparisons in future years, and that is why I have given most of my space to the new questions which have arisen in dealing with this problem.

As there must always be a substantial difference between total national wealth and aggregate wealth in private hands, apart altogether from the debt question, I have given as an addendum to this chapter, extracts from the original article which first made this fact clear.

But I do not embark upon the changes in the proportions in which the total is divided. The whole question of distribution—with the most modern use of the “multiplier”—of the total wealth in private hands has been recently well treated by Professor Daniels and Mr. Campion in *The Distribution of the National Capital*, and is a separate branch of the subject altogether, the validity of the treatment depending in no way upon the accuracy of national aggregate computations, but much more upon the respective mortality rates of the different classes of the community.

APPENDIX I

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ADDENDUM ON NATIONAL CAPITAL IN PRIVATE HANDS

In the *Economic Journal* for September 1918, an article, entitled “An Estimate of the Capital Wealth of the United Kingdom in Private Hands,” set out for the first time certain important distinctions in wealth valuation. In order

to make it more widely available now, I have acceded to the suggestion that it be reprinted, and in what follows the temporary portions, such as those relating to the Capital Levy, have been omitted.

However useful "Giffen" and similar valuations may be for particular purposes, they are certainly not capable of use in every connection in which aggregated wealth is under discussion, or without regard to the conceptions of capital involved. It is the purpose here to ascertain whether any more suitable estimate can be substituted in the interests of relevant discussion and to set out the main outlines of an attempt to estimate the amount of wealth in private hands which would come within the scope of such a tax as it is generally presented.

The ordinary estimates cover three sections: (A) Wealth belonging to the community in a broad sense, and not subject to individual rights of ownership, *e.g.* Government and municipal property; (B) private wealth capable of absolute individual disposal, *e.g.* shares in companies; (C) wealth held legally in forms of corporate ownership, intermediate between (A) and (B) and not readily assignable in definite proportions to individuals. In the ordinary computation, the national debt is treated as positive wealth under (B), but as a deduction (or mortgage) from (A). Obviously, as the national wealth consists normally of the sum of (A), (B) and (C), it must be greater than the private wealth capable of individual taxation, consisting of (B) and a small part of (C) only, but this will no longer be the case when the national debt assumes gigantic proportions exceeding in amount the value of State and local property. In that event, (A) becomes a minus quantity, increasing *pari passu* with the increase in (B) due to this cause, if the whole debt is borrowed at home, and at an even greater rate if there are loans from abroad, while the deduction of the debt as a mortgage may even exceed the sum of (A) and (C). We should, therefore, now expect that the estimate of "wealth in private hands" will begin to exceed the estimates of "national wealth" in the ordinary sense.

There are two available methods of computation of national wealth which fairly cover the whole ground. The first is a capitalisation of profits and sources of income in (B) and (C) supplemented by estimates for (A) and for non-income-producing wealth, and this method is based upon income-tax data (the "Giffen") method). The second, based upon estate duty data, covers (B) supplemented by estimates for (A) and (C). The latter is closer in character to the figures we are seeking, for three reasons, viz.: (a) the capitalisation is already achieved in the data, (b) it represents *individual* wealth at first hand, and (c) it covers non-income-producing wealth; but it has the great drawback that the section of wealth "passing" in any given year is a fraction only of the whole, and the precise size of that fraction, or rather the "multiplier" which is required to bring it to unity, is still the subject of elaborate enquiry, and obviously governs the whole estimate based on these particulars. The reason for the wide difference between the results of the two methods has been a vexed question for some years.

It is possible to get at (B) from the income-tax data, by eliminating (C) from the total assessments and capitalising the balance which we may then term B_1 : but the income-tax system also furnishes an alternative opportunity for finding the aggregate incomes of individuals, on their personal statements, and an estimate based upon these may be called B_2 . Now B_2 is very much less than B_1 , but it is greater again than B_3 , the personal capital derived from estate duty data.

The complications introduced by war conditions are such that the only possible approach to the question is to ascertain, as nearly as may be, what the 1914 or pre-war valuation of wealth would have been for the purposes of the Levy as generally put forward, and then to modify the result for the changes since that date. The pre-war valuation will be an attempt to get the nearest result for the purpose from the estimates referred to as B_1 , B_2 , and B_3 , and then for additional security, and particularly for the sake of those who suspect that both methods give wholly inadequate results,

to apply any supplementary checks that may be available, even though they apply over only a part of the field.

I.—*The Pre-War Valuation*

The limitations of the Giffen valuation have been discussed elsewhere¹ and need not be set out here. It is for the major part a capitalisation of actual profits being made at any given moment on the average prospects of their continuance, and it includes nothing for marketable potential wealth which is not yielding a present income of money or satisfaction. By reason of the fact that it capitalises *profits* on their amount ascertained as far as possible at their "impersonal" source, it is necessarily greater than an aggregate of the capitalised *incomes* ascertained at their "personal" destination, *i.e.* the final user or consumer. It is a matter of importance to find some measure of this difference at the outset by reference to the *aggregate income* brought under review for income-tax, and the aggregate amount of the *total incomes of individuals* returned or returnable by them for that tax. The former is ascertained for the purposes of the normal charge, and the latter for the purposes of various reliefs from the full rigour of that charge, or for a super-tax on large incomes.

	Millions.
The aggregate income returned and chargeable to super-tax for incomes above £5000 for 1913-14 was	£180
Between £3000 and £5000 (see Report for 1914-15)	60
The aggregate incomes of individuals from £160 to £700 calculated upon the abatements, and allowing for those who failed to claim	280
The aggregate of the incomes between £700 and £3000 not found directly, but by the most generous interpolation (on a Pareto index continuing the £500 to £700 graduation up to £1000, and the £5000 to £3000 graduation down to that figure) would not exceed	240
Total of individual incomes above £160	<u>£760</u>

Now the total sum reviewed for the tax was £1167 million for approximately the same period, of which £138 million, for repairs, wear and tear, and other deductions, is not actual

¹ *British Incomes*, Chapter XI.

income, leaving a difference, over and above the £760 million, of £269 million to be accounted for.

It is partly made up as follows :

	Millions.
Belonging to people whose incomes are under £160 (and brought under review)	£61
Belonging to charities and other similar institutions and identified	15
Incomes of certain clubs, co-operative societies, certain municipal properties, Crown properties let to tenants, some insurance reserve funds ; income paid to foreigners, not exceeding ¹	45
Sums not allowed as deductions in arriving at profits, but incapable of ranking as individual income ²	30
	£151

We are thus left with £118 million unaccounted for, and a part of this sum represents profits of companies put to reserve for *other* purposes than equalisation of dividends, depreciation, bad debts, etc. If these profits "emerge" ultimately to individuals as bonus shares, they probably do so in a form which does not rank legally as individual "income." It is possible that in the immediate pre-war years the sums so reserved amounted to as much as £30 million per annum. The residuum is untraced. It must be remembered that "source-income" and "destination-income" are not mere alternative expressions for the same fund, and the difference is not solely that of *degree*, due to the human element (which may euphemistically be termed psychological), but is also a difference of *kind*, conditioned by formal distinctions and the legal conventions of taxation. The existence of so large a balance of this character forms an interesting feature to be pondered by all advocates of systems of perfect graduation which involve taxation on individual returns and the abandonment of taxation at the source. The point to be observed here is that the personal income in fact coming out upon individual statements is of the order of 73 per cent. of the total taxed income (£1029 million) and 86 per cent. of the income that might upon a reasonable view be made liable to individual taxation (£878 million).

¹ More fully discussed in *British Incomes*, p. 422 *et seq.*

² *Ibid.*, p. 203.

If these results were applied to the pre-war national capital, £14,300 million, we must first take out the capital which is not yielding taxable income (viz. : income of non-income-tax-paying classes derived from capital £200 million, movable property not yielding income £800 million, Government and local property net £400 million, and capital the income from which is subject to tax evasion, etc.), reducing it to £12,800 million, of which about 86 per cent. would have been *capable* of return upon individual statements of capital wealth. This leads to £12,000 million as the estimate B₁. But unless we can assume that the capital declarations would have been more exact or exhaustive than the corresponding income declarations, the actual aggregate returns for taxation would not *exceed* 80 per cent., or £10,250 million—the estimate B₂, after making a full allowance for the effect of reserves upon market values of shares. Adding to this the “non-income-tax” wealth, £1000 million, referred to above, we have £11,250 million in all as the amount of pre-war capital that would appear for taxation upon individuals in a Capital Levy.

The taxation of income proceeds upon a double principle : it taxes income, wherever arising, which accrues to residents in the United Kingdom, and *also* income arising in the United Kingdom which accrues to persons abroad. As generally presented, the proposals for the Capital Levy rest upon the former principle only, and it is not suggested that persons resident abroad shall be subjected to Levy upon their wealth physically situated in this country, or (as in the case of rubber plantations) physically situated abroad but under collective ownership here. The Capital Levy valuation differs from the full tax valuation in the following respects :

- (1) It does not include the wealth situated or controlled here but belonging to residents abroad.
- (2) As it is generally presented the Levy is to be graduated according to individual wealth, and therefore no attempt is made to reach any residuum of capital by taxation of companies “at the source.”

(If the Levy simply took a fraction or aliquot part of

all classes of capital, viz. ordinary, preference, debenture, and loan and reserves, from each company, and left each company to reduce the individual holdings, the problem of valuation would be simplified, and there would be no evasion, but, of course, graduation would be impeded and the State would have a mass of not very manageable assets with which to pay off State debt.)

The Giffen valuation capitalises the profits of the business, whereas the Levy valuation would, in effect, capitalise the dividend. In the case of two companies, each making £1000 profit, the Giffen valuation would be the same, say £10,000, but if one is distributing £800 as dividend and reserving £200, whereas the other distributes the whole £1000, the aggregate market value of the shares in the former will be sensibly less in normal circumstances than the latter. Although the existence of the reserve strengthens the market value, it does not do so to the extent of the full capital in the reserve, a bird in hand being worth two in the bush to the average investor.¹ For this reason the capital valuation of shares may be somewhat less than a valuation of profits. (If it were attempted in the "Levy" to supplement the graduated tax on individuals by a flat rate on the balance of capital in the hands of the company, it could not be placed upon the reserves without deranging the applicability of the market quotation of the shares to the Levy valuation. To get at the true residuum upon which to place the flat rate and avoid this difficulty, it would seem to be necessary to face the formidable task of aggregating the evaluations of different classes of shares and of subtracting the result from a capitalisation of the whole *profits* of the business, which in practice would yield some astonishing and anomalous results.)

- (3) The Giffen valuation ignores potential income, e.g. the building value of land now used for agriculture,

¹ *British Incomes*, p. 414.

ungotten minerals, etc. A substantial sum must be added for this purpose.

The capital returnable for estate duty does not differ materially from the usual conception of capital returnable for a Capital Levy, except that the value of real property abroad belonging to British residents would presumably fall to be included in the latter. The highest estimate of pre-war capital wealth in private hands which can be made by working upon the values of estates returned for probate is £10,776 million, or £10,900 million¹ including all small estates. (This represents B₃.) This is, of course, notoriously far short of the figure reached by capitalising the profits assessed to income-tax at the source, but it is more comparable with the £11,250 million which we reach by capitalising the income that is returned by individuals (B₂). To make a strict comparison and reduce the two aggregates to like elements we should add to the valuation by incomes the sums included in the estate valuation for all future sources of profit (building values and ungotten minerals) and deduct from the valuation by incomes all sums accruing to individuals upon real estate situated abroad. It is probable that the difference between the two valuations would not be greatly changed after this had been done.

[The remainder of the article dealt with the valuation in detail for a Levy as at March 1919, "in the neighbourhood of £16,000 million. But it cannot be made too clear that this has no reference to the aggregate national wealth as generally understood."]

¹ See "The Multiplier and Capital Wealth," *Journal of the Royal Statistical Society*, 15th July 1915.

II

A NEW INDEX-NUMBER OF PROFITS

II

A NEW INDEX-NUMBER OF PROFITS ¹

I. *The Economic Dynamic—Profits*

STATISTICAL examination of trade movements is the conventional basis of practical discussion of economic questions to-day, but analysis of the statistics of profits has not long been available. This is mainly due to the fact that a sequence of comparable profits is seldom obtainable, and if it is not a complete aggregate for an area or an industry, it is difficult to relate it to other economic data. Since 1918, when I wrote on the *Effect of Trade Fluctuations upon Profits*,² no attempt has been made to examine in detail the course and fluctuations of aggregate industrial profits, although the interval of time that has elapsed must prove to be one of the most interesting in economic history. For any relations between the level of prices and the level of employment, about which economic analysis is now so busy and so much involved, must find their existence through the medium of profit-making, either achieved or anticipated. Throughout the world, outside Russia, the profit-making incentive occupies the position of the mainspring of the economic machine. If individuals or a group find that they can associate a mass of accumulated capital or savings with a mass of human labour, manual and mental, and produce commodities or services which can be marketed at a figure that allows a margin above the rewards necessary to evoke the supply of the agents they bring together, then they will proceed, and employment results. If they can see no margin, and cannot, in prospect, cover their costs, no employment results. Even

¹ Based upon the Presidential Address to the Royal Statistical Society, 1932.

² *Vide* p. 243.

when they are once committed to a project, the profit-making test is still dominant, although it may be retarded in action, and unemployment may not ensue for some time. So the margin or surplus either brings the machine into being or determines the period of its operation. In a money economy where costs vary in their relative changeability, or their susceptibility to change, the effect of price change upon this margin is particularly far-reaching. The greater the proportion of the relatively unchangeable elements of wages, unemployment pay, taxes, interest on capital, to the total costs, the more important the effect of price changes upon the profit margin, and therefore upon employment. No amount of bureaucratic planning can in the long run overcome the necessity for producing such a surplus for a wide range of products taken together.

The economic theory and analysis resting upon this position is not the subject of the present discussion. The intention is to assemble the available material of recent times and to ascertain what, if anything, may be gleaned therefrom, in statistical form, concerning relationships with parallel conditions of price, employment, output, etc. The object is to attempt to construct an index of profits of the same order as the index of production, of foreign trade, and other indices progressive in time, but also comparable, after suitable elimination of trend, with the price index, the unemployment index, and similar measures of movement about a non-time norm.

2. *The Existing Data*

The only comparable and aggregated statistics of profits are the assessments under Schedule D of the Income-Tax. I would refer to my *British Incomes and Property* and Chapter VIII for a statement of their limitations as representations of actual commercial profits. The chief drawback in their use, as they stand, is that (1) they represent trading years ending at many different dates, and (2) they are thrown into three-year averages (up to 1927-8, when the law was altered to allow of assessments upon a single "preceding year" basis).

Both these facts tend to obscure the sharper variations which it is our object to analyse.

But we possess a standard sample record of the quarter to quarter, or year to year, course of industrial profits in the *Economist's* periodical statement.¹ The chief limitation of the figures as they stand is that the sample for a year with its successor is quite distinct from the sample which compares that successor with the year following. Each sample is the same as its successor for a very high percentage of its constituents, but there is enough different matter in each to destroy continuity, especially over a period. The number of concerns in a sample is now more than twice what it was originally. But there is no reason whatever to doubt the representative comparability of each *pair* of years, in their percentage relationship, and taken as a whole, they make a *chain* of perfectly comparable percentage links, and in recent years such a chain has been constructed. From this series an index may be constructed which expresses in a common term the whole series, showing not only the relation between any two adjacent years, but also between any separated years in the series.

Apart from the "period of identity" question, to which reference is made later, the chief doubt that arises about this series is its ability to give true aggregates over a wide stretch of time. For each pair of linked years is a static sample, and there is theoretically no room for the effect of an increasing *number* of businesses in the aggregate unless all sample businesses are growing in size to an extent equal to the aggregate. If there are 5 per cent. of new businesses every year, this would not come out in the series except quite accidentally, and the effect of "unrevealed growth" would not show itself. How serious is this limitation? The income-tax totals may not be so perfect as annual links, but they are perfect as a time "stretch," and the chain method may be tested by the conformity of its aggregate "stretch" with the assessment totals.

First of all, however, the assessments of averages have to

¹ A complete statement for the period 1909 to 1931 inclusive may be found in the *Journal of the Royal Statistical Society*, 1932.

be resolved into their constituent years. This can be done by the use of large samples of assessment—a method I employed in giving the ratio for 1912, 1913 and 1914 in *Taxation during the War* (p. 151); for 1921, 1922 and 1923 in *The National Income*, 1924, and for the years 1903 to 1914 in the computations in Chapter VIII. A series for twenty-seven years which satisfies the test of the aggregate at the two ends and the demands of these samples has been constructed.

3. *The Range of Fluctuation—in Theory*

(1) It is important to note that the *Economist* samples since 1911 show the changes in profits *after* charging debenture interest, but including rents, etc., while the taxed profits show the profits *before* charging debenture interest but *after* deducting rents. On the whole the taxed profits are the more inclusive, and should in theory move upwards and downwards more sluggishly, for the item of debenture interest paid (less rents and rental values) represents a relatively stable constant, and the aggregate which includes it should fluctuate with less amplitude. (2) Moreover, the taxation assessment series contains an immense mass of smaller assessments on retail businesses, etc., which do not in fact vary much year by year, and this must reduce the range or violence of variation compared with a series which excludes them almost entirely.

(3) But acting in the opposite direction is the fact that the published results of large public concerns in the *Economist* series have undergone an inevitable smoothing process before they are actually published. There is a fairly general practice of minimising results in good years and maximising them in bad years, through stock, debt, and security valuations and other secret reserves (and releases from reserves), which affects the published results but does not survive the scrutiny of the Revenue for taxation, so that the assessments, *ceteris paribus*, should fluctuate *more* widely than the published results.

It is impossible to state, on theoretical or *a priori* grounds,

what on balance the net effect of these three factors would be in the comparison of the two series.

The order of magnitude of the first may be judged by the fact that, in the quarter in which the *Economist* gives the most violent decline in net profits, 53.9 per cent., the addition of the debenture interest to the sample would have made the fluctuation 44.1 per cent., but the deduction of the annual property values would have restored a good part of the difference and made the result probably 47 or 48 per cent. The comparison for a quarter in which the decline in the sample was less marked, viz. 10.6 per cent., gives a figure of 9.5 per cent., or 10.0 per cent. if the net position of the tax assessment is in view.

The second factor of small assessments represents a deduction from the tax assessment totals of something of the order of $12\frac{1}{2}$ per cent. Thus a fall of 10 per cent. on the tax totals would be consistent with 11.43 per cent. on the samples.

The order of magnitude of the third factor or smoothing element in published accounts is quite indeterminate. On balance it may well offset the other two.

4. *The Identity of Period*

In any known samples of accounts, the business year ends at many different dates, and in the *Economist* series these terminal dates are spread throughout the year.

The sample taken for the last quarter of a given year covers examples with terminal dates stretching from December of the previous year to November of that year, over a third relating to June, and just under a third to September. The weighted average terminal date is 8th August. The sample for the third quarter stretches from the prior December (one-fifth of the whole) to August, the accounts ending in March accounting for one-third and in June for nearly one-third. The average terminal date is 17th April. The second quarter of the year covers reports running from the prior September to May, 60 per cent. ending in December, and 27 per cent. in March, and the average terminal date is

4th February. The first quarter of the year covers cases from the previous June to February, and 68 per cent. end at 31st December, the terminal date being 19th December.

Thus the weighted average terminal date for the whole year 1931 samples is about 6th or 7th March 1931, which in itself is not a good "fit" for the calendar year 1930, with which most comparisons have to be made, and which is strictly fitted in other classes of statistics. Moreover, when we consider the *range* of dispersion, it is even less satisfactory, for only 41 per cent. of the total number of cases end at 31st December, 13 per cent. end in the subsequent June, and 7 per cent. as late as September, while an appreciable number end in the *prior* September or earlier. Now the months prior to 31st December will not, in their final effect, properly balance even an equivalent number of months after December, if the *rate of change of profits is not uniform*. Our next step, therefore, is to regroup the quarters, to get a succession of years ending on 30th September, by putting the fourth quarter of the calendar year forward. This grouping has a mean terminal date, 25th December, and is, therefore, the nearest approximation to the calendar year that any *complete* grouping of the *Economist* samples can give. But the dispersion is still a wide one, with a heavy sub-modal class ending in the earlier June, partly balanced by another in the succeeding June.

It is possible to get a sample in which the calendar year is really predominant, and the dispersion in balancing sub-modal classes less important. But it means a definite sacrifice in the size of the sample, though none, so far as I can see, in its representative character. If we confine ourselves to the reports published in the first two quarters of the year, the sample is 60 per cent. of the whole, but the proportions of actual calendar year cases rises from 41 per cent. to 63 per cent., and the number falling between 30th November and 31st January raises it to 72 per cent., while the proportion which falls outside the limit ± 3 months, is less than 5 per cent. The average terminal date is 14th January after the calendar year in question.

A comparison of the percentage changes exhibited, as in a continuous series, by these two groupings is given on page 67.

It is unfortunate that no comparison can be made for the stretch of years 1915 to 1922 owing to the extraordinary incidence of the Excess Profits Duty. The figures in brackets in the first column of Table I indicate the index of *gross* profits

TABLE I

Calendar Year.	Taxed Profits (including Debenture Interest).	Economist Profits (excluding Debenture Interest).		
		First Grouping.	Second Grouping.	Third Grouping.
1911	100	100	100	100
2	110.0	115.4	114.8	114.8
3	114.6	116.4	119.6	120.8
4	103.6 (106.5)	112.7	114.3	114.6
5	119.6 (144.1)	144.9	141.6	140.2
6	147.2 (199)	159.4	158.3	156.9
7	156.7 (225.5)	162.0	162.3	151.6
8	172.8 (247)	168.0	166.3	156.6
9	230.6 (279.4)	222.7	215.0	206.1
1920	208.3 (236.2)	178.0	204.2	200.7
1	140.5 (149)	126.4	121.7	122.2
2	185.4 (191)	165.0	156.1	160.3
3	191.0 (198)	175.9	165.6	169.0
4	195.7 (199)	191.2	182.3	186.2
5	196.3	203.3	194.9	201.1
6	183.2	197.2	190.6	191.7
7	199.6	211.4	203.5	207.0
8	197.7	211.4	204.3	207.6
9	—	210.1	210.8	219.0
1930	—	162.8	172.8	185.5
1	—	—	—	151.0

before the duty was deducted in *respect* of each particular year. But the actual provision for the duty was made by businesses at later dates, differing in the particular cases. Thus, in 1915, when the assessed profit index, *after* deducting the duty attributable to the year, rose only to 119.6, the profit sample index rose to 140.2. As a fact, duty for 1915

was not assessed, or provided for by businesses, until late in 1916 or even in 1917, owing to the nature and date of the legislation, and the assessed profit index, without such provision, registers 144.1 and compares closely with the sample. After that date the business profits were making provision for the earlier years, whereas the assessed profit index in Col. 1 is allowing in each year for the duty assignable to each year. It is important to note that over the period 1915 to 1923, during which this situation worked itself out, the two indexes aggregate to 1552 and 1463 respectively, a difference of 6 per cent. only.

The chief value of the series of the assessed profit index carried back to the year 1911 is to test the "stretch" of the chain index against two comparable absolutes over a long period, as some evidence of the validity of the chain index in the long run. It will be seen that by the year 1928 they had come within 4 per cent. of the same point.

5. *Smoothing by Grouping*

We are now in a position to examine the alleged smoothing effect of a greater diffusion of terminal dates in the different series, or, to put it in another way, the smoothing effect of the wider standard deviation.

From 1911 down to 1919 the first grouping (the ordinary *Economist* annual grouping, with its mean terminal date of 6th March in the year) has an aggregate of first differences 113.5, the second grouping (a full year's reports to 30th September, with mean terminal date 25th December and a wide dispersion) is 116.7, and the third group (with its terminal at 14th January and closer dispersion) 129.1. These aggregates are adjusted to cover an identical stretch, and they represent the degree of fluctuation between two terminal points, 100 and 206.1. They bear out the point made as to the smoothing effect of dispersion in dates.

Taking the years *from* 1920, the following table of differences is worth studying :

Year.	First Grouping.	Second Grouping.	Third Grouping.
1921	-51.6	-82.5	-78.5
2	38.6	34.4	38.1
3	10.9	9.5	8.7
4	15.3	16.7	17.2
5	12.1	12.6	14.9
6	- 6.1	- 4.3	- 9.4
7	14.2	12.9	15.3
8	0	0.8	0.6
9	- 1.3	6.5	11.4
	91.1 -59.0 32.1 net	93.4 -86.8 6.6 net	106.2 -87.9 18.3 net
	150.1 aggregate -32.1 rise*	180.2 aggregate - 6.6 rise	194.1 aggregate -18.3 rise
	118.0 net	173.6 net	175.8 net

* The net rise is deducted, so that the differences cover an identical stretch.

It is true that, with the fewness of years of reverse fluctuations, these tests are not very important, but such as they are, they are in direct support of the view that the third grouping I have chosen gives a sharper and clearer result for the calendar year.

At times when there is a "turn in the tide," the quarterly figures are well worth examination, for, if there is a peak or trough culminating in mid-year, results taken on either side of the point of change will exhibit sharper results than those of the calendar year, which cuts off the apex or throws a plank across the ditch, so to speak.

Let us take May 1920, the turn of the price level, or "break," and beginning of the depression. The 1921 first quarter's reports, ending, say, in the autumn of 1920 with a preponderance of "pre-break" profits, showed an increase of 3.5 per cent. compared with 27.1 increase in the previous quarter's reports. The second quarter, with a slight majority of months post-break, began the declines with 8.4 per cent. The third quarter, with nearly all its months of account in the post-break period, was minus 42.4 per cent., while the

fourth quarter, with its mean terminal date in August, was wholly " post-break " and gave 52.9 per cent. decline. These results are cloaked by the calendar year figures, but the third grouping gives a much closer rendering from 1919 to 1920, because the first group stretches actually so far into 1921 in giving its 1920 results.

Now look at April 1925, when the gold standard was restored and special deflation resulted. The first grouping, by stretching the calendar year's samples further forward to the point of change, takes the index higher, and the year's accounts in two second quarters that are half clear of the break showed an increase of 3.2 against the preceding increase of 8.0 per cent., and the two next quarters gave falls of 4.8 per cent. In 1931 we went off the gold standard in September. The fourth quarter's reports with their terminal date in August, prior to that date, had the maximum fall of 53.9 per cent., while the next quarter with its mean terminal date after September was 14.3 only.

6. *Is the Sample Representative ?*

(1) It would appear probable that in its separate sections the sample must be quite unrepresentative, for the numbers in the groups are small, and they tend to take only the largest cases. Nevertheless, the *amount* of profits in the sections is sometimes so considerable a part of the whole that the effect of bringing in a mass of small cases could not be very important unless their trend runs quite counter to the large ones. Where an industry is to a considerable extent in private hands, or in small units, the published results of large companies may be wide of the general average. Thus coal-mining is about 60 per cent. under companies in numbers, but about 95 per cent. in profits. Cotton and wool are predominantly company-held, and so are iron and steel. But building, timber and printing are predominantly under private management. If the large concerns here sampled tend to be those with greatest fluctuations, or if the most fluctuating industries tend to be over-represented in the sample, then the sample as a whole will

be unrepresentative. I have some acquaintance with the relative proportions of the profits of different industries in their aggregated tax assessment, and the proportion in the *Economist* sample can be obtained from the summaries. From this I should say that the groups substantially over-represented in the sample are Breweries, Oil, Tea and Textiles, while Hotels and Iron, Coal and Steel, are under-sampled, most of the other groups being roughly of a reasonable order. I find it difficult to conclude that the more fluctuating industries are unduly sampled, but undoubtedly the large concerns are predominant. But there is no evidence that it is an unfair sample of *large* concerns as such, and the value of the large concerns in the mass of profit is so great that the non-sampling of the small ones at all is of less moment than might appear. It would be quite another matter, however, if instead of the average *aggregate* percentage change we were seeking the modal change of all businesses.

(2) The second possible reason for defect in the sample for *comparison with home conditions* in production, etc., is the inclusion of purely foreign profits (*e.g.* Oil, Tea, Rubber), if those profits fluctuate more widely than home profits. Examination of the record for Rubber and Tea shows clearly that their fluctuations are enormously greater than the general run, while the Oil sample shows an aggregate of percentage differences (since 1914) about half as much again as the big miscellaneous group. However, the assumption that the inclusion of tea, oil and rubber profits on such a scale in the sample *must* make its fluctuations greater than they would otherwise be breaks down completely on examination for the eleven years 1920–30. Taking the annual summaries to June, and deducting these three classes from the totals, I constructed an index number for the net totals. Pivoting both samples at 100 in 1924, the full sample begins at 122.2 in 1920 against 123.6 for the net sample, and ends at 100.8 against 103.5. The average deviation in both series is 12, and the coefficient of dispersion 11.9 for both. At the same time, the examination revealed an important influence in 1926 when the net sample rose much less than the full

sample and 1928 when it rises much more (and compensates). This has some bearing on the divergence between the assessment series and the sample series in 1926. (It is not possible to make an elimination of all actual foreign profits.)

(3) *Is the sample large enough?* In the number of businesses it is very small, say, 0.5 per cent. (excluding retail businesses), but in the aggregate of profits, 200 millions, it is about 20 per cent.

(4) *The Times Trade Engineering Supplement* (4th May 1932) gave a sample of 108 concerns in twelve groups running consistently from 1922–31, and, for the purposes of comparison with the other indices (production, prices, etc.), employed an index “based on unweighted arithmetical averages of the earnings ratios for each year of the twelve groups.” The figures are not given, but they appear to be approximately as follows: 1922, 85; 1923, 90.5; 1924, 100; 1925, 97; 1926, 88; 1927, 93; 1928, 90; 1929, 93; 1930, 81; 1931, 50. The absence of weighting gives special prominence to motor accessories and cycles, and the series is not in any way comparable with those given above.

(5) After my earlier work upon this subject, the *Economist* gave some new results of its own samples. It gave the “defects” of its series of tables for a continuous series as follows¹:

- (1) The lumping together of home and foreign concerns.
- (2) The deduction of debenture interest.
- (3) Variation in the deductions for income-tax in “declaring” profits.
- (4) The various terminal dates of accounts.
- (5) The lag in the accounts for holding companies.
- (6) The influence, in times of violent fluctuations, of the different quarters in which important companies may publish their accounts.
- (7) The disproportionate size of the miscellaneous group.

My comment upon these is: (1) is not a drawback for all purposes—only when a direct comparison with home production is desired; (2) is a distinct advantage when measur-

¹ April 30, May 7, 1932.

ing the impetus for the entrepreneur ; (4) has been reduced to a minimum in my method ; (5) and (6) are reduced to a minimum, since 31st December is dominant in the samples of 1st and 2nd quarters ; (7) is not a disadvantage in an aggregate index.

The *Economist* then made a picked sample of 700 companies, as from 1924, eliminating trusts and financial companies, holding companies, certain rubber companies, and *added back* debenture interest. The results for manufacturing and mining were :

	1924.	1927.	1928.	1929.	1930.	1931.
Net profits . . .	100	109	101	109	91	73
Volume of production	100	106.8	105.5	111.8	103.3	93.7
Profits per unit . .	100	97.5	96	97.5	88	78

The figures for the group " Transport, Distribution and Services " were :

1924.	1925.	1926.	1927.	1928.	1929.	1930.	1931.
100	105	100	110	115	120	109	86

and companies operating overseas :

100	110	107	103	101	95	67

The *Economist* did not attempt to combine them in a general total because of the difficulty of weighting. A straight average of the three would give :

1924.	1925.	1926.	1927.	1928.	1929.	1930.
100	102.3	96.3	105.6	105.6	108	89

This series, so far as it goes, shows some resemblance to the aggregate tax results.

7. *The Essentials of an Index*

We have at this stage to ask ourselves what we really seek most in a profits index, and it may be well to summarise the elements in the assessed profit series which would tend to make it the more inert of the two :

- (1) The inclusion of debenture and other interest.
- (2) The large mass of conventional assessments which

change little from year to year—from $12\frac{1}{2}$ to 20 per cent. of the whole.

- (3) Included in (2) partly, the fact that retail business generally has avoided the main vicissitudes of profits felt by industry.
- (4) The regular and conventional treatment of depreciation.
- (5) The entire omission of many losses.
- (6) The smoothing effect of a spread of terminal dates over the whole year.
- (7) The lesser proportion of the highly fluctuating trades in the total.

To set against this we have the elimination of some of the equalising devices adopted in commercial accountancy, which may be of great importance. The *Economist* sample, moreover, suffers from a certain double counting, from which the assessments are free, and which may reduce its fluctuations somewhat. The full profits of both A and B are included, although B may derive dividends from A. Suppose that A rises from £100,000 to £130,000, and B from £100,000 to £120,000, the sample registers a rise of £50,000, or 25 per cent. But if B drew a dividend from A of £35,000 (which was increased only to £40,000) the combined net incomes for assessment purposes would rise from £165,000 to £210,000, or over 27 per cent. (If the dividend was unchanged the rise would be over 30 per cent.) Inasmuch as the debenture interest, preference and even ordinary dividends tend to move more sluggishly than profits, their inclusion, as profits, by duplication must have a perceptibly slowing-down effect upon the sample.

8. *The Effect of Losses in the Aggregate Figures*

The *Economist* sample contains a good number of cases in which losses appear, and these affect the aggregate ratios to the full extent. But the assessments, even under the average system, did not reflect losses to the full extent in the aggre-

gate, as a minus average was not recorded. Under the present single-year basis this tends to make the aggregates move more slowly, for in the years when losses are heavy, the aggregate is too high and does not register the full extent of depression, while, inasmuch as losses can be carried forward for deduction from later profits, when better times come the aggregates must be weighted downwards and do not show the full current profits. It is obvious that in bad times much more is below the line, and much less above, so that the unrecorded losses bear a much bigger proportion to the recorded profits than in good times, and it is not simply a question of regarding undeducted losses as a constant proportion, not affecting the rate of variation.

The order of magnitude of the difference that this may make can be seen from an examination of the profits of Corporations in the United States (*vide* Appendix B). They are reduced to indexes in the following table.

TABLE II

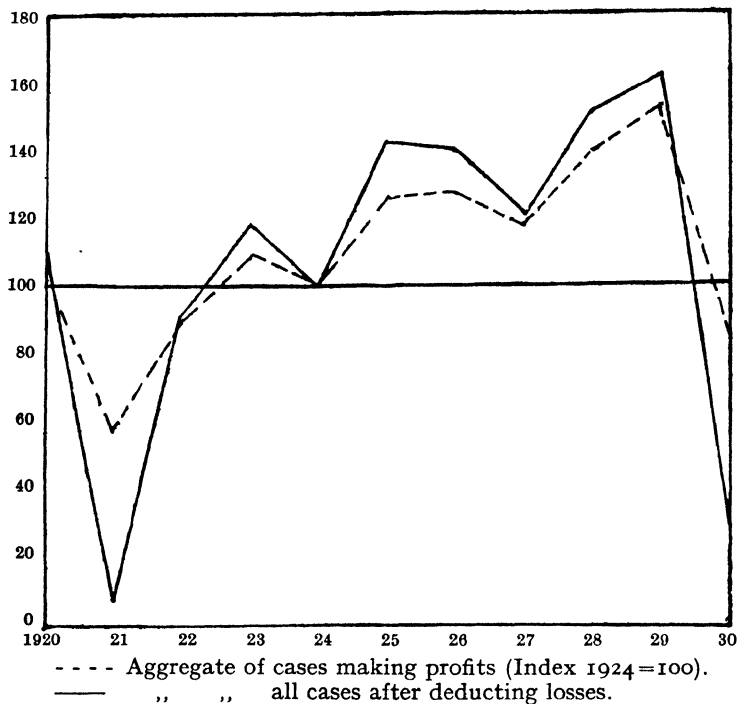
Index (1924 = 100) for profits of United States Corporations

Year.	Cases making Profits.	Cases making Losses.	All Cases—Net Profits.
1920 . . .	104.3	91.2	109.5
1 . . .	57.2	174.4	8.5
2 . . .	91.8	98.7	89.0
3 . . .	109.8	90.6	117.6
4 . . .	100	100	100
5 . . .	126.5	88.3	143.0
6 . . .	127.6	97.6	139.9
7 . . .	118.3	111.2	121.4
8 . . .	140.0	107.6	153.4
9 . . .	153.8	131.0	162.6
1930 . . .	84.4	213.0	30.6
Average deviation	20.8	—	36.2
Coefficient . .	18.9	—	33.8

It will be seen that the coefficient of dispersion of the cases making profits is 9.8, but of all cases after deducting losses it is 33.8, and the effect is clearly seen in the following

Graph 1. In this the profit-making cases' aggregate is always fluctuating well within the net aggregate of all cases. The lesson, for our own comparison, is that the assessment index, which tends to be like the former, must be less lively than the *Economist* sample, which tends to be like the latter. One must not assume that the proportion of losses to the

GRAPH 1



profits, which in the eleven years' aggregate is 31 per cent. for the United States, is necessarily the same in this country. It is useless to bring these figures to later years, because of the devastating effects of the depression. (In Dr. Coates' sample given to the Colwyn Committee, 14.3 per cent. of the *total turnover* was in the loss-making classes in 1922, so that it was about 17 per cent. of the turnover resulting in profit, and in 1922 the percentage of loss cases to profit cases in the United States was 31 per cent. The comparison is, of course,

not exact, since the amount of profit and loss respectively per unit of turnover is almost certainly not identical.)

9. The Index Computed

Now we certainly desire to know the mobility of profits against prices, employment, production, etc., in the *area* in which such mobility exists. We desire to know, too, the change in the profit incentive (which comes into play on the ordinary share capital), and these factors would not be wholly supplied by the assessed profits index. On the other hand, the *Economist* sample seems *prima facie* too lively, with its bias of large cases and fluctuating industries. My personal feeling is that a combination of the two types will yield us a series giving most satisfaction, for most purposes, most of the time. I have accordingly combined them, pivoted about 1924 (for comparative purposes), and not going back prior to 1920, in Col. 1 of Table III below. This

TABLE III

Year.	General Profit Index.	Sub-Index for Ordinary Capital.	Index of Production.†	Prices.			Index of Business Activity.	Product Series (3) and (5).	Bankers' Clearing (Country).
				Board of Trade.	Statist.	Cost of Living Index.			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1920	107.0	112.0	104.7	184.9	180.5	142.2	100	190	144.0
1	68.7	57.3	75.3	118.7	111.5	129.1	74	84	103.5
2	90.4	84.5	89.3	95.5	94.2	104.6	86	84	96.8
3	94.1	90.6	91.1	95.6	92.8	99.4	95	85	96.9
4	100	100	100	100	100	100	100	100	100
5	104.1	109.3	101.4	95.7	97.8	100.6	101	99	102.0
6	98.3	103.0	90.5	89.1	90.6	98.3	91	83	97.2
7	106.5	111.4	110.1	85.2	87.8	95.7	109	97	102.5
8	106.2	110.7	108.7	84.4	86.3	94.9	107	94	104.8
9	106.8	114.3	115.8	82.1	82.7	93.7	112	96	106.2
1930	92.8	94.4	106.5	71.9	69.8	90.3	106	75	102.2
1	77.4	74.3	97.3	62.7	59.7	84.3	99	58	94.9
2	74.3	71.4	98.8	61.1	57.6	82.3	95	57	92.0
3	82.7	82.6	107.7	60.7	56.8	80.0	101	62	95.4
4	95.0	98.8	120.4	62.6	59.0	80.6	109	71	102.9
5	105.3*	114.0	127.4	63.3†	60.4	81.7	114	76	111.3
6	120.5*	136.0	136.9	67.2†	63.3	84.0	120	86	122.0
Standard Deviation	13.39	18.92	14.55	29.49	29.38	—	10.77	28.76	12.02

* Provisional, and subject to correction by later results.

† Computed from new series part year 1930.

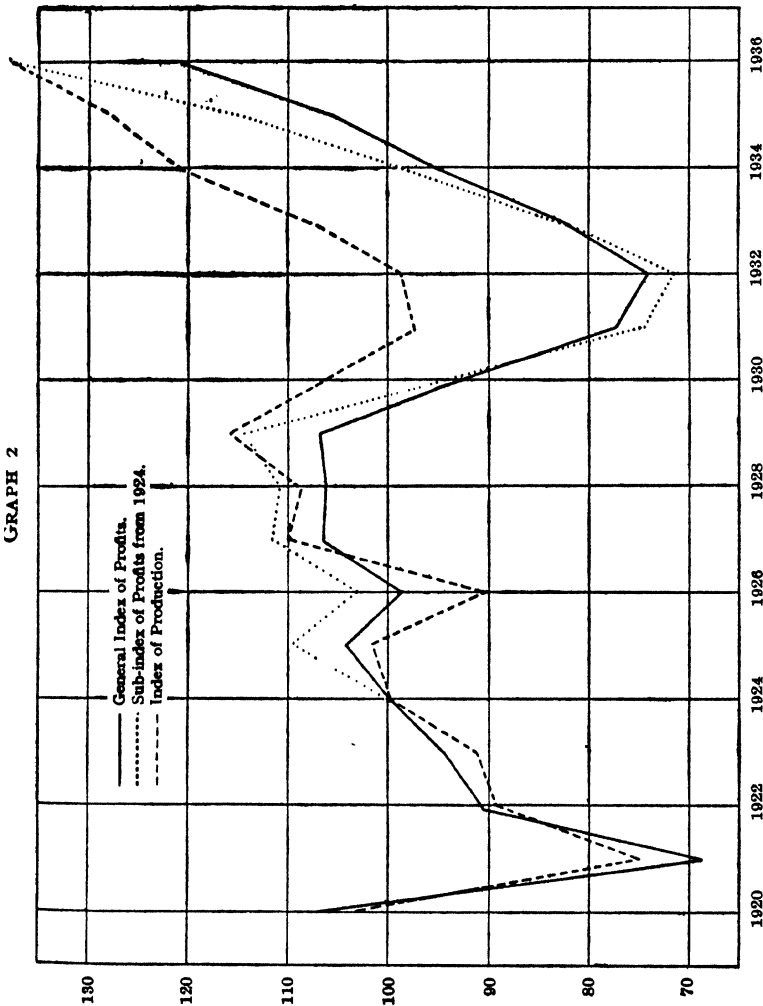
I regard as the general profit index, comparable, for example, with the production index, and to be used when the whole return, apart from wages and rents, upon business of all kinds is under consideration.

But for some purposes we need a different type of "change indicator," especially when we have in view the actual *incentive* to new business and risk-taking. For this purpose, a series representing the changes in the profit flow, *after* paying not only debenture interest, but also dividends on preference capital, and unladen by a mass of steady *personal* earnings (as in shopkeeping), is desirable. This special sub-index I have constructed as follows: the percentage of total net profit (for my third grouping) actually paid in preference dividend gives a deduction from each year's index figure, and a net series, which is again converted into an index pivoted on 1924 at 100, in Col. 2 of Table III. (See Appendix C for details.)

10. *Profits and Production*

The accompanying graph shows the movements of the General Profits Index and the Index of Production, and the degree of correspondence between the volume of production and the amount of money profits. The correlation coefficient is $+0.69 \pm 0.08$, but the coefficient with the Sub-Index or Special Index is even higher, $+0.77 \pm 0.07$. This superiority is consistent with the theory that the risk-taking profit, as distinct from the volume of secured interest, is the real dynamic in business expansion and contraction. When we compare the fluctuations with prices, the influence of the price level is found to be negligible, and indeed the correlation is quite non-significant, being $+0.18 \pm 0.16$ between the General Index and the Sauerbeck Statist Index, and $+0.13 \pm 0.16$ for the Board of Trade Index. Between the Special Index and Sauerbeck Statist Index it is $+0.09 \pm 0.16$ and the Board of Trade Index $+0.05 \pm 0.16$. It is therefore not to be wondered at if the connection between production multiplied by price, or gross trade value and profit, is not so close as that between production and profit

GRAPH 2



- (1) From 1920 to 1928 the movement of the two lines is closely similar.
- (2) Profits fell away in 1929 and the difference has been fully maintained since. But if we start both series from 1929, the identity of direction of movement is very close, but profits fall away much more than production, and the rise tends to gain ground more rapidly.
- (3) The sub-index for profit on ordinary capital, viewed as the dynamic for decreased and increased production, did not move it to the full extent between 1924 and 1926, but from 1927, on the fall, it has been much more violently affected and continued longer, though on the four years of rise it has now caught up completely.
- (4) The pre-war tendency for fluctuation in profits to be less than that of "turnover" (*vide* page 278) has not been maintained, but the conclusions about the effect of price changes for pre-war years remain valid for the post-war period.

alone, so far as this connection is measurable by the correlation coefficient. Col. 8 of the Table gives this product, and the coefficient with the General Index is $+0.48 \pm 0.13$ (or, if we omit the special year, 1920, it is $+0.60$), and with the Special Index $+0.41 \pm 0.13$.

11. *Profits and Trade Activity*

Now that the *Economist* publish an Index of Trade Activity, which is more scientific than the mere product of a volume index and a price index, it is interesting to find that it yields the highest correlation coefficients with the profits index. For the General Index it is $+0.74 \pm 0.07$, and for the Special Index $+0.80 \pm 0.06$, which is certainly as high as one would ever expect to find with indices constituted in such divers ways.

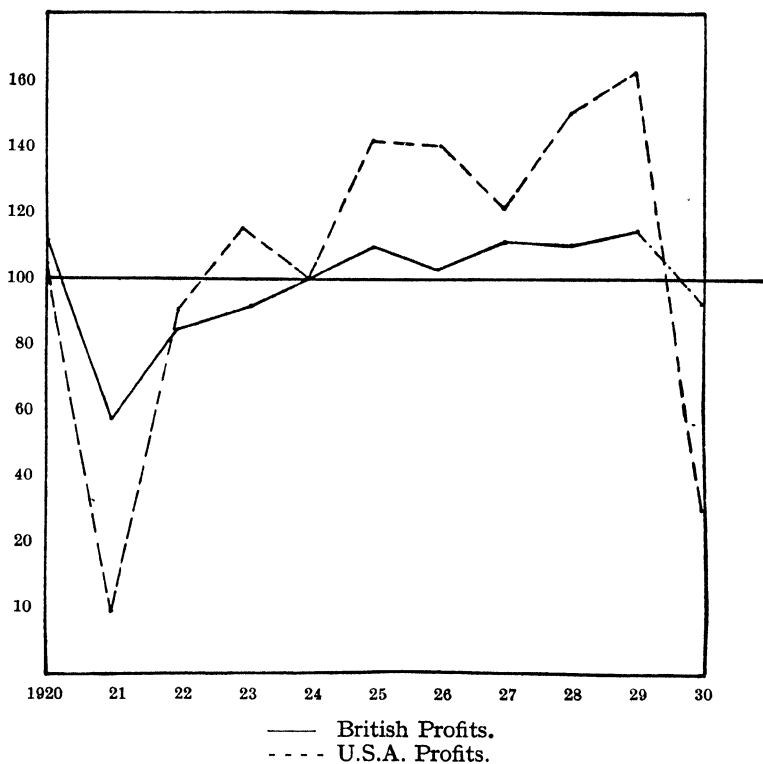
Leaving the constructed index-numbers, and looking at natural aggregates, it will be obvious that fluctuations in foreign trade statistics, with all that has happened in fiscal policy, etc. in the past eighteen years, are not likely to be closely related to aggregate profits, nor can railway statistics be expected to give such high correlations as in previous years. The best available natural aggregates are the Bankers' Clearing figures (Country) given in Col. 9 of the Table (reduced to a series with 1924=100). The coefficient for this series is $\pm 0.56 \pm 0.11$ for the General Index. This is greatly strengthened if the abnormal conditions of 1920 are excluded and then becomes $+0.71$. The coefficient of variation on mere change of direction is very close indeed, and it can well be said that the Clearing House Statistics are the best natural guide we possess to the course of the profitability of the country's economic activities. In this connection, I must refer to Chapter VIII, which gives my conclusions for pre-war years when I had reason to believe that these figures moved most closely with profits.

12. *Profits in Great Britain and the United States*

In Graph 3 below, I compare the two countries, down to the depression, using the sub-index as the "liveliest" for

this country, and an index derived from the taxation returns (*vide* Appendix B) for the United States. The capacity of the States for enjoying depression and prosperity to the fullest extent possible was well illustrated even down to the great collapse. Subsequent figures are almost seismological.

GRAPH 3



13. Conclusion

It must always be remembered that these indices of profits are for *aggregate profit*, and not *rate of profit on Capital*. As the total invested capital increases year by year, the *rate* of return on capital is exaggerated by these indexes, and there is no way of relating the indices to units of *invested capital*,

for which there are no statistical aggregates whatever, nor in the nature of the case are any obtainable.

I regard all such indices as these, when they get far away from their base, as subject to an increasing margin of error, unless a new base is made by an absolute test and worked backwards to link with the original series. The difficulties over the cost of living index are well known in this respect, and only a completely new basis, objectively determined, with retrospective calculations to "splice" the original series, can meet them. The new cost of living basis enquiry may well furnish such a "back check." The index of production finds its judgment day in each new Census of Production. Price indices can be re-made and re-weighted. The index of profits must be periodically tied down to the tax assessment aggregates (for a suitable average of years) as an absolute check, and its variations worked retrospectively by samples.

It will be seen that the main data upon which we must rely do not in themselves form index-numbers, and remain only the raw material for them, needing close scrutiny and constant check from various angles. It does not follow, however, that an index-number that is not entirely automatic in its construction and perpetuation, is for that reason useless or unworthy of credence. It is the best that is obtainable in the circumstances, and it is doubtful whether, for such a subject as profits—itsself capable of many different conceptions and uses—any objectively independent and self-regulating mechanism for an index-number will ever be possible.

The year 1924 has been deliberately chosen as the base, because (1) it has been adopted for so many other sets of statistics, (2) it gets free from the statistical difficulties associated with the separation of the Irish Free State, (3) it was, in itself, perhaps the best *nodal* year since the war. It will be seen that no time trends have been taken out, linear or otherwise, for in such a stationary period they would be entirely artificial; nor does any cyclical influence survive the succession of extraordinary economic phenomena.

APPENDIX A

The Summary of Quarterly Reports published in the *Economist* from 1909-10 to 1930-1 may be found in the *Journal of the Royal Statistical Society*, 1932. Below are given the figures for the first two quarters of each year since that date.

Year.	Quarter.	No. of Cos.	Profits, First Year. £'000.	Profits, Second Year. £'000.	Percentage change on the Year.
1931-2	1	548	63,404	54,315	- 14.3
	2	675	72,998	56,834	- 22.1
		1,223	136,402	111,149	- 18.5
1932-3	1	562	57,105	52,046	- 8.9
	2	612	51,165	52,871	+ 3.3
		1,174	108,270	104,917	- 3.1
1933-4	1	547	52,923	55,751	+ 5.3
	2	642	56,971	67,335	+ 18.2
		1,189	109,894	123,086	+ 12.0
1934-5	1	592	58,578	67,137	+ 14.6
	2	694	67,975	80,076	+ 17.8
		1,286	126,553	147,213	+ 16.3
1935-6	1	569	66,840	75,732	+ 13.3
	2	739	83,404	92,281	+ 10.6
		1,308	150,244	168,013	+ 11.8
1936-7	1	628	84,661	94,733	+ 11.9
	2	765	83,910	100,691	+ 20.0
		1,393	168,571	195,424	+ 15.9

APPENDIX B

United States—Net Profits of Corporations

(In millions, \$)

Year.	Net Profits of Corporations making Profits.	Losses of Corporations making Losses.	Net Profits of all Corporations.
1920	7,903	2,029	5,874
1	4,336	3,878	458
2	6,964	2,194	4,770
3	8,322	2,014	6,308
4	7,587	2,224	5,363
5	9,584	1,963	7,621
6	9,673	2,169	7,504
7	8,982	2,472	6,510
8	10,618	2,391	8,227
9	11,654	2,914	8,740
1930	5,627	4,205	1,422
	part year	part year	part
			1,644
			est. whole

APPENDIX C

Year.	Third Grouping Index.	Percentage paid on Preference Dividend.	Deduction from Col. 1 for Col. 2.	Third Grouping, Net Series.	New Index.
1920	107·7	17·2	18·5	89·2	112·0
1	65·6	30·5	20·0	45·6	57·3
2	86·1	21·8	18·8	67·3	84·5
3	90·7	20·5	18·6	72·1	90·6
4	100	20·4	20·4	79·6	100
5	108·0	19·4	21·0	87·0	109·3
6	103·0	20·4	21·0	82·0	103·0
7	111·0	20·1	22·3	88·7	111·4
8	111·5	21·0	23·4	88·1	110·7
9	117·6	22·6	26·6	91·0	114·3
1930	99·6	24·5	24·4	75·2	94·4
1	81·2	27·4	22·0	59·2	74·3
2	78·6	27·8	21·8	56·8	71·4
3	88·0	25·2	22·2	65·8	82·6
4	102·4	23·3	23·8	78·6	98·8
5	114·6	20·8	23·8	90·8	114·0
6	132·7	18·4	24·4	108·3	136·0

APPENDIX D

From Inland Revenue Reports

(In millions, £)

Years.	Manu- facturing, Production and Mining.	Distribution, Transport and Communications.		Finance, Professions and Other Profits.	Deductions, Wear and Tear.	Other Reductions and Discharges.
		Railways.	Other.			
1920/21	525·0	60·0	439·0	157·6	51·7	534·4
1921/22	558·0	61·2	486·0	180·5	52·8	424·2
1922/23	512·2	51·4	500·9	197·6	57·6	388·3
1923/24	483·4	48·2	450·5	177·1	54·6	257·7
1924/25	460·5	83·6	438·0	176·5	55·9	221·4
1925/26	500·0	50·0	457·3	183·8	69·1	227·2
1926/27	503·0	39·6	468·4	187·1	73·2	209·7
1927/28	472·8	29·9	456·9	194·2	72·5	216·2
1928/29	478·0	37·2	486·5	198·1	80·0	221·0
1929/30	478·2	37·3	494·2	212·4	87·6	224·3
1930/31	476·5	47·0	491·4	191·7	93·3	246·2
1931/32	428·7	35·0	448·0	173·9	87·4	229·3
1932/33	350·1	32·5	385·5	175·8	88·5	209·1
1933/34	332·3	23·8	367·4	176·7	96·1	187·4
1934/35	367·1	26·7	389·8	183·8	100·2	185·5

III

METHODS USED IN DIFFERENT COUNTRIES FOR ESTIMATING NATIONAL INCOME

III

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1. *Scope of the Present Treatment*

IT is no part of my purpose in this instance to criticise or even summarise the various estimates that have been made of different national incomes in different years, a process which must involve an attempt to put them on to similar lines with identical scope, for this again involves special difficulties in times of rapidly changing price levels and exchange rates, if any comparable basis expressed in a single unit is to be obtained. An analysis of this kind was attempted by me some years ago, with a classification of the relative degrees of approximation to accuracy which the several estimates seemed to have² (85-6). It is rather the intention to devote the treatment entirely to methodology, and to set out the main types of statistical material and the chief devices for adapting it to the purpose in hand, which have actually been employed, with varying degrees of success, in different countries. In this programme is included some reference to the main differences of principle involved by different concepts of income aimed at, because such differences are often influenced by the nature, limitations or absence, of the particular statistics required in detail. Even a preliminary survey shows how wide and varied is the range of material which may have to be pressed into service,

¹ Based upon the Centenary Address to the Royal Statistical Society at the Jubilee of the International Statistical Institute, 1934. Vide *Journal of the Royal Statistical Society*, 1934. The numbers in brackets refer to the List of Authorities at the end of the chapter.

² "Wealth and Income of the Chief Powers," *Journal Royal Statistical Society*, 1919 (also in "Current Problems in Finance and Government").

from population statistics, occupational censuses, family budgets, area crop yields to insurance benefits, and we all know how many may be the pitfalls to be overcome when statistics which were prepared for one particular purpose are used in areas or for purposes quite unconnected with their original objects. The literature is large, and while we must review much that is common property and knowledge, in order to get a plan for the subsequent more detailed comment, we shall do so only in brief, treating such matters as are to be found in accessible appropriate and standard references. Otherwise it would be difficult not to become involved in the examination of the minutiae of particular estimates. The space given to the several aspects of the subject will, therefore, bear no necessary relation to their relative intrinsic importance.

2. *Definitions of National Income—Rival Concepts*

These are as numerous as the estimates, and occasionally the differences really matter, because there is a difference of substance behind. We need not now go over this wide and rather familiar ground (84, 88, 18). Professor Marshall called the National Income "the net sum-total of things and services produced." Three reservations are necessary. This concept may mean produced in the country wherever the individuals may live who own it, or, more properly, it may mean accruing to the inhabitants of the country involved, which must exclude production going abroad, but brings in values accruing abroad to or received from abroad by those inhabitants. The second reservation is that only goods and services that are *exchanged*, or are capable of exchange, really count. Of course, a shopkeeper cannot deduct his own notional wage, or even the goods from his shop that he may consume, for that is "income." Similarly, a small farmer paying himself a wage, either in money or in goods of his own production, must include them as his income. But when the production so consumed does not form part of a business for sale, *i.e.* gardening in one's spare time, or production of values impossible to sell, the

best convention is to omit the value. The household services of wives are involved, otherwise. However, a liberal view of the main convention is necessary when we are dealing with countries where small-scale agriculture predominates, for the small farmer may consume practically all his produce. The third point has become more important of late years. We confine the idea of services to those rendered *during* the year, and a payment of interest or pensions out of the proceeds of taxation, for which the recipient renders no *current* services, must, for reasons to be explained hereafter, be excluded. We do not ordinarily narrow down the national income concept to material output, and still less to the "true income" of Achille Loria, where personal subsistences of different kinds were deducted. We shall have occasion to note some practical differences of view in due course. But we constantly stumble across some new definition, such as this from Egypt: "*la valeur des produits fongibles du domaine foncier (rural et urbain), ce revenu étant majoré des revenus du capital et du travail engagés dans les autres formes de l'activité productive, tant à l'intérieur du pays qu'à l'étranger,*" and we have to analyse it carefully to see whether any new idea has crept in. The only special case that need be seriously looked at for the moment is the Hungarian, which is important.

De Fellner¹ (37) finds a rational principle for excluding services by a distinction between "lucrative-ness" in private economy, and "productivity in political economy." As the idea of national economy does not belong to the sphere of private economy, it is exclusively from the point of view of political economy it should be analysed. "Authors, including Bowley, Stamp, Flux, who consider national income as being the aggregate of individual incomes, start from a point of view belonging to the sphere of private economy, and in calculating the amount of national income fall into the error of duplication by taking derivative incomes into account as well." The Hungarian conception is of the amount newly provided annually, plus, of course, income from abroad. He claims that it dispels all ambiguity and

¹ *The National Income of Hungary*, 1930.

satisfies the requirements of practical statistics. His view is overwhelmingly supported by his countrymen, *e.g.* Földes, Navratic, Heller and Lang. My contention is that it gives an unreal conception of national well-being. The term "National Income" in Soviet literature refers only to the volume of national production of material values. We are bound, however, to discover differences of practical treatment even amongst those who are adopting the full concept, which can be traced back to underlying regard for some of the consequences of the "material" concept. American writers make no effort to distinguish such so-called derivative or duplicate income, except for interest on government debt paid out of taxation. W. C. Mitchell and S. Kuznets consider it is natural for countries in an early stage of development to omit services, and instance India (70).

It must not be supposed that each country has a consistent method of its own. A recent American work (72) gives a table with nine vertical columns of different estimates and twenty rows for items of income, to show which items are included in the different estimates. Thus "income from odd jobs" comes in three only, and "imputed rent on owned homes" also in three. "Interest on mortgages on owned homes" appears in seven. The authors estimate that the items common to all cover nine-tenths of all totals. The others have different degrees of utility according to the object or philosophy of the estimate.

3. *The Rival Concepts Tested Dynamically*

In the dilemma between the materialists and the idealists, the former might seem to get the benefit of nearly every argument on individual logical examples, but there is one broad general consideration which seems to me to be conclusive upon it. As civilisation advances, it may well do so by the very fact that merely material production in wealth tends to render a less and less proportion of total human enjoyment. It cannot be said, for this reason, that the national income is stationary. Suppose that in one year

three-quarters of the population are engaged in physical production and create a net product equal to 2000 million sterling. Let us suppose that at the end of a decade one-half the people are producing this amount, and that, therefore, the average *physical* consumption of the people has not changed, but that one-half instead of one-quarter of the population are then engaged in providing supplementary immaterial enjoyment, as singers, preachers, artists, lecturers, etc. Would it not be absurd to say that the national income in the two instances is unchanged, where the country has become so much richer in its annual flow of enjoyable things? Take a detailed example: materialists aver that if I receive £50 for a broadcast address, which gives great enjoyment to my listeners, I have not added to the national income. If, however, my £50 forms instead a part of the production of a book worth £250, that is an addition to the national income, though the enjoyment be the same, simply because it has called into existence £200 worth more of paper and binding. From the valuation of the books the materialists ought certainly to exclude, to be logical, anything given to the author for his service. As a matter of fact, they get inextricably mixed up in their total valuation of services, whereas, to be strictly logical, parts of those services should be excluded; and they miss altogether the value of services which are not embodied in some saleable object. The balance of argument to me is overwhelmingly in favour of a conception of national income which puts full exchange value upon services rendered, however immaterial. I make one safeguard to this, viz. that in a community of very rich people there may be a ring of services at fancy values, which undoubtedly enhances the totals. If they were important enough these ought, perhaps, to be reduced to their general average cost. In *British Incomes* I give the illustration of "A," a great surgeon, performing an operation for "B," a prima donna, thereafter "B" going to sing at a social function for "C," a leading barrister, and "C" taking a brief for "A" in a lawsuit. In each case the service is generally rendered for £100, but on this occasion each sends a bill in for £1000 and so the national income

goes up by £2700 above its figure upon any reasonable exchange basis.

We must beware, however, of falling into a fallacy. The high figure charged by a surgeon to a wealthy patient may be the reason why very low fees are charged elsewhere, and it does not follow that such high fees are finally in excess of "cost of production," any more than railway rates charged on some classes of goods are excessive, when we remember that the product of the rate system in relation to the costs as a whole must be the test and not isolated examples.

I have expressly said that amongst our conventions it is only services rendered on an exchange basis to other people which can be regarded as producing income. This, no doubt, introduces an arbitrary element. If a hundred men have been to the barber regularly, they have no doubt produced a service income in addition to their own. Now if each of them proceeds to shave himself and the barber turns draper, should we not be justified in adding to the income of each person the services he now renders to himself? The answer is, of course, that the convention, while not strictly logical, is most convenient, because ignoring it leads us into metaphysical difficulties. But from this springs the more difficult question of "mutuality," and the service performed by a group of people strictly to each other in a club or society. If they agreed to give services without monetary payment on a basis of general equality, do they or do they not give rise to income for our purpose? This point would doubtless be a purely academic one but for the growth of the co-operative system, where it is held that profit made by members "out of" each other, under the principle of mutuality, is not income. The question of degree is so involved that it might lead to one country, just as rich actually as another, but practising this principle to a greater extent, showing a less total national income; or it might lead to one country retaining a stationary national income merely because of the increase in this practice over a period of time, where its true income of services is actually increased. In a reservation to the Report of the Royal Commission on Income-Tax, the question of mutuality becoming so

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“ diluted ” that it begins to assume the characteristics of the general community is discussed (78). So far no adjustment has ever been made for such a consideration, but it is getting within the reach of possibilities that such services ought to be valued and included.

4. *The Two Main Approaches*

In one instance an *ad hoc* Census of Wealth and Income was taken, with interesting results which I have referred to elsewhere (85). The Commonwealth Statistician of Australia gave the full results in his report on the War Census of 1915. J. H. Sutcliffe, writing ten years later and producing an estimate on conventional double lines, has concluded that the census was $14\frac{1}{2}$ per cent. below the true figures, and he explains that many people who completed it felt that it might be used for taxation purposes and were either shy of giving figures higher than the lowest at any zone of doubt, or actually practised the same kinds of evasion as they would have done in a tax return. The nearest approach to this Australian experiment is the inclusion by New Zealand of additional questions in the ordinary census, asking the individual to classify himself in one of seven income groups, the lowest being “ No Income ” and the highest “ over £364.” Obviously the last, by itself, is of little use, but coupled with the income-tax statistics is capable of yielding some information, although farmers’ incomes provide the usual stumbling-block, and the omission of house occupation from real income was a complication. A novel estimate of national income has followed ; each group has been aggregated by taking the income at the arithmetic mean of the upper and lower limits—which does not, of course, accord with any known distribution formula. The results accord with the wages figures in the Report on factory production. Farmers were roughly estimated ; a round figure of company profits not included in individual incomes was taken at £10 million. No account was taken of Maori income, and owner occupier rental values and certain payments in kind were excluded (39).

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Apart from these special cases the means and data generally available for estimating national incomes may be first divided broadly into the subjective and the objective, or perhaps better distinguished as those statistics which attach mainly to persons and incomes, and those which relate to things. For the national income, commonly expressed as annual, may be described as a flow of goods and services either *produced* or appropriated in a year, or as an aggregation of individual incomes *received* or due in a year, plus those receivable by corporate bodies and not divided amongst persons. Sometimes only one method or set of facts is available. Sometimes both are used and can check each other ; sometimes the total estimate must be arrived at by the use of each over a part of the field, and their subsequent aggregation. Perhaps the best short nomenclature we can adopt is the "income" method and "census" or "inventory" method respectively.

5. *The Income Method*

The income, "individual," "personal" or "subjective," method and data involve the following distinct types :

- (a) The statistics of a personal income-tax assessed in a total upon each individual, leaving, for separate estimation, the undivided corporate income.
- (b) The statistics of an impersonal income-tax, which charges the founts of income at their source, *i.e.* companies on their profits, before distribution ; or the occupant of an office upon the salary attaching to it, regardless of his total income ; or the rental value of a house, which covers the interests of tenant, owner, ground-landlord, and mortgagee wherever resident.
- (c) The statistics of wages, as such, to supplement or check (a) and (b).
- (d) Estimates of any classes of income "intermediate" between (a) or (b) and (c), such as small shopkeepers or farmers below the particular income-tax limit.

6. *The Census Method*

The Census, "aggregate Industry,"¹ "real,"² "inventory," or "material" method, comprises :

- (a) A comprehensive sectional enquiry at particular selected years, of all manufacturers, and possibly of agriculture (not divided specially for the annual income of recipients of receipts therefrom), and setting out either Gross or Net output, or both. "End-product" is the latest American term (93).
- (b) A computation for intermediate years by means of index-numbers of production, detached in industries, or as a whole.
- (c) An *ad hoc* "inventory" of particular trades and industries made especially for the national income computation.
- (d) A supplementary estimate of the value of services, professional, etc., not passing through the industrial machine, but paid for, out of net production proceeds, *after* they have become incomes (*i.e.* the so-called "duplication").
- (e) By consumption statistics. "Since the national income of Poland can be estimated neither as it is earned, nor as it is produced, it must be measured as it is consumed" (14). The piecemeal census method is checked by consumption in Greece, but it is not really an independent estimate.
- (f) By statistics of retail trading, or a Census of Distribution, as in Canada.

7. *The Impersonal Income-Tax Statistics*

The classic ground for the use of the statistics of the impersonal income-tax is Britain, where it has been used for estimates of the national income for the past hundred years. An aggregation of individual incomes has not been available over much of the range, although at one time the

¹ Sutcliffe.

² "Schatzung nach der überwiegend realen Methode," Waisner.

number and amount of incomes up to £700 was roughly known, and the amount of incomes over £5000 assessed to a global super-tax after 1910 was also recorded. Attempts made to distribute the difference between the sum of those two parts of the scale and the total sum assessed to the impersonal tax led to strange anomalies, and interpolation by ordinary means on the Pareto formula led to an obvious "bulge" of an unsatisfactory kind (20). The explanation finally emerged that the total income assessed would *never* be found in an aggregation of individual incomes, and there would always be a considerable difference (87).¹ This is probably true of all aggregations of personal returns. The difference is made up as follows :

- (1) Greater possibility of direct evasion in individual returns than in profits assessed at the source, *e.g.* the omission of a single dividend in a personal assessment is an irrecoverable difference.
- (2) Administrative indifference to the individual incomes at the lowest end of a scale, owing to the small sums involved—as indicated by the failure to conform to a fair statistical distribution.
- (3) Evasion due to bunching of incomes just below critical points in the scale at the expense of the numbers just above, much minimised wherever the effect of the stages or brackets for the progression rates gives a smooth and not discontinuous graduation in the tax (87).
- (4) Profits held in reserve by companies, etc. and not distributed to shareholders as dividends. (In certain circumstances, when times are bad and reserves are being depleted to provide dividends, the difference is reversed.)
- (5) Income of clubs and societies not traceable to individuals.

This unidentifiable income may assume considerable dimensions, say, even 10 per cent. of the whole. The practice of creating "one man companies" to minimise the distribu-

¹ *Vide* page 37.

tion of income, while, at the same time, not alienating the wealth, but consolidating it into capital, has grown heavily of late years in all highly taxed countries, and makes the "personal income" method much less reliable.

The amount of "corporate income" not distributed by companies, etc. may be determined by difference between the total profits and total individual declarations, by sample, or by guesswork. If a separate estimate is being made for evasion, the method of aggregate difference is rather precarious, for a difference between two large totals differently compiled, though small in relation to them, may contain other residual elements very large in relation to that difference. The estimate should certainly be checked by large samples of known company profits and distributions. In Bowley and Stamp (1924) it represented about 5 per cent. of the whole estimate. For 1931, Dr. Coates, dealing with *savings*, said, "No quantitative analysis of the aggregate is possible beyond the suggestion that in normal conditions possibly 30 to 40 per cent. of the total is provided by companies."

In Germany, the recent official estimate gives an elaborate calculation, and shows that as much as 45 per cent. of certain trading profits were not distributed. For the four years 1925 to 1928, the percentage of the *whole* national estimate was, however, less than 2, and in 1931 there was a minus (or distribution of income in excess of current profits under this head).

For Japan the estimate was 6 per cent. of the taxable income similarly withheld from distribution.

8. *Aggregated Personal Incomes charged to Income-Tax*

The classic instance of the employment of this method is Germany, where the exemption limit originally was so low—900 marks p.a.—that a very high proportion of the total income of Prussia was included by this method, leaving a relatively small field to be estimated by other methods. Thus in Helfferich's pre-war estimate, 70 per cent. was covered and Rogowski's revision made in 1926 almost con-

firmed this, and his estimate for 1924 was not far short of 70 per cent. covered by the tax returns. But much of this apparent advantage was lost by the fact that the Prussian totals had to be brought up, assuming them to be representative, to a total for all Germany, on a population basis, by adding 60 per cent.

Helfferrich certainly claimed to have made, for 1911, a "thorough examination of the assessment results in the other States," and to have been justified in applying this general average (79). But Rogowski followed this lead without any corresponding check, and most writers have drawn attention to the possible margin of error due to this. In any case the population figure seems to have been 61.6.

All past German work has now, however, been superseded by the monumental study recently published by the German Government (34), which for variety of material and method is an important addition also to methodology. The general effect is considerably to increase the 1913 estimate, through higher additions for undistributed profits and evasion, etc., and one feels at this stage the great value that would rest in a thoroughgoing check by the census method. But the proportion of Prussia to the whole area is closely borne out on the population basis.

9. Individuals below the Levels charged to Income-Tax

The conventional method adopted is to estimate the numbers by deducting from the total population the numbers already dealt with, and applying to the remainder a multiplier of average income. Obviously both factors may be very obscure, especially if the population is handled, crude, without the refinements of age groups, occupational details, checks by houses, or by insurance or income statistics. In a like manner the average income may be a mere shot in the dark, or it may be the result of very careful sampling, over the whole field, or part of the field.

In Japan, for example, we have the Government estimate of the untaxable incomes, on which a critical writer says,

" In default of reliable data, there is no alternative but to have recourse to somewhat fallible methods, as, for instance, multiplying the number of those persons by their average income. It is, however, supremely difficult to discover the average income of such people, nor is it possible to know their number " (81). Such complete agnosticism is, however, rare. The earlier German estimates with a tax minimum of 900 marks p.a. assumed an average for this class of 750 m. without much close examination. But the more recent ones have a greater refinement. Thus Rogowski, estimating again for 1913, has the sickness insurance contribution in five wage classes, and so is able to split the problem into three grades and to weight averages of 300, 500 and 750 marks respectively (77), giving a mean figure of 6 milliard marks—very similar to Helfferich. The recent Government estimate gives a different approach, with the limits for the seven chief States—the average for Prussia being 735 marks.

The British direct tax limit was at one time fixed at such a point that the wage-earning class was almost entirely cleared, without overlapping, so that the wages total could be separately computed and added, leaving an intermediate class of shopkeepers and small salaries to be added. But when the change in wage levels, post-war compared with pre-war, brought large numbers of wage-earners above the income-tax level the problem was more complicated, and the " overlap " had to be carefully estimated. Again, when the effective exemption limit was materially lowered, *i.e.* from £150 to £100, the overlap became so large that the estimate for wage-earners below this limit became a different class of estimate altogether. For 1924, Bowley and Stamp gave £290 m. for 1,600,000 wage-earners within the tax limits and £1310 m. for 13½ millions below those limits, while, for 1931 on parallel lines, Dr. Coates (with Mr. L. R. Connor's support) gave £703 m. for 5,624,000 persons within the assessment limit and £707 m. for 9,960,000 people below (27).

Essentially, wherever the exemption limit of an income-tax may fall, (a) some independent total wages estimate

has to be made, and attention then concentrated on the "overlap" and its elimination; (b) a residuum of non-wage-earners or intermediate incomes must be examined, and (c) the most baffling section of this is the income from farming.

10. *Wages*

It is impossible to say that there is any considerable common factor in the ascertainment of the total sum paid to wage-earners in different countries, although the problem seems identical. The data available vary so greatly in the different countries that no general method is possible, although in many of them a high degree of accuracy is attainable. It must suffice to summarise the methods adopted in two or three, to indicate the range of statistics and devices for handling them.

In Great Britain, for the Bowley-Stamp estimate, the original basis is the Board of Trade enquiry into hours and earnings in the chief industries in 1906. Bowley brought this up to 1911 in his *Division of the Product of Industry*. It was a single week in the autumn of 1906, used as a basis for a year, with allowance for unemployment and sickness, superannuation and casual work, and the net average annual earnings brought up to 1911 by the population census and total workers in each industry. This 1911 figure, £782 m., became the starting-point for the 1924 estimate. The change in wage rates came from the *Ministry of Labour Gazette* monthly, checked by a special enquiry into rates and hours in 1926. The year 1911 was brought up to 1914 by 8 per cent. for population and rise in wages—£845 m. The change in average earnings from 1914 to 1924 was then applied (90.6 per cent. males, 112 per cent. females) = £1731 m., reducing by £76 m. for the Irish Free State = £1655 m. Increased unemployment (from 3.8 to 8.3 per cent.), holidays 1 per cent., brought it to £1564 m. (excluding sailors and soldiers). The evidence for the increase in wages rates was worked up piecemeal, and *included* statistics from the Coal Commission 1925, an engineering report in 1926, and for textiles 1926 and many other sources. To

bring the figures down to 1931, Dr. Coates used a 3 per cent. reduction for wage movements, a correction for gross population in the ratio 490 to 479, and for increased unemployment and short time, in the ratio 80 to 90 (27). At a later date, Mr. Colin Clark approached the matter from a different angle. He took the *number* of insurable persons (health) and added the excepted occupations. The Census of Production gave the insurable earners, and other employments accounted for the balance. He then estimated the number from 1924 to 1928. By deducting the numbers insured in the Unemployment Scheme, the difference represented agriculture and domestic service. The Ministry of Mines returns and the Labour Wage Enquiry of 1934, together with the change in the number of insured employees, led to 1928 estimates, and by much intricate use of the other tests an effort was made to reconcile the numbers of the two insured categories. The emphasis is shifted from the Population Census as a fundamental basis to the social insurance statistics and the Census of Production. In Clark's latest work, 1937, he is able to use closely related material, 1931 Census, with unemployment details, 1930 Census of Production, a low exemption limit for income-tax 1931-2, and new index-numbers of wage rates.

In France, so far as the general movement is concerned, wages are found in an annual official enquiry showing, in 38 male and 7 female "professions" in 200 towns, and 21 callings in Paris, figures which give an index of hourly and daily rates based on 1911. The Ministry of Mines gives figures for coal, other groups or public bodies collect figures for metal industries and electrical industries. Agricultural statistics are compiled in connection with accidents. The figures for actual wages paid exist only for certain groups, mines, railways and civil services, but certain totals available for accident insurance legislation officially given for 1928 and 1930 form a basis. *La taxe d'apprentissage* gives another rough check to these totals. The occupational census is brought into service and "average" earnings applied to agricultural workers, and averages for other classes are determined from the monthly reports of labour

inspection. Railways and public services are taken direct from the operating accounts (35).

II. *Intermediate Incomes*

The intermediate class, not being income-tax payers or wage-earners, includes small shopkeepers and farmers.

When the income-tax level is high, the problem is important. It was sufficiently noteworthy in Great Britain to be the subject of an enquiry by a special committee of the British Association for the Advancement of Science (Sec. F). Bowley and I, for 1924, employed the following method :

- (a) The numbers of occupied persons in different occupational classes were derived from the last census.
- (b) A percentage derived from birth and death-rates was added to bring the totals to the appropriate year.
- (c) A percentage was added to adjust the totals for an area different from the census.
- (d) A sample was obtained by questionnaire to a number of private firms, including large employers in most industries.

In effect, it accounted for 9 per cent. of the totals, varying from 32 per cent. in the best to $2\frac{1}{2}$ in the worst, which was average income for the class under £150 in each section, which was applied to get income totals for each class. (The samples were tested by the conformity to theoretical type distribution.)

- (e) For Government and other officials an *ad hoc* estimate was made of the proportion of the total numbers falling below the limit.
- (f) Small farmers were separately estimated.

Dr. Coates, in bringing the estimates of 1924 down to 1931, found it necessary (owing to the income-tax limit coming down much lower) to "devote little attention to it." Instead of two millions with an average income of £133, he was able to deal with one million with an average of £80.

So far as income from small agricultural business is concerned, even in the case of fully accredited income-tax statistics the farmers' incomes do not appear well authenticated, and a realistic check is usually applied. In Great Britain, the classification (in averages) of agricultural holdings, by number and total area, is used. Sufficient of the larger holdings are taken at an average rental to give the taxed aggregates of farm incomes, and the remaining holdings are reckoned to be untaxed. The total number of farmers thus indicated is compared with the occupational census totals, and an average income appropriate to the average holding is assumed.

The difficulty is especially important in its influence on national income totals, where agricultural income predominates, as in the Irish Free State, for the small farmer is practically a personal wage-earner (55). Land Valuation, and the Schedular Tax based upon it, is of very little value. The *net* product method (derived from Gross output at retail prices, with purchases deducted, and rents, but *not* wages) brought out £58½ m. against £1,284,000 assessed under Schedule B of the Income-Tax. The income from occupation of land was eventually taken at 56 millions against 3½ millions for ownership. Valuation only comes into the picture for non-farm property.

In Australia, the Labour Department reports give average wage rates, in general, for industries, and for males and females. A weighted average is adopted, and a percentage deduction for unemployment taken. There is an overlap with income-tax payers, which is eliminated by estimation. In general it may be said that occupational censuses, special wage-rate enquiries, periodical reports of changes in wage rates, insurance statistics, and various taxes on wages, with a reconciliation with population growth statistics, provide the broad general basis for these estimates.

12. *The Census Proper*

The term "census" connotes individual returns of activity to be aggregated by the authority charged with

the duty, and these may be in *values* without close description of the detailed products, or in quantities of products, leaving the monetary equivalents to be superimposed. We may term these "Value Census" and "Product Census" respectively. Where the information is not collected from individuals but is worked out from statistics of area, average produce, etc., the term "census" is inappropriate, and I prefer to borrow a term from capital and call the computations "Product Inventory" and "Value Inventory."

The British Census of Production obtains no direct record of goods. "The record of the output of manufacturing establishment groups together goods ready for final use by final consumers and goods which serve as a starting-point for further manufacturing operations"¹—the proportions are not known. But while the returns of "gross output" when aggregated contain much duplication, the "net output" returns are practically free from it, and can be added together with impunity. "The net output of any industry is the fund *from which* wages, salaries, rent, royalties, rates, taxes, depreciation, advertisement and sales expenses and all other similar charges have to be defrayed, as well as profits." So far as duplication is concerned, goods go out of one industry at the value at works, but come into the next industry at the value at the new place, which is greater by the cost of merchanting and carriage *between* them. This leaves the profits of the intermediate stage to be separately accounted for. In the Hungarian Census the opposite method is followed, and fuel consumed is reconverted in price at the colliery instead of the factory, and timber at the forest (37). A computation is then made for a deduction from the profits of commerce and transportation.

The precise differences between the technique of this census and that in the United States are too large a subject for treatment here. The United States Census since 1905 has omitted the hand industries and covered the factory industries, at first quinquennially and now biennially. The British Census is at much longer intervals and presents a greater difficulty in interpolation for intermediate years.

¹ Flux, "The National Income," *Journal Royal Statistical Society*, 1929.

The detailed comparison of the Census of Great Britain and the United States has been made by Sir A. Flux recently (43). The pairs of years for comparison are 1924 and 1925 and 1930 and 1929 respectively. He shows the differences in the scope of the industries included, and the effect of bringing in *public* enterprise in the particular industries for Great Britain, with many interesting contrasts in the results of net output, but he does not devote himself specifically to the part that each census plays in the National Income estimates, and the steps taken to prevent overlapping. An elaborate study of King's "net value products" in the National Bureau estimates has been made by Professor Copeland recently in "Some Problems in the Theory of National Income" (31).

- (1) King's deduction for operating and maintenance expenses paid to other enterprises for materials, supplies and services, includes a part of rent, and a part falls to be paid out of the net value product—tantamount to separating lessees and lessors. Copeland prefers to group all together in the unclassified income group.
- (2) Compensation to employees for damages is treated by King as coming out of net value product, but by Copeland as depreciation of human resources and as a deduction.
- (3) He considers the scheme works well except for banks and financial enterprises.
- (4) There is much shifting about of property income paid to, and received from, other enterprises.

The census of distribution and figures of retail trading are used as cross checks in Canada.

The Hungarians claim to be pioneers in Europe of industrial census-taking in 1898. Since 1921 they have published annual results of systematic production statistics. The results are not, however, strictly comparable over the years because of (1) currency changes, (2) greater efficiency in giving information, (3) inclusion of larger numbers of factories, (4) a change of test for inclusion, from a man-

power basis to a combination of man-power, mechanical power and amount of production. The general principles of the census are similar, but the quota of wear and tear is completed as a percentage, 1.72, of gross value apparently on the basis of a detailed calculation in 1916.

Countries without a census adopt various devices, *e.g.* in Greece, commercial profits are taken at 20 per cent. of the entire volume of trade, exports plus imports.

13. *Intercensal Years and Extrapolation Generally*

When a detailed estimate has been made for particular years it is often desired to bring it more up to date for years in which the basic particulars are lacking or not yet available, or to fill in the figures for intercensal years, in order to enable some comparisons to be made with other statistics. Occasionally the methods employed are very broad or crude, and actually or virtually move the whole total bodily. In an Australian estimate, a detailed interpolation really results in moving the whole estimate of national income exactly with the movements of the annual census of production (91). In Poland, the important "quantities" (75 per cent.) of home consumption are left unchanged, only purchases being moved annually (14). In Germany, some comprehensive methods of "bridging" by income index numbers have been elaborated, and, so large is the basic factor of income, this may approximate to a corresponding movement of the whole estimate.

The chief materials for the bridge, or for extrapolation, are samples of profits, foreign trade figures, the index of production, unemployment statistics, the wages index, and, of course, population.

The samples of profits published by the *Economist* have been used for extrapolation by C. Clark and Dr. Coates for Great Britain. The latter moved the estimate of total profits assessed to tax forward seven years by this means. It is of course subject to subsequent check of accuracy, as the Revenue figures are published some three years after the actual trading year to which they relate. In Chapter II

I have combined the two sources in a Profits Index dating from 1920, with 1924 as a base.

The use of import and export figures, with their great advantage of being so up to date, has been commended by Sir A. Flux, as an attractive method, in the absence of any large change in the general structure of a country's economy, for computing intermediate figures of national income.

Sir A. Flux has also begun the inevitable procedure of getting post-censal figures for production by the use of the new Index of Production (42), and this will obviously reach a crucial test when those years lead into a new full census year, and the results so projected are put to the test of facts. That test should lead to a revision of the index itself as a proper record of industrial change. It will be interesting to see how far accuracy in the projection depends on splitting up the total index into its sub-indices for application to separate sections of industry, and how far sufficient accuracy is obtained by using the index as a whole.

In fact the time is now ripe for a thoroughgoing examination of the results of interpolating and projecting devices. The absolute estimates for particular years, not too far apart, should afford the necessary terminals, and it should be seen to what point, by projection or extrapolation, the first estimate would reach, compared with the second or terminal absolute estimate. Great divergence may or may not lead to modification of the index-numbers used, to make them truer guides to facts, but obviously no amount of divergence could be pleaded to alter known series, such as import and export totals, population statistics, or railway tonnages or receipts—one can only conclude that they are good or bad guides for the purpose. An attempt to determine the degree of correlation between different series and profits or incomes is given in Chapters II and VIII. But this correlation must be continually redetermined, for economic trends change, and even when it is high it may not be reliable for very long. The risk of error is very great, and unless we have several convergent series giving similar results, or unless there is an absolute test or support, we may be "let down" quite early in the extrapolation. I

have already given an example of successful use for Ireland 1842-52.¹ Mr. Colin Clark recently found a coefficient of .86 between the Sauerbeck Index-number and Great Britain's income from overseas investments 1922-31. Dr. Snow showed that if this method had been used to compute 1932 there would have been a difference from the directly computed figure of 30 millions or 15 per cent. Census of production figures have been interpolated and carried forward by the use of unemployment statistics in separate industries, with a price factor, and a factor representing the increased physical volume of gross output per employed person (Clark). This is obviously safer for intercensal years than for extensions and has been criticised in the outcome. The price changes, in particular, must not be regarded as making all the factors of the census, such as gross output and net output, move in the same proportion.

Price changes are, in fact, much more than quantity changes, the real difficulty of extrapolation. Private incomes from business were carried forward by Rogowski on a basis of population and a price index, with a great element of doubt. But even numerical changes of classes are not easy to handle. Extrapolation of the numbers of employers and independent workers for any distance, on the basis of a prior trend, was shown in the light of actual census results to be risky—such a calculation gave an increase of 14 per cent. against a proved result of 17 per cent. decrease (Snow).

In the case of wages, an absolute total is so seldom obtained that extrapolation is a common and necessary method, especially where the income or wage tax minimum is so high that taxation figures give no help. I have already referred to the original bases in Great Britain and the projections by wage indices, etc., twice adopted by Dr. Bowley and myself, and also the later projection by Dr. Coates. C. Clark has brought in a new absolute test of numbers (rather than wage amounts) through unemployment and other insurance figures, which show important differences.

Very elaborate sampling gives the relative yearly figures for the United States, and the annual trend is well estab-

¹ Vide *British Incomes and Property*, Appendix III.

lished and the occupational census checks the numbers from time to time to which the trends apply. But with the varying factors of unemployment, short time, nominal wage rates, hours of work, total numbers in each class, the value of an occasional actual wage-earnings census, with absolute figures, is obvious, for the purposes of an estimate of national income as distinct from a variation of pay rolls when the presence of a constant absolute error is unimportant.

For Greece, Rediadis, ingeniously but rashly, weights all old estimates by their age, assuming an annual increase, extrapolates by least squares and reaches a total for 1929 to compare with his own.

14. *Inventory Estimates—Agriculture*

In Britain the appropriate Government Department has undertaken enquiries on a voluntary basis, coming under my head of "Product inventory," which, when priced, gives the value "at farms" of each category, and the detailed description is passed over as being readily accessible, in the official publications.

The United States has a Census of Agriculture which, together with the reports of the Federal Bureau of Agricultural Economics, give the data for a very close estimate. The census was taken in 1925, and small farmers constitute some "three-fifths of all entrepreneurs. It is fortunate that the single field for which fairly reliable information is available is the largest of all entrepreneurial groups" (91). It is obvious that the method depends upon the intervals at which such a census is taken, and the accuracy of the estimates or other devices for computing intercensal years. It has been claimed for Australia (where nearly 70 per cent. of the whole is agricultural, etc.) that the "annual statistics of Production published by the Commonwealth Statistician are more complete than those published at annual periods in any other country. Even the periodical censuses of the U.K. and U.S.A. are no more complete than are those published annually in Australia." The figures in no instance known to me, certainly for intercensal years, represent

actual receipts, but total values computed on the basis of average prices at particular dates. King took monthly sales and prices (57). The expenses are derived from the census particulars, especially for fertilisers, which in the States in 1919-21 worked out at about 15 per cent. of the gross income. The elaborate U.S.A. estimates bring into the computation gains and losses an inventory of farm land and property, which covers not only values of crops on hand but also actual variations in the values of farms, on the principle in Section 19.

In Canada five-eighths of the population produce farm utilities, and it is assumed the remainder are "proportionately as productive." But fortunately there are other checks.

The Irish Free State estimates also give the output at retail prices derived from the gross output, taking stock changes into account, because the special nature of agriculture there makes them include the *retail* value of farm produce consumed by farmers. It is not general, however, to make a large retail profit out of oneself, for inclusion in the national income (55).

In Australia the prices used are those at the cities, and these include a good deal of merchanting and transport profit (assumed to be one-third of such profits), and the deduction for renewals and replacements is 10 per cent., copied from Great Britain without comment (91). In Greece import prices are adopted. In France the profits of agriculture, until the results of the general agricultural enquiry are known, are dependent on the *Statistique agricole annuelle*, which, while often seriously criticised, has, at any rate, "le mérite d'exister." The figures of gross "végétale" production are priced and the consumption for annual production estimated. The wages previously determined for this class are deducted and a further subtraction made for working expenses (based on the 1882 and 1892 enquiries, but now raised for the heavier modern use of machinery and fertilisers). Seven per cent. is deducted for sowing, and general expenses come to 25 per cent. of the remaining 93 per cent. gross production. Deterioration of implements and stock and

buildings is not taken into account in the Russian estimates. Gini's estimate of 24 per cent. as a proper deduction for seed, upkeep, etc., has influenced writers in other Latin countries.

"The estimates of national income which take no account of qualitative deterioration cannot present the actual dynamics of the physical volume of national production" (13).

Where a census of agricultural produce is not available, estimates have been made for the product, on a population basis and sample family budgets. Thus, for Egypt, Dr. Levi used the details collected by T. L. Bennett for a cost of living index of family budget consumption of meat, milk, butter, cheese, fowls and fish, taking the unweighted average of two classes of budgets, and multiplying these quantities by the population figures and pricing the results at wholesale with allowance for transport. The results were severely criticised by Baxter because they involved total expenditure by individuals double their earnings from all sources! It is interesting to see what a wide range of statistics may be pressed into service when we find Mr. J. I. Craig, the Controller of Statistics, defending Dr. Levi, by the use of food values, taking the energy calories, the protein and fats contents of the average budget, and checking the totals against the known results elsewhere, after making allowances in the calories totals for climatic differences, and finding that the budgets were not only consistent, but that the work of the individual could not have been done on much less. He also appealed from dietetic evidence to show how the average consumption of the clerk and artisan classes might be applied to fellahin and others.

The most recent estimates for Poland are based on family budgets. (Agriculture employs 64 per cent. of the population.) These show the proportion of income spent on different items. The actual total consumption of certain selected commodities by the whole population is known. The method is to multiply the total consumption of these commodities by the proportion of income spent on them in the average family budgets to get the value of the total consumption of all commodities. (Current investment is of course added.)

For Greece the total amount spent for "alimentation" is

multiplied by its percentage of all income arrived at by "demographic methods" (*i.e.* comparative guesswork).

In Bulgaria, the census gives the number of women engaged in agricultural work; they are assumed to work 100 days p.a. at one-half of the average money wage of the ordinary urban labourer (101).

Vandellós gives the estimate for agriculture in Spain as follows: average figures 1903-12 for harvests collected by the *Junta Consultiva Agronomica* were reviewed and corrected arbitrarily; in view of a percentage of 30 per cent. used in France in 1875 and 25 in Italy before the war, he then adopts $27\frac{1}{2}$ per cent. as Spain's proportion for capitalisation, but in computing his income tables, takes the full production. The other categories are all derived by multipliers in five classes: agriculture, animals, mines, industry and commerce. The figures for 1923 involve taking revenue as 25 per cent. of agricultural production to get capital values, and revenue is obtained by "la méthode des multiplicateurs pour arriver à un résultat probable."

For Portugal, what he calls an approximate figure is arrived at on model lines. A writer, Ponsard, in *Le Portugal inconnu*, gives the story of thirty-five families, and for twenty-one computes the family income, and guesses the remainder. From this, Gini found an *average* family income, which has been taken as a minimum, and applied to the whole, on a population basis, there being 160 people in the sample, and 6,100,000 people in Portugal, thus giving 435,000 contos, which was raised to "450,000 to 500,000," on a comparison with Spain (95).

Another very hazardous method is to reach a capital value of wealth as a whole, or landed wealth in particular, from successions, by using a multiplier representing the devolution through mortality rates, and then reckoning an arbitrary percentage on this for the annual yield. This was followed by Barthe for a pre-war estimate for Spain—he used the multiplier 37 and $3\frac{1}{2}$ per cent. as the income, but without any enthusiasm concerning his own results. He was aware that the multiplier always gives too low a figure, and invented a "coefficient of evasion," which he thought, for

Spain, ought to be substantial. But finally he presented his results for wealth in the usual inventory form :—Agriculture 40 per cent. of the whole : Animals, Houses, Industrial establishments, *mobilier*, precious metals, industrial values, reserves *en magasin*, public debt—surely as strange a grouping as we shall find. Vandellós, estimating for 1924, kept much the same framework (95).

The general estimates for Russia are based on government statistics of production, but one endeavour was made by Litoshenko in 1925 based on income return, wages, workers' budgets, etc. (13).

15. *The Duplication Problem—Official Salaries*

Under the heading of duplication comes the question of incomes paid out of taxation. Personal taxes such as an income-tax are not deductions from the gross income out of which they are paid, and the higher the income-tax and the more the number of people employed by the State, the greater will be the total national income reckoned by our primary principle ; whereas, of course, there may be no corresponding increase in the total quantity of physical goods to be enjoyed—they are merely distributed between primary and secondary earners. In this sense we are at once in the realm of duplication for services, and an excessive number of Civil servants may be exactly parallel to an excessive number of doctors. Even if the tax expenditure takes the form of encouraging physical production, it may be said to be only substituted for the physical production that would have been required by the taxpayers if they had not been so highly taxed. To pass from this question related to the nature of services, it is more important to look at the form of the tax. A Customs Duty may be said to absorb part of the purchasing power of the individual, just as much as an income tax, and, therefore, to have a similar effect. But it is not so clear that a tax which is allowed as a business expense in computing income for tax has this result. Let it be supposed that a business with a profit of £10,000 a year is charged with £1000 for certain

essential national services, *e.g.* State doctors for the wage-earners. The national income will fall in this regard from £10,000 to £9000 unless the £1000 earned by the doctors is added. What has happened is that the total produce being the same, the owners of business are entitled to enjoy less, the wage-earners enjoy the same and the doctors enjoy an amount which, by hypothesis, they did not have before. The alternative way of doing it would have been for the full £10,000 to be distributed in dividends to the business owners as income, and for an income-tax to have been levied upon them to the tune of £1000, out of which the doctors were paid. In the first instance, when the doctors were idle, the national income was, say, £30,000; in the second instance it was £29,000, unless the £1000 earned by the doctors was added in again, making it £30,000. In the third case, it is £30,000 until the income of the doctors is added in, when it becomes £31,000. It seems clear, therefore, that services *must* be added in where they are met by direct or taxing payments charged in industry, and reducing its profits, and that when paid by direct taxes not charged to business, whether they should be added in or not, and not reducing incomes, turns upon the same point as duplication for services already considered.

After writing the above, I was amused to find the point, and the doctors, anticipated sixty-eight years ago in an International Statistical Congress :

Supposons que les médecins ne reçoivent pas leurs honoraires du malade même, *pour chaque service rendu*, mais qu'ils fussent salariés par le public (l'État) pour donner leurs secours gratis (comme cela a lieu effectivement pour les médecins militaires). Le résultat quant à la société serait évidemment le même, mais ce revenu ne pourrait être considéré comme une part du revenu national qu'en défalquant la même valeur des autres revenus dans les parts d'impôts; peu importe que le paiement se fasse ou non par l'intermédiaire de l'État.

On demande donc—pour trouver le chiffre du revenu national par l'addition des revenus individuels—s'il ne faudrait pas se tenir strictement aux revenus obtenus par la production immédiate d'objets échangeables; en d'autres termes aux revenus, prix des services productifs dont la valeur peut se retrouver dans la richesse produite par l'analyse des prix de revient.

Ce point de vue exclusif n'aurait rien d'injuste pour les producteurs dits *immatériels*. Leur travail est de la plus haute importance pour la production matérielle en général, principalement comme cause et comme auxiliaire de production future. Que deviendrait à la longue la production si on négligeait la santé, la science, la discipline de la jeunesse ; si on n'élevait les cœurs, si on n'annoblissait les pensées, la vie sociale et même les délasséments ?

Évidemment le niveau social baisserait et avec lui le résultat productif.¹

16. *The Duplication Problem—Houses, etc.*

It is generally agreed that payment for rent of houses is a way of spending one's income, and not a reduction of income, while to the recipients it certainly represents income. Now this conception gives rise to two difficulties, first, where no rent is paid except by the owner to himself, the view taken in some countries is that there is no addition to the national income, but a strict parallel to the first case adds the rental value of the house occupied by its owner to his income. If this were not so, the national income would vary without any change in the outward physical assets enjoyed, as men moved in and out of each other's houses, and the arbitrary act of renting houses to each other would change the national income. This argument determined King to include "imputed income" (31). But the latest official American estimate omits it with the comment, "there is some doubt as to the propriety of including this item, since the ownership of a home combined with its possession does not constitute a participation by the proprietor in the economic activity of the nation in the same recognised fashion as does his work for wages, profit or salary, or his capital investment in industry" (93). On the other hand, why do we single out a house as the only item of capital assets enjoyed by the individual, which gives rise to an unseen annual income? Why not his pictures and his furniture, his books and even money spent on his education? The rejoinder of the materialist is that we get into this

¹ *Congrès International de Statistique à La Haye*, 1869, première partie, p. 141. Revenu annuel de la nation (Rapporteur M. J. L. de Bruyn Kops)

difficulty the moment we depart from the objective scheme. The only safe income to reckon is the materially produced income. Renting a house redistributes this, but does not alter its total.

When a new house is built out of savings, the expenditure does not diminish the income of the owner, but at the same time it creates income for those engaged in building. The objective parallel is that the owner consumes less consumable goods but more bricks, whereas if he had not built the house he would have had the same net objective production in consumable goods, while the income of the producers would have been the same, because instead of building a house, those engaged thereon would have produced his extra consumable goods.

In my *British Incomes* I face this dilemma by saying that as the renting of houses was customary, its income-producing capacity could not be ignored, even though it only provided an annual service (and not a new supply of goods), and it was more convenient to assimilate owner occupation to this state of affairs of service in rent than to blot out such service income altogether.

Mr. S. A. Cudmore, for Canada, says, "Certainly most people never think of their non-money income as income at all, and would never dream of putting the rental value of their owned houses into their income-tax returns"—and they are not required to do so. But he agrees that this makes comparisons between urban and rural families misleading, and his totals include owned houses, home produce on farms and in gardens, and personal service excluding the work of wives. Part of the reason for the hesitant attitude in the United States on this problem is no doubt the fact that ownership and tenancy are about equally divided, tenancy being 53 per cent. for non-farm houses and 45 per cent. for farm houses.

The income received by individuals from Government interest paid out of taxation is the one section of duplicated income that should be clearly distinguished. The same problem arises in estimates of national wealth, as to whether the capital value of the debt, which is wealth to individuals,

should be added to the capital values of all other physical assets. Giffen at first considered it a duplication; later, that the value of the other property, subject to a hidden mortgage charge through taxation, was diminished. Before the war I examined this contention in detail and concluded that there was a partial duplication, but afterwards I dealt with the matter as one of degree and refused to admit that the "bigger the debt the bigger the income" (85). Bowley and I made an express exclusion of this interest payment, as not being given in return for any current services, a mere redistribution of produce for some past *quid pro quo*. Our distinct computations for aggregate income, disposable income, personal income and social income made full allowance for these distinctions (88). The exclusion is recognised by American writers.

Morris Copeland accepts the British method, and in analysing King's figure says, "Whether King is right in including interest on our domestic war debt as an item of national income, depends upon the incidence of taxation which services this debt. If these taxes (1) fall on other properties, (2) cannot be passed on, (3) become capitalised into discounts in the value of the properties, we may fairly argue that the interest should be included . . . theoretically, the case against including it seems fairly conclusive. . . ." Practically he wishes to determine which part to exclude.

On the analogy of house ownership not being converted into new national income by the mere process of mutual letting, he concludes that national income should not be decreased by a mere increase in government ownership. "We have, with Stamp, argued against King's concept, but on different grounds, viz. the need of a reasonable relationship between income and wealth." (31).

On similar lines, the British estimates exclude pensions, which, in so far as they come out of taxes which have not been deductions in arriving at other people's incomes, swell the totals. No *current* services are being rendered, so that the duplication that would be permissible if a doctor were paid out of taxation income is not allowable. If the pensioner, or the war loan interest, were paid direct by the

citizen instead of out of taxation, the charge would reduce their taxable income, but the doctor's charge would not, so that the method is completely consistent. Rogowski seems to agree in principle to exclude war pensions and interest on non-productive debt, but it is not very clear whether he has actually done so. Relief and charity is a mere redistribution, and if specially included, for the recipients, would be a duplication, except where it is paid by a business which can treat it as an expense (93). Similarly, industrial pensions should be treated as postponed wages.

In recent American official estimates "work relief wages" since 1933 are shown separately, but included in "total income paid out," and the whole trend of the national income figures from 1929 to 1935 is affected by the number of regular governmental employees paid out of taxation. It is criticised as altering distribution, but not on account of its falsifying the absolute total of income.

Pensions are included in most American estimates, regardless of their source, but "relief payments" only appear in one formal estimate. Argument on the principle is found in the National Industrial Conference Board's work on the subject (72).

The severely objective view of national income taken by Fellner, for Hungary, leads to a strange consequence in dealing with income from travel. He computes that 173,000 foreign visitors, crossing the frontier, spend in railway fares 45 pengos per head, from which he computes the addition to the national income. The rest of their spending has already come into the proceeds of production. (The passenger fares of residents have been ignored under his definition.) Then he proceeds to make a deduction from the national income for what Hungarians spend abroad. In the absence of better statistics, he computes from the railway ticket coupons dealt with, the money flowing from Hungary into foreign countries for summer holidays, and deducts the result as a liability. Apparently the wealthier Hungarians become the more they will take such holidays, but the national income must be blind to additions to the incomes so spent. He quotes Gurtler and Winkler as objecting to

this conception, because it is merely a method of consuming income. Fellner answers them in detail, concluding with the words, " Travelling expenditure of citizens of the country spent abroad has the same effect as payment of interest to persons residing in foreign countries, which payment diminishes national income."

In the Russian computations excise duties have been excluded " because they do not constitute a part of the value of national production." Income from road transport is partly included in the income from agriculture, as the latter is calculated at market prices and not at those obtained at the peasants' homesteads, and partly included in income for trade, which also includes transport expenses. It is therefore excluded as an independent item of national production or income.

As an odd example of the duplication argument I may quote :

Mr. Baxter would have the cost of the Irrigation Service omitted from that part of the income which arises from payment to Government officials, since it is already included in the cost of raising crops and must not be counted twice over. Why does he not equally demand the reduction of the national income by, say, part of the cost of the Ministry of Justice, of the police, of the army and even of high officials in the Ministry of Finance ? Without justice and without the protection of the police and army, and without the skilled advice of the officials, it would be impossible for the fellah to produce the crops he does. The reason is obvious. They all perform real services, and these must be added to the national dividend at the value placed upon them by a hard-hearted Treasury . . . the produce of the land, labour and capital of the country consists of certain commodities and certain services . . . quite indefensible to consider they have been included in the income measured by the material produce (32).

In the estimate for Poland (14) the cost of education given free is added. One estimate for Greece added to production the difference between imports and exports, although it seemed to be a genuine " deficit."

A new work by Mr. Colin Clark starts (1937) a fresh idea. In addition to the money income of the taxpayer, and that of the person whose remuneration is paid out of taxes, he

includes the gross total of Government revenue from indirect taxes. "The reason for this is that, in comparing one year with another, national income figures have to be divided by price index numbers, which incorporate the effects of changes in indirect taxation." I find the concept confusing and the reasons unconvincing, but this is not the place to examine the theory in detail.¹

17. Causes of Differences between the Methods

Values by the objective method through a census, and by the subjective method through profits and wages, should theoretically coincide, but owing to the conventions upon which profits are computed, there may be important differences at times when price levels are rapidly altering. First, the profits for a year are affected by the methods of valuing the stock at the beginning and end. Stocktaking is a device for eliminating the cost of manufacturing a thing which has not yet been sold. The census normally takes gross output at its sale price and, therefore, brings in unrealised profits on goods that have been made. A profit and loss account ignores such profits. If the quantity at the beginning and the end of the year is the same, there is no difference between the two methods. But if the quantity has materially altered on advancing or declining trade, the difference may be important. Again, if the price has materially fallen, any ordinary accountancy method writes off against the profits of the year, through its valuation of stock, a secret reserve for the loss when it is made. By not taking into account unrealised profits, by dealing with differences in quantity and differences in price, in a time of rapid movement results may emerge which give differences between the two methods.²

The second element relates to the elimination of bad debts, against which, in bad times, there are special precautionary reserves. These do not necessarily appear in the census. Third is the difference between depreciations and renewal,

¹ Vide *Journal of Public Administration*, 1937.

² Mr. Colin Clark has introduced an elaborate correction (p. 26), but on erroneous lines, because cumulative,

and a census may show repairs and replacements of a very small amount where accountancy spread over a long life makes a heavier charge. Many taxation systems give a heavy allowance in the early history of a plant and a small allowance at the end.

In the fourth place, profits for taxation in computing payments that go out from concerns to others are not necessarily the same as the payments that come in, whereas all such transfers of goods in a census will cancel out, for the taxation rules about computation of profits treat some payments by the payer as capital and by the recipient as income, and others by the payer as expenses and by the recipients as capital. My own conclusion in considering the British case between the estimates of Dr. Bowley and myself on the subjective method, as against Sir A. Flux's on the objective, was that the income method was almost certain to fall below the census during times of business difficulty. This view is recently confirmed by the official American report (93).

On this confusion about personal services, Dr. Coates has pointed out that it is difficult to know by what means the spending part, *i.e.* payments for private journeys, are separated from the earning part, *i.e.* payments for business journeys on the railways. This fact alone would make the estimate of service income extremely difficult to reconcile.

Professor Gini has said that a moving national income could not be measured for the same reasons as a moving object could not be weighed.

18. *Territorial Divisions and Adjustments*

It is sometimes necessary to apply the statistics compiled for a particular area to a wider or narrower area or to use them as a basis. The computation of the individual incomes for all Germany from the Prussian totals is the most important instance, and it has been done by a straight addition of 60 per cent. on a population basis by several writers. Reductions of pre-war Germany estimates to post-war areas have been similarly made on a population basis.

For comparative purposes, when the Irish Free State was formed and the statistics of the United Kingdom were thus affected, it was often assumed for official computation that a deduction of 4 per cent. from the aggregate would be a satisfactory adjustment. This was based on a combination of various tests and valuations. When an independent calculation came to be made for the new area by T. J. Kiernan, it proved to be practically $4\frac{1}{2}$ per cent. From 1842 to 1853 there was no income-tax in Ireland as a whole, and to establish a notional total of income-tax liability for eleven years for inclusion with Great Britain, so as to get a comparable sequence, I constructed an index-number made up of a consumption index, an external trade index and a finance index. The first comprised twelve elements with continuous statistics, quantities of spirits distilled and charged for home consumption, bushels of malt charged, four kinds of licences for liquor, licences for tea and coffee, post licences, tobacco dealers and manufacturers, attorneys, notaries and conveyances; the second sub-index we based on the note circulation, and the third upon exports and imports, coasting brand, tonnage cleared. This index gave a difference in a post-1853 control or known period of 0.4 per cent., with a maximum difference of 4.7 per cent., and a modal difference of under 1 per cent. It was then applied to carry back the known Irish figures from 1853 to 1842. I also assumed that the same percentage of Great Britain obtained before as after 1853, and took a mean of these results which were generally close. Elements other than profits presented less difficulty (84).

Perhaps the most elaborate area division that has been attempted is that of the estimate for old Austria, into its successive States as at present constituted, made by E. Waisner, working upon the estimates of Fellner, Gurtler and others. It employs many devices for the territorial allotment of the various figures, including area, stock and population, and shows clearly that such divisions do not lend themselves to general principles but depend upon the extent to which auxiliary statistics are available (96).

19. *The Elements of Capital Value*

American writers have included the rise in the market value of capital assets under income (or the fall as a deduction) (56, 57), but the practice is not generally accepted in other countries. It is abhorrent to British thought, with its sharp taxation distinctions between income and capital appreciation. Irving Fisher (40) subjects it to ridicule: "The first publication of large American 'incomes' revealed the surprising fact that a neighbor of moderate means had in 1930 an 'income' of \$331,000! This high figure was due to distress selling of old family property. The true income, ordinarily about \$10,000, had been reduced. Another person with about the same income . . . was able to report in 1935 an 'income' of *minus* \$235,000." Morris Copeland (31) shows how the practical difficulties stand in the way of effective use, but his objection to including scarcity appreciation as an item in total wealth is that it is "valid or untenable according to the type of total income under consideration." The British concept of savings is the excess of money income over actual consumption in the year, regardless of a depreciation in the value of the main body of previously existing assets not being actual wear and tear but market value changes. The American or "King" concept estimates savings after allowing for such depletion of capital values.

Copeland analyses King's concepts of realised and accrued income. The realised income is not entirely a consistent idea, but a compromise. In agriculture it *includes* business savings before taking account of the changes of market values of farm property. In the other groups, business savings are omitted. King desires to give a figure in realised income for year to year comparison which is not dependent on the doubtful items "business savings" and "appreciation." When King seeks to diminish or increase business savings by the changes in capital values, he departs entirely from the concepts adopted by any other country. Copeland considers that the objection to including scarcity appreciation as an item in *total* income is valid or untenable according to whether the type of total income under consideration is accrued

income, in deflated dollars, or current dollars—an almost metaphysical distinction. “ King uses increases in market valuation of securities, less new money invested, as a basis for estimating business savings in important industry groups.” The shift from a book value basis to a security market value basis is due partly to defects in existing data, but also to King’s view that book values do not move sufficiently with price changes. Copeland criticises *not* the main principle, but these means for expressing it.

Recent American estimates aggregate “ income paid out ” to individuals, and in late years this has exceeded “ income produced.” In 1935, business savings were represented by a net loss of \$628 m. These were entirely an account of corporations, the net business savings of individual “ entrepreneurs ” amounting to \$815 m.

I remain an unrepentant believer that it is all very confusing and unnecessary, and am not very sympathetic to the mass of difficulties which attend its practical application. I can only repeat my original objection,¹ “ with our much clearer cut concept of the distinction between income values and capital values, this process seems very artificial and un-English, but it is ‘ all of a piece ’ with the strange compound of capital changes and income in the American system of taxation. We ask why there should be any difference if £100 of profit is distributed and £20 put back by subscription of new capital into a business, and distributing £80 and keeping £20 back for business expansion.” One of the Directors’ comments was that “ it is difficult to imagine a case in which the total figures, including the inventory gain, would be useful.” As the rate of profits increases, the capital values based thereon (as an indication of future income) increase too, and to reckon both is to get it twice over.

The treatment is dependent upon national psychology and systems of taxation, but the most recent *official* view in the United States is showing a complete change : “ The inclusion of gains and losses yielded by such changes in asset values would be either a duplication, since it would amount to counting both a change in net income, and the change in

¹ *Statistical Journal*, 1927, p. 165.

capitalisation of that income, or a distortion of the national income estimate as a measure of the economic system's end product" (93). It seems clear that the publication to the nation of figures of national income already heavily diminished, but reduced to a minus quantity by the special deduction of the huge shrinkage in capital values for 1932-1933, was too much for any realistic official statisticians to face!

20. *Reconciliations*

When the two main methods have yielded their results and are brought into comparison, what may be expected to result? Can it be said that one method invariably gives higher totals? Is the proper course to "split the difference," or what combination should be made? Hardly any attention has been given to this as a separate problem, and they tend to be equally valued. Dr. King tells us that when he prepared the objective estimate and Dr. Knauth the personal ones, independently, "it was an exciting moment when the two sets of totals, each covering the years 1909 to 1918 inclusive, were brought together. All concerned were much gratified when it was discovered that the difference between the two estimates was in no year of much consequence" (57). Over the nine years 1910 to 1918 for which the estimates were comparable, the Production Total averaged 40.2 billion dollars, and the Income Estimate 39.5, or 1.7 per cent. less. The highest difference was in 1913, 6.9 per cent., and in two years there was identity. The British totals were brought into juxtaposition at the Royal Statistical Society. For 1911 the Personal was between £2050 and £2150 m., and the census £2000 to £2250 m. For 1924 Bowley and Stamp's estimate was from £3700 to £3900 m., and Sir A. Flux gave £3750 to £4200 m., the middle points being £3800 and £3975 m., about $4\frac{1}{2}$ per cent. difference. Waisner, for Austria, brought out Real and Personal totals, with the latter just 1 per cent. in excess. *Vierteljahrshefte zur Konjunkturforschung*, 1930, Heft 4, contains estimates, 1925 to 1929, under six heads, inventory fashion, and then "Methodische Erläuterungen" depending on tax statistics for incomes, wages and cor-

porations. The results of the latter are not summarised, the estimates resting on the objective method, but on examination and aggregation they are found to tally closely (54.3 to 54.9 md. R.M. for 1925).

A New Zealand estimate was content with £137 m. by personal methods against a value of material production £113 m., adding £20 to £40 m. for personal and professional services, so that "confidence in both the estimate and the census is strengthened." But his colleague Sutcliffe, in Australia, made a much closer job of it, for the estimates were within 0.3 per cent. For other derivative years the differences were 2 per cent. over five years, 1 per cent. over four years.

Dr. Reichlin brought out Swiss estimates at 5700 (Personal) and 5300 (Real) milliards of francs, and adopted the mean figure.

In Canada, the methods by Production, Retail Sales and Earnings, gave \$5016 m., \$5000 m., and \$4952 m. respectively. Two were partly dependent on U.S. comparisons. The conclusion was that an estimate of \$5000 m. would be correct within 2 per cent. maximum error (33). The practice of keeping a running account of the possible error in each factor, to be assembled in the totals, and treated finally with due regard to counterbalancing and the theory of errors, has been begun by Professor Bowley and myself, but has not become general. It is particularly valuable in determining whether two estimates apparently divergent are not actually mutually supporting.

21. *The Price Change Element—Capital Values*

Various countries have been much concerned to reduce the *money* aspect of national income to comparable real incomes, even if the basis of the estimate is not "realistic," so that an objective character may be given to differences over a period. Where the changes have been rapid, as in Germany after the war, the difficulties are very great. Rogowski alters the figures for employment and interest on current prices. The monthly returns of tax from employ-

ments were corrected (1924) by monthly mark values, then divided by the average rate of tax, with additions for abatements and employers' contributions.

The statistical method employed officially in Russia since 1918 has been to compute the national income for 1913 at 1913 and 1900 prices, and by price indices since to adjust the later money totals and get indices of the physical volume of production. The index-numbers are, however, based mainly on commodities which fluctuate strongly, so that the changes in production are unduly stressed. But a more important defect in the totals is a radical failure to allow for a decline in the quality of the goods and commodities produced, owing to the "persistent endeavour of the authorities to reduce the cost of production and to score quantitative results." (13)

Generally, the use of index-numbers is crude and facile, and it would seem that a more detailed effort to suit the sectional indices to sectional parts of the income is very desirable, and the use of a cost of living index is also worth consideration. The recent official American estimate indicates that it requires an all-inclusive index, covering wholesale and retail and all groups of people, and such an index is not available (93). Their view shifts with the definition of income. Thus we get the following statement: Between 1932 and 1935 income *produced* rose 34 per cent., while the index of wholesale prices increased 23 per cent.; and in the latter year income *paid out* showed a rise of 19 per cent. over 1933, while the index of the cost of living had increased only 6 per cent.

22. Conclusion

Dr. Fellner declared at the Tokio meeting of the International Statistical Institute that "estimation of national income is among the most difficult problems of economic statistics," with often nearly unconquerable difficulties. It seems clear that comparative methodology may do much to assist and suggest in practice, and that the severity of Fellner's own conception of national income makes the complications worse. We need not be as pessimistic as the

Verein für Sozialpolitik in the conclusion that "attempts at estimating national income are futile." Rather should we take heart at the progress that has been made in principle and theory, in data and practice, over the long period since the International Congress of Statistics discussed the problem at the Hague in 1869.¹ Great progress has been made in methods, but unfortunately at the same time the problems have become progressively more complicated, and the demands of social theory and enquiry for precise information much more exacting.

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IV

THE INFLUENCE OF THE PRICE LEVEL ON THE HIGHER INCOMES

IV

THE INFLUENCE OF THE PRICE LEVEL ON THE HIGHER INCOMES ¹

I. *The Broad Issues*

ON a crude view of the quantity theory of money, if the purchasing medium were doubled overnight, and perfect mobility existed for the prices of goods and services of all kinds, which in themselves were unchanged in volume and character, all prices and rewards would be expressed in double the amount of money, and everyone would have a doubled money income, but an unchanged real income. The *relative* distribution of incomes would be unchanged. But measured against a fixed scale of money incomes, the statistics of incomes might be rather difficult to read intelligently. Suppose we had the following scale of original incomes which, though hypothetical, is conformable to actual type :

Amounts.					No. of Incomes.
Over	£100,000	.	.	.	100
Between	50,000 and	£100,000	.	.	250
"	25,000	" 50,000	.	.	1,000
"	10,000	" 25,000	.	.	6,000
"	5,000	" 10,000	.	.	16,500
"	2,500	" 5,000	.	.	46,000

After the overnight change in the price level this would read :

Over	£200,000	.	.	.	100
	100,000 to	£200,000	.	.	250
	50,000	" 100,000	.	.	1,000
	20,000	" 50,000	.	.	6,000
	10,000	" 20,000	.	.	16,500
	5,000	" 10,000	.	.	46,000
	2,500	" 5,000	.	.	?

¹ Based on the paper with this title, May 1936. Vide *Journal Royal Statistical Society*, Vol. 99, with additions,

It would be seen that whereas the £50,000 to £100,000 class is four times its proper magnitude, the £10,000 to £50,000 class is only 3.2 times the former numbers, and the £5000 to £10,000 is 2.8 times. At first sight we might declare that each income class ought to have gone up equally.

It may be seen that to set against a range of fixed distance measuring points, a new range of quantities in which the differences have doubled, and which, therefore, stretches over twice the total distance, is to get a false sense of the change that has taken place. It is like setting at the side of a wooden foot-rule an elastic foot-rule, which has been *stretched to twice its normal length*. If they are put level at the beginning, the double distance of the first inch is a different thing altogether from the double distance at the tenth inch, and in connection with comparing fixed scales it is necessary to bear this in mind all the time. Logarithmic spacing may correct this false impression, and that is why the Pareto index scales are the most suitable for registering such changes. On such scales we can just lift the income pyramid bodily for the required distance without changing its shape. Represented graphically, as one side of a pyramid, we might put it thus :

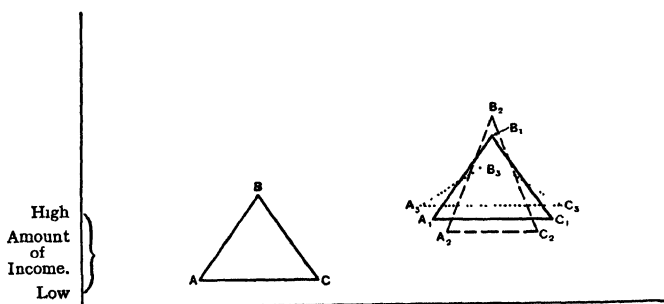


FIG. 1

The pyramid $A B C$ represents the numbers in the classes of incomes at a certain level of price, such that the few at the apex B have the high incomes and the many along the base the lowest. At the second and higher level of prices, the original number $A C$ have higher money incomes and

all the others to correspond. Is the new pyramid the same shape $A_1B_1C_1$ or does it undergo elongation, $A_2B_2C_2$, or compression $A_3B_3C_3$, in the process of being lifted?

But, in fact, changes in price levels are very different in their effects in practice. Even if goods and services are unchanged, a change in the purchasing medium will greatly affect some prices (and therefore some sales and consequently some incomes), and affect them more than others; many customary services, wages and fees with rents and obligated interest, will hardly be affected at all. The ordinary price index change may be much "livelier" than the net change in total incomes. This index change makes a real redistribution of net money incomes as between different categories. If different categories are not proportionately distributed over different magnitudes of incomes, then it will also make a difference in the magnitude distribution. If every income were made up in equal proportions of the various elements, the net relative distribution might be unchanged; but, in fact, large incomes may be quite different in composition from small—they may contain more elements quickly susceptible of change. If wages and interest are immobile, larger incomes drawn mainly from profits may rise disproportionately on a rise of price, and fall much more heavily on a fall. In other words, on a rise of prices, the number of rich may be proportionately greater than the median, and the median than the lower incomes, or, put another way, the top X people may have a larger proportion of the total than before. On a further fall below the assumed norm the position may be reversed, and the top X people may get a much diminished proportion of the total.

But goods and services are unlikely to remain the same with a change in prices. On a rise of price they may be increased in volume through trade activity, and so tend to check the price rise resulting from a given increase in purchasing power. This effect (a new volume of goods or services multiplied by a new price) may not be proportionately spread over the whole community. Fortunately, it is no part of my purpose here to discuss why price levels change, in *fact*, and how far different renderings of the

quantity theory are valid. We can start from the point that changes do actually take place, and with them some change in the amounts of incomes certainly occurs. It may very well be that the change in incomes will not always be the same with a particular change of prices without regard to the way in which that particular change of prices is brought about, viz. changed volume of the purchasing medium, changed volume of goods and services, changed velocity of circulation. But the cause of the change is not determinate—we must just accept the resultant changes of price as the result of composite causes, with a modal influence upon incomes. Even if we assumed that there was an exact direct correlation between prices and incomes (other things being equal), it would by no means follow that the percentage variations would be equal, and, indeed, it is highly improbable. For, accepting the view above that some constituents of income respond rapidly and others are inert, it would be expected that the average deviation for incomes would be smaller than that for prices. If the constitution of particular classes of income corresponds with that of incomes as a whole, and if we class as “inert” the profits assessed to income-tax under Schedules A, B and C (property, ownership and occupation, and income from public securities), three-fourths of salaries under Schedule E, railway profits and interest under Schedule D, and as responsive, one-quarter of Schedule E salaries and all trading profits under Schedule D, the “inert” would be rather less than 60 per cent. of the whole (in 1933). Even exact correlation, therefore, might well be accompanied by an average deviation (in incomes) less than the average deviation in prices, and we might hazard a guess that it would be about one-half at most. On the other hand, if we took, not a wholesale price index affecting profits, but a cost-of-living index representing purchasing power of wages (with many inert items), and remember that the link between such a cost-of-living index and the high incomes must be remote both in theory and practice, we should expect the degree of correlation to be far less, but the extent of variation much closer.

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What has happened to incomes in actual fact? Is it possible to test any of these points? A statistical graduation of income in the mass is not available in this country, but we have now for over twenty years the annual super-tax (now surtax) statistics, which at the present time give the incomes above £2000 p.a., and began with those over £5000 p.a. in 1911-12. (The two earlier years were given in the Statistical Tables of the Royal Commission on the Income-Tax 1920, but they are omitted here in order to give the statistics an opportunity to "get into their stride.") This material, summarised in Appendix I, is the basis of the present enquiry, but it is not possible to extend the enquiry upon similar lines to the great mass of lower incomes, for the material does not exist. A special effort was made for the Royal Commission on Income-Tax in 1920, but there is no annual sequence.

2. *Tests of Relative Distributions of Income*

Before we examine the data from different points of view, it is important to consider what tests we shall apply, because defects or peculiarities in the data will be important in some connections, but unimportant in others. For example, if we were concerned with the absolute accuracy of the data, in total, and as distributed, certain defects would be most important and certain tests paramount. But if our objective is accuracy of yearly *comparisons* only, those peculiarities, if constant in character, may be unimportant, and other tests are more appropriate.

It may be well to pass briefly in review the various devices for measuring or contrasting distribution of incomes according to size. The most familiar is, of course, "Pareto's Law" or formula, for which at one time rather formidable claims were made, but which has suffered criticism on its mathematical basis, and also, more recently, because it is said to give really a much poorer fit to the data than had been supposed. In its simplest and most categorical expression, if the income distribution is plotted upon a double logarithmic graph with one axis representing numbers of incomes

above stated amounts, and the other, those levels of income, the points will be upon a straight line, the equation being $\log N = \log A - a \log x$, where x is the level of income, and N the total number of incomes of that size and more. When Pareto found that for all the statistics of modern times and countries available, the straight line was a good fit, and a was pretty constant round 1.5, he concluded that some fundamental force made incomes behave so, and therefore that the only way to improve incomes or economic welfare was by increasing production and the whole range of income, and that it was useless to depend upon the usual panacea of redistribution of incomes.

F. R. Macaulay showed that the Pareto line was nothing more than the ordinary tail of an extremely skewed distribution. But if it served for interpolation and a little extrapolation, this was not actually to condemn it, for all purposes, as so many have done. But it was considered also intrinsically unlikely that the summation of a number of separate distribution curves for the different *classes* of income would give a composite result having any of the fundamental significance usually attached by Pareto to it. Personally, my instinct would be to expect that the discontinuities of sectional distributions would be generally greater than those of the aggregate. In any case, in the lower sections of income there are sometimes customary points, such as £300 or £400, which gave heavy sub-modal points, intermediate salaries, etc., being found in far fewer cases. And the peculiarities of tax assessments have been responsible for the failure of the Pareto index to give results coinciding with the actual tax exemption points or statistics at other administratively critical points of the scale. I have described this phenomenon elsewhere. Apart from this, the actual points at the top tend to be on the left of the line (*i.e.* fewer large incomes than the index for the main section would indicate), and at the bottom to the right of the line for the small incomes, much more numerous than this index would indicate. In consequence, a line joining the actual plotted distribution tends to be rather like an elongated reversed S with a long, straight middle section. For extrapolation purposes in

middle ranges it has, in my judgment, despite the criticism of extreme claims, some considerable uses, and my description of the practical use made of the initial gap on the inception of the super-tax was described by me some years ago, and has often been quoted.

Three recent contributions to the subject in the *Economic Journal* have challenged the goodness of fit in Indian statistics, have reinforced the value of this fit, and generally made a closer analysis of the use of the formula. But there is little in this literature that is germane to the use that I shall make of it—limited, in fact (1) to interpolation in fairly narrow ranges, and (2) to a straight computation for comparative purposes. As a matter of fact, for this second use it tends to condense, through logarithms, and to make annual changes less visible to the eye than other ways of treating the same statistics.

In 1931, R. Gibrat, a French writer,¹ suggested a modification of the Pareto idea through a normal curve of error adjusted by a selected income constant $(x - x_0)$ with the equation $y = \pi^{-\frac{1}{2}} c^{-x^2}$ and $z = a \log (x - x_0) + b$, y being the number of incomes and x the amount of income. The usual objective of these formulæ is a determinant of inequality, and with Pareto's α the higher the value the steeper is the slope, and the less the inequality. Conradi Gini has a concentration index δ similar in origin to Pareto, but involving the total amount of incomes over a certain size. It can be expressed in terms of Pareto as $\delta = \alpha/(\alpha - 1)$.

Coefficients of dispersion have been used, as average or standard deviations from some mode or average. These have only a limited use for the purpose of this paper. The Lorenz method plots the cumulative percentage of aggregated incomes along the horizontal axis, so that an equal distribution gives a straight line at an angle of 45° , and inequality is the greater as the curve of actual income bulges further from this axis.

The general study of the problems suggests, first, that as there are many different questions involved in income distribution, different methods of measurement are best adapted

¹ *Les Inégalités Economiques*.

to particular ends, and one is justified in choosing *ad hoc* by trial that method best adapted for the purpose in hand. Second, that many suppositions derived by abstract reasoning from general principles as to the behaviour of distributions under different conditions are falsified when tested against statistical data. Thus Morris Copeland in 1932 suggested that the distribution of all incomes tends to become more concentrated in years of depression and less concentrated in years of prosperity—a conclusion which has been doubted. Simon Kuznets says that “all studies tend to disregard the absolute size of incomes and study only relative inequality, although most of them note the positive correlation in time between size of average income and extent of inequality. But from the point of view of welfare, capital formation or other analytic implication of a frequency distribution of income, the absolute size of incomes involved is of material importance. Income inequality may decline during years of depression, but the welfare inequality may rise materially because of the general lowering of the absolute level of incomes. Similarly, inequality may be more conspicuous in one country than in another, but because of difference in the absolute size of income, the capital-forming power of the second country may be greater than that of the first ; that is, assuming that inequality of distribution stimulates capital formation, a rather doubtful hypothesis” (Simon Kuznets, “National Income,” *Encyclopædia of the Social Sciences*). Now, except so far as a rise or fall in the price level may be closely associated with prosperity or depression, the question of the effect of the fluctuation of prices upon distribution has hardly been suggested, let alone examined.

3. *Examination of the Data*

It is not possible to examine the effect of price fluctuation on less than an annual basis, because income itself is not known for a shorter period, and, in fact, the term “income” is almost meaningless in statistics save as an annual concept, and even here has severe limitations. This involves

bringing the price-level indexes on to an annual basis, either by a weighted collection of annual average prices, or by an average of twelve monthly indexes. The latter is the most available method, but our *Sauerbeck Statist* index produces its own annual figure which must serve for our purpose. (The tests I have made with other indexes make no substantial difference in the conclusions.) But I have also occasion to use the cost-of-living index as subject to much narrower fluctuations than wholesale prices, and perhaps reflecting incomes more naturally, though least naturally the higher incomes. On the income side we have to consider the nature of the statistical material carefully from three points of view. The statistics of incomes are of legal or statutory incomes. First, how closely do statutory incomes for taxation conform to actual money incomes as commonly understood, both absolutely as to magnitude and relatively as to fluctuation from year to year? How far have there been changes of statutory bases such that there are "breaks" affecting comparisons, because incomes are differently computed in different years? Second, how far do the published statistics represent the actual statutory incomes for the periods indicated? Third, with what *actual* periods of time do the *legal* incomes correspond, and is the demarcation clear or blurred, and if blurred, how far are real fluctuations artificially smoothed out or provoked by the statistical and the statutory conditions combined? In short, under these heads have we such difficulties that comparisons of short period fluctuations are fallacious or unreliable?

(1) *The conformity of statutory assessments with actual income.*—Monetary and spendable incomes, particularly in higher stages, tend to fluctuate much less violently than full business profits because of rents and inert items of income. Statutory profits for taxation tend to fluctuate less than real commercial profits, in so far as stock valuations make inner reserves by accountancy practice, and in so far as losses are carried forward against profits, and in so far as renewals and depreciation are allowed on a more even basis than in actual business accounts. But aggregate dividends tend to fluctuate less than either real or statutory profits because of the con-

servative or "steady dividend" practice of refraining from paying away full profits in good times, and making a big effort to pay dividends, if necessary, from reserve amounts carried forward in bad times. And dividends, rather than profits, count for taxation of individual incomes over the greater part of the field. Rents and salaries are hardly responsive at all to quick external fluctuations individually, though they will disappear and reappear with changes of national prosperity. But there is no reason why total statutory incomes should not approximate to total economic individual income in the long run, if perfectly assessed. (This absolute identity will not exist to the same extent with total *profits*, because of the continuous process of creating collective incomes in excess of distributed income, by companies with increasing free reserves—which on balance is in excess even in bad times in this country.) But fluctuations must tend to be obscured.

With imperfect assessment, or evasion, the absolute difference increases, but the fluctuations are not necessarily affected to anything like the same extent. A constant loss of, say, 20 per cent. in the aggregate, making the absolute totals unreliable, might not invalidate comparisons of fluctuations in the least. Nor need we know the precise degree of the loss. If fraudulent evasion tends to be greater where incomes are rising and less when they are falling, then this element would reduce fluctuation. But we have no evidence that this is the case, particularly for short-run comparisons. Some people are more willing to pay up to the mark when the "going is good," or they may be forced by hard times into loose consciences. Others are reluctant to show the full extent of growing good-fortune. These elements would affect the fluctuations of the aggregates liable. But they would not affect the relative distribution unless the tendency to evasion is greater, *pro rata*, at some points in the scale than at others, and even then they would not affect the comparative statistical or relative distribution from year to year unless these differential tendencies were also affected, and the points of particular susceptibility to the idiosyncrasy in question tend to shift up and down the scale. Now, the

moment we make comparisons of the inequality of distribution over considerable periods of time, to see whether inequality is getting greater or less, these questions as to whether evasion is becoming different, *pro rata*, at different levels, become important, and the increase or decrease of evasion as a whole is also significant, but for a year-to-year comparison of differences it is much reduced as a disturbing factor.

Similar considerations apply to legal avoidance, or the numerous devices invented to reduce liability—creation of trusts and income charges, registration of private companies abroad, etc. Do these operate to a higher proportionate extent in the higher brackets than in the lower? If the average real income of £10,000 is reduced in this way by £ x , is the £50,000 income reduced by £5 x or some higher amount, and the £100,000 income by £10 x , or must we say £20 x ? If so, then the Pareto index or slope must be definitely affected, and we may draw wrong deductions therefrom as to distribution and inequality. But it may well be that the effect is much the same most of the way down, leaving α untouched. Moreover, if the tendency greatly increased over a period of years, so long as it was still proportionately spread all the way down, then α would again, *ceteris paribus*, be unaffected. But even suppose it is quite disproportionately spread, we are at this point mostly concerned with the short-period fluctuation, and this comparison can only be vitiated if the *extent* of the disproportion changes from year to year.

(2) *The conformity of published statistics with the actual statutory incomes for the periods stated.* The statistics for a particular year of assessment are not actually complete until a full six years after, because power to assess, or to add to assessments, exists over the whole period, and adjustments are continually being made. This does not necessarily mean that we can make no use of the tables since 1928, because each year's report gives the latest figures for each of the last six years of assessment. Any given year of assessment will thus appear six times, with figures advancing in the aggregate and for each class each year. The absolute differences

between the earliest and last year are, of course, important, but it does not follow that the *slope* of distribution is altered. If all the classes get the same percentage addition of new assessments every year of the six-year period, then the earliest report will be as useful as the latest. But there is a *prima facie* case for assuming that in the first years the obviously liable cases will be found and assessed, and that in the later years more and more of the obscurer cases close to the margin of liability at the bottom will be gradually traced. If so, the lower classes would be relatively deficient on the first reports, and would be increased to a much more than proportionate extent, as time allowed. This was certainly the case in the earliest days of the super-tax, and when the six-year rule did not apply. (See *Wealth and Taxable Capacity*, also *Statistical Journal*, 1911, p. 200, "A New Illustration of Pareto's Law.") It follows that the statistics for any particular year should always be taken from the latest report, which supersedes all the earlier ones for that year. But the question whether we can use the uncompleted years for our survey with safety, or if not, what the extent and nature of the correction should be, can best be answered by an actual examination of a particular year for six years' statistics. The last completed one is 1928-9. The reports are reproduced in Table I, p. 133.

If we treat the first year as 1000 in each class, the successive additions for succeeding years are shown in Table II.

It will be seen that the lowest class increased by 7 per cent. against just over 4 per cent. in the next three classes, as was suggested above. Then there was a small surge through these classes leading to an increase in the next of $8\frac{1}{2}$ per cent., and in the highest class of over 13 per cent., but, of course, this is small in absolute amount. In the aggregate the bulk of the increase 2.6 per cent. came in the second year, 1.5 in the third, 1.0 in the fourth, and 0.3 per cent. in the last. In order to see how far this result is characteristic, we may examine 1929-30 for four years, as in Table IV.

Here 2 per cent. was gained in the second year, and it

TABLE I
Super-tax, Year 1928-9

Class.		As in 1931.		As in 1932.		As in 1933.		As in 1934.		As in 1935.	
Exceeding :	But not Exceeding :	No. of Persons.	Total Incomes Assessed	No. of Persons.	Total Incomes Assessed.	No. of Persons.	Total Incomes Assessed.	No of Persons.	Total Incomes Assessed.	No. of Persons.	Total Incomes Assessed.
£	£		£000.		£000.		£000.		£000.		£000.
2,000	3,000	39,818	97,437	41,418	101,258	41,994	102,618	42,439	103,915	42,663	104,351
3,000	5,000	30,156	114,937	30,870	117,679	31,142	118,708	31,373	119,722	31,494	120,170
5,000	10,000	18,559	126,591	18,956	129,276	19,147	130,601	19,277	131,483	19,324	131,792
10,000	50,000	8,676	153,246	8,885	157,076	8,971	158,593	9,016	159,443	9,030	159,729
50,000	100,000	357	24,222	367	24,927	383	26,054	387	26,271	387	26,271
100,000	—	130	24,886	130	24,915	135	27,049	135	28,132	135	28,306
Total		97,696	541,319	100,626	555,131	101,772	563,623	102,627	568,966	103,033	570,619

TABLE II
Table showing each Class Standardised on the 1931 Figure

		As in 1931.		As in 1932.		As in 1933.		As in 1934.		As in 1935.	
£	£	No.	Incomes.	No.	Incomes.	No.	Incomes.	No.	Incomes.	No.	Incomes.
2,000	3,000	1,000	1,000	1,040	1,039	1,055	1,053	1,066	1,066	1,071	1,071
3,000	5,000	1,000	1,000	1,024	1,024	1,033	1,033	1,040	1,042	1,044	1,046
5,000	10,000	1,000	1,000	1,021	1,021	1,032	1,032	1,039	1,039	1,041	1,041
10,000	50,000	1,000	1,000	1,024	1,025	1,034	1,035	1,039	1,040	1,041	1,042
50,000	100,000	1,000	1,000	1,028	1,029	1,073	1,076	1,084	1,085	1,084	1,085
100,000	—	1,000	1,000	1,000	1,001	1,038	1,087	1,038	1,130	1,038	1,137
Total		1,000	1,000	1,030	1,026	1,042	1,041	1,050	1,051	1,055	1,054

TABLE IV¹
Super-tax, year 1930-1 (being Surtax, year 1929-30)
Table showing each Class Standardised on the 1933 Figure

£	£	As in 1933.		As in 1934.		As in 1935.		As in 1936.	
		No.	Incomes.	No.	Incomes.	No.	Incomes.	No.	Incomes.
2,000	3,000	1,000	1,000	1,025	1,024	1,034	1,033	1,038	1,039
3,000	5,000	1,000	1,000	1,020	1,020	1,025	1,025	1,028	1,029
5,000	10,000	1,000	1,000	1,021	1,021	1,028	1,028	1,030	1,030
10,000	50,000	1,000	1,000	1,016	1,014	1,019	1,019	1,021	1,020
50,000	100,000	1,000	1,000	1,058	1,054	1,055	1,055	1,055	1,055
100,000	—	1,000	1,000	986	990	979	984	979	984
Total		1,000	1,000	1,022	1,020	1,029	1,025	1,032	1,027

¹ Table III, containing the actual figures, is not reproduced from p. 638, *Journal Royal Statistical Society*, 1936.

only became 2·7 by the fourth year. The same characteristic appears of a larger increase in the lowest class, 3·9, than in the next three, then a larger one again in the £50,000–£100,000 class, 5·5, and an actual reduction in the top class. Apparently the pattern of increase is fairly consistent except for the top class, which must, with such small numbers and special cases, always behave rather freakishly. If the index of distribution is computed by taking the top two classes together, making only four classes in all, it is probably accurate enough to say that the top and bottom gain slightly more than the intermediate classes over the whole assessable period, and that the effect upon total distribution is not very marked, while, if we compare one year with its neighbour at any stage, the differences will not be significant. Thus the decline in total numbers and amounts from 1929 to 1933, as shown in the main surtax statistics in Appendix I, cannot be due to the more complete assessment or fruition of the earlier years—it is far too great in magnitude, and will not be made good in the course of time by additional assessment.

(3) *Statutory and Administrative Discontinuity.*—The *Time Factor*. (i) When the super-tax was first introduced, premiums in respect of life insurance and deferred annuities were allowed as a deduction in computing income for super-tax purposes, up to the limit of one-sixth of the total net income, and this deduction (unlike the deduction for income-tax purposes) was allowed to have the effect of reducing the income below the limit of income (then £5000) at which super-tax began to apply. For super-tax the allowance was wholly withdrawn in 1916 (see Appendix No. 7 (f), p. 61, Royal Commission on the Income-Tax, 1920). The absolute amount of incomes charged is, of course, affected, but the spread in any particular year not necessarily so, for there is a reasonable assumption that it was fairly proportionately borne all down the scale, though it is true that there was no heavy differential tax on the highest incomes then making this kind of provision exceptionally attractive at those levels, and in general the necessity for insurance was heaviest at the lower levels when earned income prevailed in salaries, etc.

(ii) The Excess Profits Duty ran from 1914 to 1920 as a deduction from profits of business for taxation to income-tax, at rates of from 50 to 80 per cent. on the excess. This must have materially reduced the amount of income coming under income-tax in those years and the super-tax incomes of 1915-1916 to 1920-2. At the same time, it is thought to have materially enhanced the level of prices, especially towards the end. If there is an ordinary comparative ratio of variation that exists between incomes and prices, it would therefore tend to be greatly widened during this period, and reference to the various tables and graphs given in this paper shows that to have happened. Prices in 1920 rose immensely more (per cent.) than incomes. But in general there is no evidence to rebut the presumption that the incidence of the deduction of excess of profits duty was proportionate down the scale.

(iii) From 1922 special legislation was introduced to deal with the non-division of the profits of small private companies, and where restricted dividends were being paid, to ignore these and divide up the whole profits for super-tax purposes. This may have been a material element in increased assessments from that date. There was also legislation for dealing with revocable dispositions to members of the family, etc., which has strengthened the assessments, but so far as the declaration of bonus dividends in ordinary companies is concerned, the Case law, as a whole, has been against the revenue contentions. It does not make a conspicuous break in the aggregate figures at any point; nor do any of these matters affect the general distribution.

(iv) In 1923-4 a serious break occurs in the severance of the Irish Free State—that is, serious if we are concerned with the aggregates of the assessments rather than their distribution. We find that in the Report of that year the aggregate for Great Britain and Northern Ireland was about £5,000,000 less than for the United Kingdom as previously constituted, or 1111 taxpayers. But the ultimate figures for Great Britain and Ireland, as finally published, were £16,000,000 more for nearly 2832 taxpayers, so that the check due to the break

was completely swallowed up in the actual increase of assessable wealth, and it is not possible to trace any effect upon the relative distribution in the parts.

(v) In 1926-7 the general basis of the Income-Tax Schedule D assessment was altered from the three years' average to the preceding year. Up to that time the profits of the years 1, 2 and 3 were averaged to make the assessment for the year 4, and this became the basis of the super-tax for the year 5. In so far as the super-tax deals with profits through dividends, the matter was not important, but no doubt some part of the figures brings in direct areas of the income-tax assessment. Its final effect we cannot determine, but, once again, there is no reason to suppose that it has an important effect upon distribution.

(vi) In 1927-8 there was an important change of name from super-tax to surtax, which is rather confusing in the tables. It is described in the 71st Report, where it is stated that what is now called the surtax for 1928-9 would have been the super-tax for 1929-30. In the tables, therefore, in this paper, the surtax year has been shifted forward by one, in order to make all the years correspond to constructive super-tax years.

(vii) The most recent legislation which will have helped to support the aggregates from being depressed through legal avoidance, is that relating to life insurance payments by way of single premium policies and the interest thereon. In its influence upon the aggregates this would have a sustaining effect, but its influence on distribution is difficult to determine. I know of no evidence to show that it was more prevalent in the highest than in the lowest ranges.

The foregoing is a mere selection of the numerous points affecting the amount of assessments, and, in itself, it seems an imposing array, which might well be regarded as destroying the comparative value of the figures. If I were basing anything significant upon the movement of the aggregate sums assessed, some of them would need very close study and elaboration here, but the majority of them have, *prima facie*, no definite effect upon distribution, and, inasmuch as

the figures at best cannot be absolutely sharp, through the blurring of dates, etc., this feature represents only one additional qualification. The warning, therefore, must be to allow a reasonable margin of doubt in all conclusions which depend upon fine differences.

4. *The Behaviour of the Numbers and Amounts in Class Intervals*

As a first approach to the examination of this material, we may consider the way in which the total numbers of incomes exceeding a particular minimum are divided in the four main classes.¹

Treating the aggregates in *each* year as 1000, Table VI shows how these divisions have varied in their proportion. It is found that as the aggregate becomes greater towards 1921-2 the percentage in the lowest class (£5000 to £10,000) steadily fell, then with the aggregate change downwards in 1922-3 the percentage of the lowest class rose sharply, and as the aggregate has fallen from 1929 the percentage in the lowest class has steadily risen.

Another way of examining the same figures is given in Table VII, where each column is turned into an index-number (with base = the average of 1922-5) and the variations in magnitude of each series are strictly comparable. Thus these series can each be compared with the Sauerbeck Index series in Col. 1, and the *general* correspondence of the aggregate numbers with incomes over £5000 can be tested.

The following comparisons may also be noted :

¹ Table V, giving the *actual* numbers of Incomes over £5000 with subdivisions, is on p. 643, *Journal Royal Statistical Society*, 1936.

TABLE VI

*Number of Persons in each Classification of Income, Year
1911-12 to Year 1935-6*

(Table showing number of persons in each class *in relation* to the total number with incomes over £5000, treating the total as 1000 in each year.)

Year.	Total Number of Persons with Incomes Exceeding £5000.	Out of every 1000 with means exceeding £5000.			
		Number of Persons with Incomes Exceeding £100,000.	Number of Persons with Incomes Exceeding £50,000 but not Exceeding £100,000.	Number of Persons with Incomes Exceeding £10,000 but not Exceeding £50,000.	Number of Persons with Incomes Exceeding £5000 but not Exceeding £10,000.
1911-12	12,399	5	338†		657
1912-13	12,965	6	343†		651
1913-14	13,664	5	353†		642
1914-15	14,687	6	17	337	640
1915-16	14,159	6	16	318	660
1916-17	15,920	7	15	331	647
1917-18	18,060	7	19	338	636
1918-19	19,831	6	18	341	635
1919-20	22,923	7	17	343	633
1920-21	26,557	6	19	351	624
1921-22	28,803	7	17	346	630
1922-23	26,114	5	16	329	650
1923-24	27,067	5	17	333	645
1924-25	27,428	5	17	331	647
1925-26	28,229	5	16	326	653
1926-27	28,304	5	15	321	659
1927-28	28,120	5	14	317	664
1928-29	28,876	5	13	313	669
1929-30*	29,846	5	14	315	666
1930-31*	29,856	5	13	312	670
1931-32*	27,348	4	13	299	684
1932-33*	23,007	4	11	292	693
1933-34*	20,617	4	11	288	697
1934-35*	20,013	3	11	289	697
1935-36*	21,135	3	11	294	692

* Now described as surtax years for the years preceding these.

† Not divided officially.

The highest incomes have a rough general correspondence with price movements, but the fluctuations in the lowest

class are much steadier as a whole, though no clearly emergent tendency appears.

TABLE VII

*Number of Persons in each Classification of Income, Year
1911-12 to Year 1935-6*

(Index showing number of persons in each class standardised on average of years 1922-3, 1923-4 and 1924-5.)

Year.	Sauerbeck Index-Number on Base of 1923-5.	Total Number of Persons with Incomes Exceeding £5000	Number of Persons with Incomes Exceeding £100,000.	Number of Persons with Incomes Exceeding £50,000 but not Exceeding £100,000.	Number of Persons with Incomes Exceeding £10,000 but not Exceeding £50,000.	Number of Persons with Incomes Exceeding £5000 but not Exceeding £10,000.
1911-12	58	461	489	†		468
1912-13	59	483	561	†		486
1913-14	63	509	540	†		504
1914-15	63	547	647	570	555	541
1915-16	63	527	633	505	506	537
1916-17	80	592	741	541	593	593
1917-18	101	672	914	762	687	660
1918-19	130	738	871	821	760	724
1919-20	142	853	1,065	887	884	835
1920-21	153	988	1,259	1,122	1,047	953
1921-22	186	1,072	1,482	1,088	1,119	1,044
1922-23	115	972	1,000	921	966	977
1923-24	97	1,007	957	1,043	1,014	1,004
1924-25	96	1,021	1,036	1,034	1,021	1,020
1925-26	103	1,051	1,036	991	1,034	1,061
1926-27	101	1,053	1,079	932	1,022	1,072
1927-28	93	1,047	971	876	1,002	1,074
1928-29	90	1,075	971	876	1,015	1,111
1929-30*	89	1,111	1,194	925	1,057	1,142
1930-31*	85	1,111	1,014	905	1,048	1,149
1931-32*	72	1,018	799	792	919	1,076
1932-33*	61	856	698	557	754	917
1933-34*	59	767	612	500	667	827
1934-35*	59	745	460	484	649	803
1935-36*	61	787	496	514	699	841

* Surtax years corresponding are a year earlier.

† Figures not available.

The next table (VIII) shows how each year's total income "over £5000" was divided up (in percentages) amongst the

main income groups. The highest class at 10.3 per cent. of the whole in 1920-1 has fallen almost steadily to 4.9 per cent., and the lowest class rose from 32.2 per cent., its lowest

TABLE VIII

Total Amount of Incomes in each Classification in relation to the Total Amount of all Incomes over £5000, Year 1911-1912 to Year 1935-6.

Year.	Sauerbeck Index-Number on Base of 1923-5.	Total—All Incomes over £5000.	Incomes Exceeding £100,000.	Incomes Exceeding £50,000 but not Exceeding £100,000.	Incomes Exceeding £10,000 but not Exceeding £50,000.	Incomes Exceeding £5000 but not Exceeding £10,000.
1911-12	58	1,000	82	556†		362
1912-13	59+	1,000	85+	558†		357-
1913-14	63+	1,000	79-	571†		350-
1914-15	63+	1,000	86+	92	476	346-
1915-16	63+	1,000	89+	86	460	365+
1916-17	80+	1,000	93+	83	473	351-
1917-18	101+	1,000	98+	96	471	335-
1918-19	130+	1,000	95-	95	476	334-
1919-20	142+	1,000	99+	89	479	333-
1920-21	153+	1,000	103+	94	481	322-
1921-22	186+	1,000	100-	86	483	331+
1922-23	115-	1,000	82-	86	474	358+
1923-24	97-	1,000	79-	91	477	353-
1924-25	96-	1,000	84+	89	472	355+
1925-26	103+	1,000	84+	84	470	362+
1926-27	101-	1,000	87+	79	465	369+
1927-28	93-	1,000	84-	76	463	377+
1928-29	90-	1,000	82-	76	461	381+
1929-30*	89-	1,000	88+	76	460	376-
1930-31*	85-	1,000	81-	77	458	384+
1931-32*	72-	1,000	74-	75	448	403+
1932-33*	61-	1,000	70-	63	448	419+
1933-34*	59-	1,000	65-	63	444	428+
1934-35*	59-	1,000	50-	65	452	433+
1935-36*	61+	1,000	49-	65	458	428-

* Now described as surtax year for the years preceding.

† The official division of these figures is not available.

point in 1920-1, to 43.3 per cent. in 1934-5. The signs of the changes in these two classes are highly correlated negatively, being definitely converse in all but six out of twenty-

four cases. If we correlate the changes of sign between the price index and the incomes exceeding £100,000, they are also definitely converse in only four cases out of twenty-four. (Computations of the coefficient of correlation for the actual differences have little value because they are so dominated by the price-level change in 1921.) Similarly, for the group £5000 to £10,000 compared with the price level, the signs are converse in *all* but six cases, and indeed negative correlation with the preceding columns is of course a necessity of the case.

All these results, comparing the class composition, are consistent with a change of the distribution slope (as well as of the aggregates) responsive to changes in the price level.

5. *The Behaviour of Class Averages*

If under the pressure of price changes the slope of the income distribution is modified, this fact should come out in the average income within each class interval, for the number of holders towards the bottom of the interval or bracket will tend to change in proportion to the number towards the top of the interval.

Table IX shows the relation between aggregates above three levels and the average incomes above those levels.

In the "over £100,000 class" a marked change in the aggregate has been accompanied by a change in the converse direction for the average of the class in all but 4 out of 17 cases, until we get to the Years 1932-3, 1933-4, and 1934-1935, when the converse relation breaks down, and those cases where the change was in the same direction, it will be seen, were usually in respect of the second year of a change in one direction for the aggregate. But when we come to deal with the wealth in excess of the £10,000 line, the average income is much steadier throughout all the changes in volume, and the changes in the averages are in the *same direction* as the changes in the aggregate in nearly all cases. Naturally the class over £50,000 intermediate between these is more indefinite, for out of 24 changes in the aggregates, 14 were in the opposite direction for the average, and 10 were in the

same direction for both average and aggregate, half of these being in the second year of that change of aggregate direction.

TABLE IX

Year	Total Income over £100,000.	Average Income.	Total Income over £50,000.	Average Income.	Total Income over £10,000.	Average Income.
	£000.		£000.		£000.	
1911-12	12,506	183,900	23,387*	107,280	96,902	22,770
1912-13	13,657+	175,100-	25,421*	105,920	103,260	22,850
1913-14	13,501-	180,000+	26,027*	105,370	111,134	22,700
1914-15	15,848+	176,100-	32,881	96,140	121,006	22,900
1915-16	15,500-	176,100+	30,469	97,970	110,953	23,060
1916-17	18,592+	180,500+	35,212	102,960	129,825	23,130
1917-18	22,812+	179,600-	45,343	97,720	155,617	23,670
1918-19	24,491+	202,400+	49,022	101,290	171,771	23,710
1919-20	29,497+	199,300-	56,163	104,000	199,671	23,750
1920-21	36 158+	206,600+	69,385	103,400	238,948	23,930
1921-22	37,477+	181,900-	69,667	101,410	250,657	23,560
1922-23	26,478-	190,500+	54,410	99,650	207,686	22,730
1923-24	26,599+	200,000+	57,496	96,790	218,719	22,750
1924-25	28,918+	200,800+	59,525	99,040	221,454	22,870
1925-26	29,081+	202,000+	58,214	100,030	221,931	22,690
1926-27	29,918+	199,500-	57,243	101,860	217,901	22,560
1927-28	28,468-	210,900+	54,044	103,530	210,806	22,350
1928-29	28,306-	209,700-	54,577	104,550	214,306	22,440
1929-30	31,755+	191,300-	59,048	102,690	224,696	22,510
1930-31	28 865-	204,700+	56,083	103,670	218,725	22,170
1931-32	23,335-	210,200+	46,815	101,550	187,926	21,760
1932-33	18,034-	185,900-	34,185	99,670	149,291	21,170
1933-34	14,856-	174,800-	29,186	95,380	129,892	20,830
1934-35	10,879-	170,000-	25,091	90,260	123,738	20,440
1935-36	11,485+	166,500-	26,594	89,850	132,818	20,400

* These figures represent the total income over £55,000; the total incomes over £50,000 are not divided officially.

6. Distribution of Real Incomes

Although we have so far a clear case for stating that aggregates move broadly with the price level, and a *prima facie* case for considering that the slope of distribution

changes too, the existence of *fixed* money income limits against which to test these changes makes comparisons very confusing, and one seeks to get rid of their influence. My first idea was to get rid of their fixity by turning them into real income variables, *e.g.* to alter the £10,000–£50,000 money limits into purchasing-power limits by dividing them by the price index. Instead of knowing that we had x incomes of y £ total lying between £10,000 and £50,000 money limits, if the relative price level were 120 (for a base of 100), we should know that we had x incomes of y £ total lying between £8333 and £41,667 purchasing-power limits. This would turn the statistical tables for each year into numbers and amounts of income between *different* sets of purchasing-power limits, and I proposed to reconstruct these tables by Pareto interpolations into *constant* levels of purchasing-power limits. From this might be determinable how distribution in purchasing ability at each range changes with each variation in the price level. But adjustment of the fixed-income limits by the index-number of prices gives such violent changes in those limits as to yield quite ridiculous results and variations in numbers and amounts of income, and the adjustment of such limits would have to be made by some unknown but more gentle variant of the wholesale price index. So I decided to get rid of class interval difficulties by an entirely different method, and not to beg the question of the real value of incomes. I ask the question: What is the amount of the money income of the "1000th person" down from the highest income each year, and the "10,000th and 25,000th persons" also? How do the fortunes of these representative and constant individuals vary with the varying price level? And it is upon this main basis that I pivot my statistical enquiry. If we had a known total of all incomes, we might take the upper decile or some other recognised constant position. But our total of incomes moves with the factor we are investigating—that is, the price level—as that level moves past a fixed money post, so that it is useless for our purpose. But the man I have chosen, being a fixed distance or number from one known end of the scale, is almost certainly quite close to a percentile as

ordinarily understood, if the total number of *all incomes* does not vary greatly from year to year. He is the representative man whose income varies through changes due to the price level, and to any other proportionately working factor which forces statutory incomes generally downward. How is his income to be determined? Although we are now abandoning the use of fixed-income brackets, I employ the statistics of them as a means to the end. In the surtax year 1929-30, for example, the tables gave us 9867 incomes over £10,000, and another 4359 in the £8000 to £10,000 class, so that we have to find the income of the man 133 down from the top in this class. Getting α for this narrow bracket (1.641) I interpolate with its value and make the required income £9919. By determining α for the most limited range and using it to divide a small income total, the margin for error by this method is exceedingly small, and the constancy of the method still further limits the risk in annual comparisons. Although it might be thought that the incomes are most detailed in the highest ranges, as a matter of fact, the 1000th person's income is the most difficult to compute with accuracy.

In these "altitudes" of income, the Pareto line is rather wavering or unstable, and the value of α has first been calculated for the slope between the two points in the statistics between which the 1000th income actually falls. Then α_1 has been computed for the "bracket" next below, and applied to the same statistics. The average of the two computations has then been taken for the table above. In fourteen years the difference is under £150, and it is never very great.

The standard computations for the series are :

Average deviation 13.04 (compared with 17.25 for cost-of-living index and 25 for wholesale price index).

Standard deviation 14.4 (compared with 21.58 and 32.83 respectively for the indices).

It will be seen that these variations are actually *less* than those of the 10,000th man, and approximate more closely to those of the 25,000th man.

Table X gives the range of incomes for the 1000th, the 10,000th and 25,000th man respectively, and an index-

TABLE X

Super-tax Year.	(1) Computed Income of 1000th Person.	(2) Index based on 3 years' Average, 1922-3 to 1924-5. (£37,530 = 100).	(3) Income of the 10,000th Person.	(4) Col. (3) Standardised on Average of Years 1922-3, 1923-4, and 1924-5 (9,658 = 100).	(5) Income of the 25,000th Person.	(6) Col. (5) Standardised on Average of Years 1922-3, 1923-4, and 1924-5 (5,255 = 100).	(7) Index of Wholesale Prices.	(8) Cost-of-Living Index.
1911-12	£ 23,885	64	£ 5,748	60	—	—	58	61
1912-13	24,775	66	5,933	61	—	—	59	61
1913-14	25,750	69	6,170	64	—	—	63	63
1914-15	27,160	72	6,486	67	3,431	65	63	64
1915-16	25,645	68	6,252	65	3,364	64	63	63
1916-17	27,790	74	6,811	71	3,593	68	80	70
1917-18	31,665	84	7,501	78	4,001*	76	101	83
1918-19	33,335	89	8,009	83	4,264*	81	130	101
1919-20	36,685	98	8,869	92	4,709*	90	142	116
1920-21	41,025	109.3	9,991	103	5,226	99	153	123
1921-22	41,080	109.4	10,410	108	5,534	105	186	142
1922-23	36,855	98	9,436	98	5,151	98	115	129
1923-24	37,800	100.7	9,745	101	5,284	101	97	105
1924-25	37,935	101.1	9,793	101	5,330	101	96	99
1925-26	37,745	100.6	9,863	102	5,434	103	103	100
1926-27	36,545	97	9,790	101	5,434	103	101	101
1927-28	35,185	94	9,651	100	5,404	103	93	98
1928-29	35,860	96	9,729	101	5,498	105	90	96
1929-30	36,625	98	9,986	103	5,615	107	89	95
1930-31	35,835	95	9,919	103	5,601	107	85	94
1931-32	32,435	86	9,187	95	5,288	101	72	90
1932-33	28,480	76	8,179	85	4,753	90	61	84
1933-34	26,690	71	7,632	79	4,453	85	59	82
1934-35	25,900	69	7,518	78	4,368	83	59	80
1935-36	27,110	72	7,832	81	4,507	86	61	81

* These figures have been adjusted.

number for the three series (round about the base 1923-5). It also gives the wholesale price index-number and cost-of-

living index-number on the same base, with the appropriate lag to make the statistical record of incomes synchronise. The comparisons of the series of index-numbers for the 10,000th and 25,000th persons is given in the graphs.

Let us consider first the 10,000th income series. Here there is an average deviation of 14.33 and standard deviation of 15.73 against a Sauerbeck price average deviation of 25.0, and standard deviation of 32.83. (I conjectured in Section I, from *a priori* reasoning, that the income deviation might be one-half the price deviation.) The average deviation of the cost-of-living index is 17.25 and the standard deviation 21.58. If a straight correlation coefficient with the cost-of-living index is taken, it works out at 0.849 ± 0.038 , with the Sauerbeck index 0.63 ± 0.082 , and with a combination of the two indexes 0.739 ± 0.062 . But I place no great stress upon these high figures, in view of the fact that one single year accounts for about a quarter of the xy numerator in the computation.¹ I prefer to correlate the sign only, and the "Coefficient of Concurrent Deviations"

(by the formula $r = \pm \sqrt{\frac{2c - n}{n}}$) is 0.752 ± 0.061 with both the cost-of-living index and the wholesale price index.

Considering now the 25,000th income, the average deviation of the index is 12.19, against 24.24 for the wholesale price index, and 14.71 for the cost of living. (These two latter differ from those mentioned above because the series is shorter—we cannot compute the 25,000th income in the earliest years, as it falls below the taxation limit of £5000.) Again, therefore, the range of variation in the incomes is about half that of prices and a little less than that of the cost of living. The standard deviations are respectively 13.98, 32.55 and 19.63. The coefficient of concurrent deviations with prices is 0.632 ± 0.090 and 0.775 ± 0.060 with the

¹ As a matter of fact this is more an instinctive hesitation lest too great a degree of actual causation be suggested, than a justified objection. Actually if the peak years are omitted, σ and σ_1 are also correspondingly affected, and extremes do not modify the result to any great extent. In a tested case +0.901 actually becomes +0.915 when three extreme years are omitted. The high correlation cannot be explained away—the text merely indicates a desire not to claim too much from it.

cost of living. [The direct coefficient of correlation of the 25,000th income with prices is much lower than for the £10,000 income, viz. 0.681 ± 0.078 with the cost of living, and 0.374 ± 0.126 for wholesale prices.] For the 1000th income the coefficient of correlation with the cost-of-living index is $+0.901 \pm 0.026$, and with the wholesale price index $+0.807 \pm 0.048$, or $+0.869 \pm 0.033$ for the two series together. These figures are higher than those for the 10,000th and 25,000th incomes.

The Coefficient of Concurrent Deviations is $+0.692 \pm 0.073$ in each case, or $+0.752 \pm 0.061$ for the two series together, or the same as for the 10,000th income.¹

The character of these connections between price changes and income changes is now becoming much clearer, and for social phenomena of this kind, with all the blurring of time effects, inherent in tax statistics, is very striking. It appeals to the eye also in the graphs. The two types of income there shown have very much the same ratio of variation compared with prices and cost of living, but the actual susceptibility to concurrent change is not quite so high in the smaller income. In the graphs, I have brought the year of price into line by putting the two peaks together without attempting to establish the *exact* lag in fact. The income series is roughly one year advanced.

The conformity of these series of representative incomes to changes in the price level is reasonably established, and the extent of the influence of prices indicated. But it still remains to ascertain by this method whether there is any evidence of a change of *relative* distribution upon a change of price level. This may be approached by considering the changing relationship between the 25,000th and the 10,000th income each year, and relating this to price-level changes. In Table XI the smaller income is expressed as a percentage of the larger each year, and this varies from 52.3 at its lowest to 58.3 at its highest. For graphical comparison this relationship is reduced to an index series and compared with the price-index series. It will be seen that in the majority of cases (two to one) the relation is converse, and the smaller

¹ Coefficients worked to 1934-5 inclusive.

income tends to change to a higher percentage of the latter when the price level falls. The coefficient of concurrent

TABLE XI

Super-tax Year.	(a) Income of 10,000th Person.	(b) Income of 25,000th Person.	(c) Percentage (b) of (a).	(d) Column (c) Standardised on Average of Years 1923, 1924 and 1925 (54.4=100).	(e) Index of Wholesale Prices.
1914-15	6,486	3,431	52.9	97.2	63
1915-16	6,252	3,364	53.8	98.9	63
1916-17	6,811	3,593	52.8	97.1	80
1917-18	7,501	4,001	53.3	98.0	101
1918-19	8,009	4,264	53.2	97.8	130
1919-20	8,869	4,709	53.1	97.6	142
1920-21	9,991	5,226	52.3	96.1	153
1921-22	10,410	5,534	53.2	97.8	186
1922-23	9,436	5,151	54.6	100.4	115
1923-24	9,745	5,284	54.2	99.6	97
1924-25	9,793	5,330	54.4	100.0	96
1925-26	9,863	5,434	55.1	101.3	103
1926-27	9,790	5,434	55.5	102.0	101
1927-28	9,651	5,404	56.0	102.9	93
1928-29	9,729	5,498	56.5	103.9	90
1929-30	9,986	5,615	56.2	103.3	89
1930-31	9,919	5,601	56.5	103.9	85
1931-32	9,187	5,288	57.5	105.7	72
1932-33	8,179	4,753	58.1	106.8	61
1933-34	7,632	4,453	58.3	107.2	59
1934-35	7,518	4,368	58.1	106.8	59
1935-36	7,832	4,507	57.5	105.7	61

deviation is -0.55, but some of the changes are rather fine in magnitude. It is perhaps safer to group the results in a few classes of magnitudes, regardless of annual sequences :

Price-Level Index.	Cases.	Average Price Index.	Average Relationship Index.
Up to 75 . . .	7	63	104.0
Over 75 to 100 . . .	7	90	101.5
„ 100 to 125 . . .	4	105	100.4
„ 125 . . .	4	153	97.4

This series is regular in form. As the price level rises (not in time, but in magnitude) the percentage which the 25,000th income is of the 10,000th income steadily falls; in other words, the very rich gain relatively in income with a high price level, or lose relatively with a low—their income is more sensitive to the effects of the change. It may be said that the higher the income, the larger the proportion due to speculative investment. The estate-duty figures certainly confirm the view that business profits enter more largely into the highest figures.

7. Further Observation on Statistical Method

I have resisted in this paper two statistical temptations (or, at any rate, I do not publicly display my frailties). The first is to fit trends to these series. The price level may be considered to have three trends: first, that century-span rise which seems to be the way in which current business activity ultimately eludes the long-dead hand of past capital accumulation; second, the long-period swings dependent upon changes in gold production and credit technique; and third, the effect of the trade cycle undulating about the second. Over this period of twenty years it can only be the third in which we are interested for this purpose. But he would be a bold man who would say that he could fit the real economic trend for a period which includes the Great War, the excess profits duty, being off the gold standard, then on it, and then off it again. Of course, a straight-line trend can be put in (or two of them) by the method of least squares, but whatever mathematical significance that might have, it would certainly have no economic meaning. The income series may be alleged to have a "normal growth" trend, for the increase in population, but to mean anything at all this must be the adult "gainfully-occupied" population, and in the absence of knowledge of the growth of real income (not money income) for the whole of the population, allowing for unemployment, it is rather begging the question to assert that there is a definite constant growth trend in this small super-tax *section* of the population. It is true that the index

of the number of incomes over £5000 has risen from 547 with the price index at 63 in 1914-15, to 856 with the price index at 61 in 1932-3, but I hesitate, even with this evidence, to fit a straight-line trend as really significant.

My second abstention is partly the result of my first. I have not attempted to correlate first differences. For while ignoring the time growth trends in two contrasted series gives a spuriously high correlation, it is also unsatisfactory even if only one growth trend is ignored—and in any case I am alive to the objections to the difference method on general grounds.¹

It may be said that there is an unreality about the concept of the 10,000th man, who might change from year to year in the character of the constituents of his income. But the same can be said about any percentile. The answer is that if the 10,000th man in year x had 80 per cent. fluctuating income and 20 per cent. non-fluctuating, and the 10,001st and 9999th had 20 per cent. fluctuating and 80 per cent. non-fluctuating, they certainly *would* change their relative positions in the very different year y . But to follow the *particular man* would be (a) practically impossible, and (b) transfer the problem to following the fortunes of "any rich man" with a certain proportion of the two kinds of income in the year x , regardless of his lack of business success, or his windfalls in other years. It is less artificial to follow a modal composition of income at a particular level of wealth as the method adopted virtually does.

No attempt has been made to institute any comparison with "wages," but apart from the difficulty of steering between wage rates, actual earnings of the employed, actual earnings of all, whether employed or not, the total pay-roll, the figures over the period on comparable lines are not available.

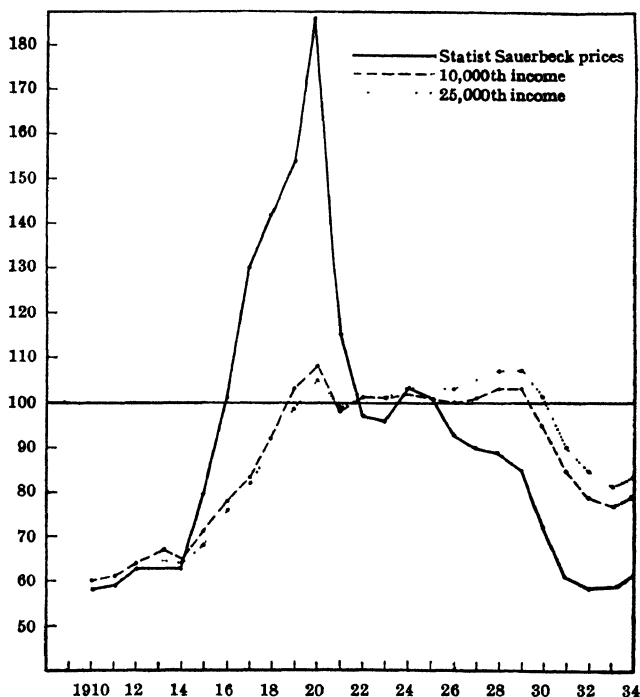
It may be objected that my title is tendencious, asserting that prices affect incomes, where some hold that it is incomes which make high prices. It would be all the same if it is called "Concurrent Deviations between the Income and Price Levels." The wholesale price index in my judgment

¹ *Vide* note on p. 250.

goes more directly to the "making" of income and the cost-of-living index to the "spending."

8. Conclusion

In the course of this examination, with many alternative tests that I have not included in the paper, the limitations of both data and method have become obvious, but nevertheless certain massive and clear answers to some of the questions posed in my opening section have emerged. Owing to



the non-existence of graduated scales for the great mass of lower incomes, we are unable to attack their problem directly, but it is not unreasonable to suppose that in the middle ranges they share the relative inertness of the lower section we have examined, and that they rise and fall less than the upper ranges with the price level, and bear the burden of

reduced purchasing power, or enjoy the boon of increased power, more definitely. Different considerations apply in the lower field of wages, and non-composite incomes.

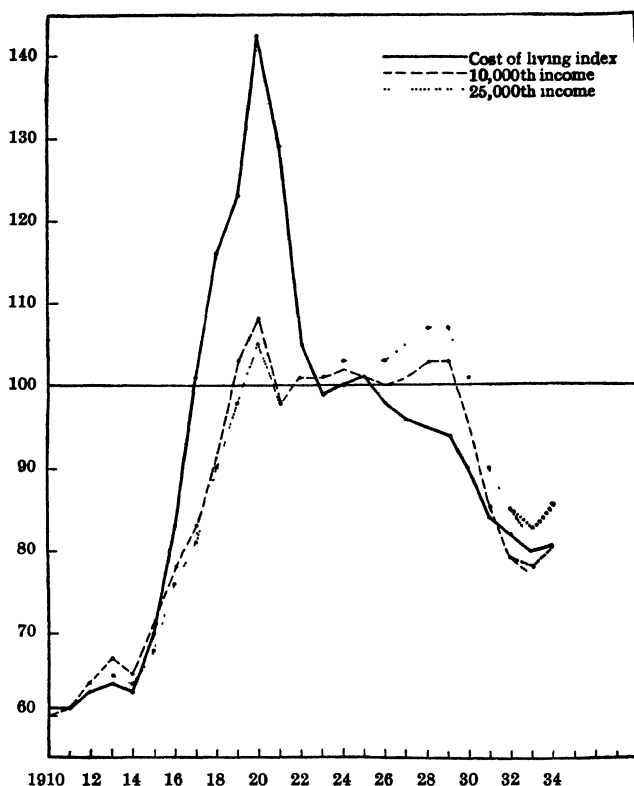
But perhaps the most interesting phenomenon we have had under review is the rapid decline of all the classes of late years, which is certainly greater than can be accounted for by the price variation alone. For it must be remembered that the ratio of variation is about one-half for incomes, so that if the Sauerbeck index of prices falls from 100 to 66, one would expect incomes to fall about one-half, viz. to about 83. It has in fact actually fallen to 72 for 1933, so that something more than the price influence seems to be at work. Four causes suggest themselves :

- (1) The incompleteness of the assessments for recent years. (The small degree of correction necessary for this is indicated in Section III.)
- (2) The extent of the trade depression from 1930 to 1933.
- (3) The successful adoption of methods of legal avoidance and arrangement of income resources so as not to "attract" taxation, and
- (4) The degradation of the taxable corpus under the influence of the heavy duties themselves over a long period.

When the largest blocks of capital and attached income are being attacked simultaneously by capital and income duties in excess of 50 per cent., we may well expect that some deterioration of the corpus will set in. (In this connection, I may refer to my analysis of the effect of the Capital Levy over a long period, in *Current Problems in Finance and Government*, which shows how much the income from the flock of geese, made up of the combined income from golden eggs and from disposing of *some* of the geese, varies according to the proportion of geese taken.)

If we assume that the top range of estates is not altered by aggregation to, or division amongst, individuals, and that it would tend to accumulate at 4 per cent. per annum, the income not being used for consumption purposes, then an income-tax and super-tax burden of 60 per cent. reduces the net rate of accumulation to 1.6 per cent. per annum. But if we assume also that it comes under death-duties once in twenty-

five years, 4 per cent. per annum will pay 50 per cent. duty, and make a net deduction from the corpus of 2 per cent. per annum. The rate of subtraction exceeds the rate of addition by 0.4 per cent. per annum and the corpus of wealth must slowly diminish. When the rate of interest is low, this



tendency may be important, but it is not enough to reduce the higher branches of income substantially yet, or at the present rate. Nor do the statistics of estate duty over the past ten years confirm the suspicion that the total of estates over £10,000 is getting "worn down," though it is certainly not very progressive, being practically the same now as eight years ago—while those over £1,000,000 in the past quinquennium of depression are slightly below those of the

previous quinquennium of increasing prosperity. Of course, the same cause—low rates of interest—that decreases incomes maintains capital values or increases them, so that the trend of figures in the two classes is consistent. We cannot plead, however, that mechanical fiscal entropy is yet very pronounced by any test, and we must look to the second cause—legal avoidance—for the main reason for the disproportionate fall in the incomes assessed to surtax. From 1929-30 to 1933-4 the total fell from £593,000,000 to £407,000,000, or nearly one-third, and "Actual income" assessed to income-tax went from £2,530,000,000 to £2,505,000,000—a negligible change. (If taken to 1934-5 the surtax figures are £424,000,000, and the "actual income" assessed to income-tax becomes £2,616,000,000.) We ought, however, to allow some £300,000,000 of this for changes in the exemption limit, so that surtax income fell from 23½ per cent. to about 18½ per cent. of the whole. This comparison is, however, rather artificial and misleading. A good part of the fall is accounted for by the people who had over £2000 for 1929, but have slipped below, though the incomes still exist, for 1933-4. It is another example of the perils of fixed limits, which I at first overlooked. £30 million should be allowed for this item. When the effect of the revival of trade and profits shows itself fully in the income-tax assessments, the extent of the corresponding upward movement will be a crucial indication of the true underlying causes of these changed proportions.

(In his Budget Speech on 22nd April 1936, the Chancellor of the Exchequer anticipated an increase of £3,500,000 or 7 per cent. for the surtax year 1935-6, which represents an important revival in the falling curves of these graphs due to trade changes alone, and the rising price level. The prevention of legal avoidance is to yield £6,500,000, which still further puts up the aggregates—in this ratio the 18 per cent. proportion referred to above would be 20 per cent. In due course it may be possible to test from the statistics the assumption in this study, that the changes from year to year of relative distribution are not greatly influenced by such practices because they apply proportionately down the line)

Super-tax Statistics

Incomes.		1911-12.		1912-13.		1913-14.		1914-15.		1915-16.	
Exceeding :	Not Exceeding :	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.
£	£		£000		£000.		£000		£000.		£000.
3,000	5,000	—	—	—	—	—	—	15,524	59,776	15,306	58,549
5,000	10,000	8,143	55,049	8,445	57,208	8,769	59,861	9,404	63,986	9,348	63,860
10,000	15,000	2,090	25,190	2,210	26,734	2,362	28,556	2,561	30,782	2,347	28,537
15,000	20,000	813	13,987	866	14,940	980	16,870	1,034	17,825	931	16,060
20,000	25,000	442	9,771	479	10,611	502	11,205	537	11,933	489	10,920
25,000	35,000	393	11,558	413	12,127	454	13,284	495	14,531	445	12,953
35,000	45,000	191	7,581	202	7,880	222	8,830	229	9,089	221	8,816
45,000	50,000	}	5,428	110	5,547	128	6,362	85	3,965	67	3,198
50,000	55,000		3,350	59	3,458	64	3,806	61	3,241	50	2,616
55,000	65,000		2,523	37	2,554	43	3,003	75	4,498	68	4,062
65,000	75,000	36	5,008	66	5,752	65	5,717	47	3,306	43	2,963
75,000	100,000	57	12,506	78	13,657	75	13,501	69	5,988	62	5,328
100,000	—	68						90	15,848	88	15,500
Total		12,399	151,951	12,965	160,468	13,664	170,995	30,211	244,768	29,465	233,362

Super-tax Statistics

Incomes.		1916-17.		1917-18.		1918-19.		1919-20.	
Exceeding :	Not Exceeding :	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.
£	£		£000.		£000.		£000.		£000.
2,500	5,000	—	—	—	—	28,038	97,882	31,603	110,768
3,000	5,000	16,065	61,755	17,594	67,256	—	—	—	—
5,000	10,000	10,306	70,359	11,486	78,438	12,586	86,101	14,515	99,559
10,000	15,000	2,661	32,151	3,079	37,224	3,413	41,350	3,909	47,282
15,000	20,000	1,129	19,377	1,265	21,747	1,397	24,002	1,660	28,465
20,000	25,000	612	13,683	710	15,906	735	16,447	894	19,970
25,000	30,000	339	9,245	422	11,474	501	13,646	519	14,203
30,000	40,000	353	12,123	420	14,434	439	15,137	584	20,092
40,000	50,000	178	8,034	214	9,489	276	12,167	302	13,496
50,000	75,000	162	9,953	239	14,246	257	15,274	279	16,886
75,000	100,000	77	6,667	98	8,285	106	9,257	113	9,780
100,000	—	103	18,592	127	22,812	121	24,491	148	29,497
Total		31,985	261,939	35,564	301,311	47,869	355,754	54,526	409,998

Super-tax Statistics

Incomes.		1920-1.		1921-2.		1922-3.		1923-4.		1924-5.	
Exceeding :	Not Exceeding :	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.
£	£		£000.		£000.		£000.		£000.		£000.
2,000	2,500	14,476	33,224	20,547	46,251	22,014	49,339	22,763	51,243	23,413	52,971
2,500	3,000	12,821	35,095	14,596	39,972	14,932	40,844	15,393	42,259	15,604	43,259
3,000	4,000	15,682	54,191	17,543	60,565	17,400	59,919	17,950	61,982	18,503	63,643
4,000	5,000	9,176	40,954	9,962	44,559	9,665	43,117	9,960	44,670	10,348	46,149
5,000	6,000	5,869	32,087	6,483	35,458	6,136	33,493	6,266	34,287	6,398	34,847
6,000	7,000	3,985	25,805	4,449	28,800	4,188	27,139	4,282	27,650	4,316	27,903
7,000	8,000	2,858	21,410	3,118	23,330	2,860	21,410	2,978	22,259	3,067	22,929
8,000	10,000	3,859	34,390	4,112	36,714	3,793	33,783	3,928	35,028	3,964	35,474
10,000	15,000	4,704	56,771	4,973	60,258	4,421	53,457	4,610	55,767	4,621	55,865
15,000	20,000	1,968	34,069	2,097	36,232	1,835	31,479	1,903	32,718	1,977	34,046
20,000	25,000	983	22,021	1,108	24,712	924	20,603	1,017	22,610	1,027	22,772
25,000	30,000	628	17,199	709	19,381	523	14,295	577	15,737	555	15,113
30,000	40,000	656	22,531	704	24,263	579	19,638	600	20,492	595	20,461
40,000	50,000	376	16,972	363	16,144	309	13,804	312	13,899	307	13,672
50,000	75,000	356	21,176	358	21,684	288	17,659	340	20,432	328	19,530
75,000	100,000	140	12,051	123	10,506	119	10,273	121	10,465	129	11,977
100,000	—	175	36,158	206	37,477	139	26,478	133	26,599	144	28,918
Total		78,712	516,104	91,451	566,306	90,125	516,730	93,133	538,097	95,296	548,629

Super-tax Statistics

Incomes.		1935-6.		1936-7.		1927-8.		1928-9.		1929-30.	
Exceeding :	Not Exceeding :	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.
£	£		£000.		£000.		£000.		£000.		£000.
2,000	2,500	23,807	53,873	24,578	55,141	24,836	55,850	25,393	57,056	26,916	60,339
2,500	3,000	16,190	44,686	16,535	45,329	16,914	46,302	17,270	47,295	18,066	49,355
3,000	4,000	19,143	66,005	19,520	67,371	19,599	67,571	20,216	69,756	21,012	72,374
4,000	5,000	10,661	47,641	10,792	48,311	11,032	49,276	11,278	50,414	11,560	51,552
5,000	6,000	6,612	36,153	6,756	37,025	6,793	37,195	6,998	38,277	7,263	39,738
6,000	7,000	4,476	28,926	4,532	29,411	4,480	28,998	4,629	29,913	4,839	31,339
7,000	8,000	3,148	23,573	3,082	23,121	3,242	24,225	3,368	25,120	3,452	25,814
8,000	10,000	4,211	37,523	4,275	38,104	4,171	37,118	4,329	38,482	4,311	38,307
10,000	15,000	4,803	58,118	4,778	57,740	4,696	56,505	4,749	57,537	4,948	59,831
15,000	20,000	1,913	33,003	1,911	32,913	1,851	31,703	1,875	32,194	1,960	33,747
20,000	25,000	999	22,288	954	21,286	979	21,822	972	21,591	1,017	22,560
25,000	30,000	562	15,303	579	15,836	565	15,475	555	15,218	605	16,568
30,000	40,000	614	21,205	586	20,065	538	18,573	603	20,840	593	20,320
40,000	50,000	309	13,800	289	12,818	283	12,684	276	12,349	283	12,622
50,000	75,000	322	19,234	306	18,441	291	17,371	275	16,546	304	18,252
75,000	100,000	116	9,899	106	8,884	96	8,205	112	9,725	105	9,041
100,000	—	144	29,081	150	29,918	135	28,468	135	28,306	166	31,755
Total		98,030	560,311	99,729	561,714	100,501	557,341	103,033	570,619	107,400	593,514

Super-tax Statistics

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Incomes.		1930-1		1931-2.		1932-3.	
Exceeding :	Not Exceeding	Number of Persons	Total Income.	Number of Persons.	Total Income.	Number of Persons.	Total Income.
£	£		£000.		£000		£000.
2,000	2,500	27,518	61,774	27,208	60,763	25,439	56,721
2,500	3,000	18,295	50,025	17,905	48,940	16,535	45,158
3,000	4,000	21,434	73,903	20,548	70,743	18,692	64,335
4,000	5,000	11,788	52,577	11,312	50,436	10,124	45,091
5,000	6,000	7,426	40,541	6,960	37,993	6,109	33,355
6,000	7,000	4,806	31,098	4,543	29,210	3,855	24,926
7,000	8,000	3,398	25,373	3,140	23,464	2,654	19,848
8,000	10,000	4,359	39,045	4,068	36,194	3,336	29,677
10,000	15,000	5,018	60,762	4,417	53,408	3,705	44,746
15,000	20,000	1,913	32,790	1,733	29,617	1,362	23,277
20,000	25,000	1,001	22,323	847	18,806	701	15,545
25,000	30,000	551	15,064	481	13,208	375	10,222
30,000	40,000	565	19,331	483	16,551	383	13,131
40,000	50,000	278	12,372	215	9,520	184	8,184
50,000	75,000	279	16,806	259	15,564	189	11,254
75,000	100,000	121	10,412	91	7,917	57	4,897
100,000	—	141	28,865	111	23,335	97	18,034
Total		108,891	593,061	104,321	545,669	93,797	468,401

Incomes		1933-4.		1934-5		1935-6.	
Exceeding	Not Exceeding	Number of Persons	Total Income.	Number of Persons.	Total Income	Number of Persons	Total Income.
£	£		£000		£000		£000.
2,000	2,500	24,175	54,055	23,216	51,983	22,839	51,042
2,500	3,000	15,324	41,900	14,643	40,028	15,126	41,294
3,000	4,000	17,346	59,711	16,659	57,339	17,183	59,174
4,000	5,000	9,250	41,238	8,888	39,568	9,166	40,819
5,000	6,000	5,429	29,659	5,271	28,782	5,510	30,087
6,000	7,000	3,603	23,285	3,427	22,153	3,574	23,153
7,000	8,000	2,360	17,658	2,337	17,471	2,397	17,921
8,000	10,000	2,989	26,614	2,924	26,102	3,142	28,031
10,000	15,000	3,384	40,845	3,240	39,135	3,475	41,872
15,000	20,000	1,178	20,383	1,194	20,640	1,251	21,576
20,000	25,000	546	11,939	553	12,304	619	13,730
25,000	30,000	332	9,060	292	7,890	343	9,349
30,000	40,000	333	11,512	344	11,864	376	12,948
40,000	50,000	157	6,967	153	6,814	152	6,749
50,000	75,000	174	10,359	164	9,993	167	10,074
75,000	100,000	47	3,971	50	4,219	60	5,035
100,000	—	85	14,856	64	10,879	69	11,485
Total		86,712	424,012	83,419	407,164	85,449	424,339

V

INHERITANCE

A SAMPLE ENQUIRY

V

INHERITANCE

*A Sample Enquiry*¹

AT the Oxford meeting of the British Association for the Advancement of Science in 1926, as President of Section "F," I gave an address upon: "Inheritance as an Economic Factor."² A Committee was thereafter set up³ to carry out further investigation of certain questions which then arose, and this Committee reported to the Bristol meeting in 1930. It dealt mainly with the subject of Inheritance as an influence upon the distribution of wealth, and a brief summary of its findings is here recorded.

The procedure at first adopted by the Committee to obtain a genuine statistical "sample" of fortunes and their history was the preparation of a standard form of details to be completed by executors, and by others with first-hand knowledge of estates, under conditions, if so desired, of individual confidentiality. The members undertook to circulate these amongst their acquaintances, and to endeavour by their combined efforts to obtain a sufficient number to allow reasonable conclusions to be drawn from the aggregation. An appeal was also made through the Press to those interested in helping a scientific enquiry, to apply for one of these forms. The general result of this effort was disappointing as to the total number obtained, but it served to bring out the difficulties, even where there was complete willingness to assist in the enquiry, and a real interest in the method, and indeed in the subject. These difficulties were:

- (a) The inability of executors to record from their own knowledge what wealth has been given away by

¹ Vide *Economic Journal*, December 1930.

² Vide *Some Economic Factors in Modern Life*. P. S. King & Son, 1929.

³ It consisted of: Sir Josiah Stamp (Chairman), Mr. Josiah Wedgwood, who acted as scrutinising secretary up to the Glasgow meeting (1928), Mr. R. B. Forrester, Secretary, Miss L. Grier, Professors Cannan, Macgregor, Clay, Hallsworth and Smith, Dr. W. H. Coates and Sir Alfred Yarrow.

the deceased, especially in the years not immediately prior to decease.

- (b) The inability of executors and beneficiaries to state the actual accessions that have been made to the fortunes of the deceased during the earlier lifetime, or to state positively that there have been none.

The Committee then decided to make a direct appeal to a number of executors by sending them a slightly revised form and a suitable covering letter. The method adopted was regular selection (every third estate over £5000 was chosen, counting 1, 2, 3, 1, 2, 3, etc.) from the daily lists of Probates in *The Times*, which statistically are compiled at random, between the dates 1st September 1928 and 31st December 1929. Over 3000 forms were issued, and again the numbers actually completed were small.

Despite the fact that the aggregation of cases is not large enough to form the basis of universal and firm generalisations, it does throw up some interesting results, which are well worth recording, provided that the limitations and risks of the statistics of small numbers are borne in mind. The sample as collected by the members is shown below, described as "A," that obtained by systematic general issue of forms is called "B," and the two together are given as "The Sample."

"A" MALES

Class of Estates.	No.	Total Value at Death.	Alienated during Life.		Total Fortune including Sums Alienated	Sums (included in the foregoing) Inherited or received by Gift.		Percentage of Inheritance to Fortune.
			No.	Amount.		No.	Amount.	
Over £50,000	6	£ 935,600	5	£ 441,000	1,376,600	3	£ 90,000	6.5
£25,000 to £50,000	10	323,200	2	55,900	379,100	5	50,300	13.3
£5,000 to £25,000	17	225,500	2	9,500	235,000	13	72,500	30.9
Total "A"	33	1,484,300	9	506,400	1,990,700	21	212,800	10.7

" B " MALES

Over £50,000	3	475,186	2	118,000	593,186	1	20,000	3·4
£25,000 to £50,000	4	135,239	1	10,000	145,239	2	12,000	8·3
£5,000 to £25,000	16	182,920	7	11,400	194,320	9	54,850	28·2
Total " B "	23	793,345	10	139,400	932,745	12	86,850	9·3

THE SAMPLE (TOTAL " A " AND " B ")

Over £50,000	9	1,410,786	7	559,000	1,969,786	4	110,000	5·6
£25,000 to £50,000	14	458,439	3	65,900	524,339	7	62,300	11·9
£5,000 to £25,000	33	408,420	9	20,900	429,320	22	127,350	29·7
Total	56	2,277,645	19	645,800	2,923,445	33	299,650	10·2

The following general statements may be made about these results :

(1) The two samples, derived in different ways, lend considerable support to each other in their broad tendencies, and indicate that the combination may not differ widely from a general condition. The graduation of estates by total amounts, and by numbers, in the sample, compares with the graduation for the whole of the United Kingdom as follows :

	Sample.		Aggregate for United Kingdom.	
	Percent- age of Amounts.	Percent- age of Numbers.	Percent- age of Amounts.	Percent- age of Numbers.
Over £50,000	61·9	16·1	53·0	11·1
£25,000 to £50,000	20·1	25·0	15·4	12·7
£5,000 to £25,000	18·0	58·9	31·6	76·2
	100·0	100·0	100·0	100·0

It will be seen that the sample draws rather more heavily upon the higher estates in proportion to the lower than their

actual total distribution in the country. This difference in weighting must be borne in mind before any attempt is made to generalise from the results.

(2) There is a definite progression in the proportion of inheritance to total fortune as the fortune decreases; the larger fortunes have been made to the greatest extent within the lifetime of the individuals and owe least to bequest.

(3) For fortunes, in general in this sample, left in recent times, about 10 per cent. has been inherited. But if each grade is accepted as generally true then the total for all estates, owing to the different weighting referred to above (under 1), would be raised to over 14 per cent.

(4) For fortunes in general, the sums given away during life were rather over twice the sums received during life. This would be consistent with a fairly uniform percentage over a long period of years in the custom of giving, if the total wealth were doubled with each generation, assuming no marked change in the level of values.

(5) For fortunes from £25,000 to £50,000 the sums received and the sums given were about in equilibrium (although examination of the particular instances shows that this is hardly ever the case individually). In the larger estates the sums given away were five times the sums received.

(6) The practice of giving during lifetime is much more marked in the large estates, where some 28 per cent. was "alienated," against under 5 per cent. in the smaller estates. In numbers, nearly all the large ones gave money away, but in the small ones only about 27 per cent.

(7) As regards the period affected: In "B" the dates of death in all the cases, except one, fall within the period 1924-9 and are therefore of a similar "time class." But in "A" 19 cases were deaths prior to 1924 with estates amounting to £759,426, £208,400 being alienated in five cases, making the total fortunes £967,826, in which £175,800 was inherited in 13 cases, including one large case accounting 1 cent. of the whole. It would be dangerous to infer; that there is any general tendency for the propor-

tion of inheritance in large fortunes to diminish in more recent years.

(8) An age distribution of the cases shows the following results for "The Sample":

Age	No	Estate	No	Alien- ated.	Total Fortune.	In- herited.	No.
Age unspecified	4	416,000	1	10,000	426,000	81,060	2
Up to 55 inc. .	6	82,039	1	3,000	85,039	29,500	4
56 to 70 inc. .	20	472,575	5	85,500	558,075	87,450	13
Over 70 . .	26	1,307,031	12	547,300	1,854,331	101,640	14
Total . .	56	2,277,645	19	645,800	2,923,445	299,650	33

This shows a negligible percentage of gifts *inter vivos* for the youngest group, 18 per cent. for the next, and nearly 42 per cent. in the oldest group (reckoned upon the amount of the estate), which accords with *prima facie* expectation on the recognised tendencies. (The fact that the average size of estates increases with the ascending age groups is, of course, well known, and the greater length of time during which money can be actively made, and during which the factor of accumulation can passively operate, are two obvious reasons. It is not improbable too that vigour of life leading to the higher ages of death is also associated with more definite individuality in wealth-creation.)

As regards inheritance by age groups, the percentage of total fortune in the youngest is 34, in the next 15.6 and in the oldest only 5.5, which again indicates that in the sample the largest fortunes accruing to the greater ages owe less to inheritance from outside than to acquirement and accumulation during life.

The number of women's estates collected by both methods was 13.

The Estates totalled . . .	£315,366
The sums given away to . . .	20,000 (in four cases)
Total fortunes . . .	£335,366
The sums inherited or received by gift to . . .	173,100 in twelve cases.

As might be anticipated, these results differ completely from the male estates ; the proportion of the fortune alienated is negligible but the origin of the fortune in inheritance instead of being only 10 per cent. is well over one-half. The numbers of cases are too small, however, for any satisfactory results by sub-division, and none is attempted.

In addition to this work, Mr. Josiah Wedgwood, the scrutinising secretary, made two special contributions to the subject of investigation under the auspices of the Committee ; the first was a paper at Leeds (1927), in which he described a first sample investigation of the fortunes of parents and children ; it comprised 99 English estates in excess of £200,000, left during the year 1924-5. As a consequence of discussion at Leeds, Mr. Wedgwood decided to take a second sample of fortunes between £10,000 and £200,000. This consisted of 124 estates passing in a few weeks of 1926. The results were published in Chapter VI of Mr. Wedgwood's *Economics of Inheritance* (1929), and together these cover the available statistical knowledge upon this subject.

VI

ALCOHOL AS AN ECONOMIC FACTOR

VI

ALCOHOL AS AN ECONOMIC FACTOR¹

1. *The Meaning of an "Economic Factor"*

THE economic world in which we live, and our economic state at any particular period, are the products of many factors. The removal of some of them might cause so little change that the difference would not be perceptible to most of us, but a mere modification in another might cause a profound upheaval, and the introduction of a new one might be revolutionary. It is not so much the absence or presence of an "ingredient" as the fact that the working and character of the other ingredients change in their process of accommodating themselves to the new composite whole. For economic life is much more than the sum of its parts, and in that regard is in line with the physical, physiological and psychological worlds as we explain them to-day. Thus a joy in poetry may have a commanding value in life, but its removal would have a negligible effect on economic welfare. A greater degree of olfactory sensibility might extend our range of pleasure and pain without much economic change. But if our bodies had a slightly wider range of accommodation to temperature and it could be 10 degrees less than the present limit before we began to feel "cold" and make the appropriate reactions, and if it could be 10 degrees more than at present before we felt uncomfortably "hot," most economic activities to-day would be affected, and many of them deeply. Again, a new factor like "birth control" must in time completely change the economic state.

A little definition at the outset may save much of the mis-

¹ Based upon the Thirteenth Norman Kerr Memorial Lecture, 1929, much altered and enlarged. *Vide* also my evidence before the "Amulree" Commission, 1930, covering the same ground.

understanding and the complex of antagonisms which surround any subject that has long been the centre of popular dispute, especially where personal likings and moral implications have been entangled. By "economic" I mean the production and distribution of wealth, either material, or including services for which men exchange material wealth. I do not include moral values except in so far as they have reactions upon the physical and economic; so that, while the economic aspect is always an important feature in any problem, it is never the *whole* answer, and there are wide ranges of life's activity and values which it barely touches. Nevertheless, it is useful to pursue the economic quest in isolation to the point of an economic answer instead of following the common but distracting method of mixing it with political, moral and aesthetic issues as we go along. The important point is to remember the limitation of the answer when we get it and when we introduce it into the general company. By a "factor," of course, I mean something which has an influence on its surroundings, and without which that whole of which it forms a part would be different.

2. *Tests and Measurements of Factors*

How do we test the importance, weight or consequences of a factor? There are the time-honoured methods of comparison and research. First, to compare two groups or collections of factors identical save for the presence in the one, and absence from the other, of the factor or ingredient under enquiry. This is confirmed, of course, if the number of comparisons is large and the results invariable. Second, with a single group or whole, to observe the difference before and after the factor is introduced or removed. This is confirmed when it can be done experimentally and at will. Third, when the factor is present, to test the effect of its being more or less in quantity by the "more-or-lessness" of the results—the method of concomitant variations. These devices, so familiar in chemistry, physics and even medicine, are very difficult to adopt in economic and social sciences because the factors are not under experimental control, and

the variation of one factor by itself is very rare. Thus, no two economic societies are so exactly alike, save for the presence or absence of alcohol prohibition, that any differences in their productivity or economic result can be solely attributed to that factor. Other changes may either exaggerate, or offset and compensate, the effect of the factor under observation. A nearer parallel to the chemical case is the comparison of two factories or businesses reasonably alike save for single factors, like premium bonuses, welfare work or total abstinence. Nor does one economic society remain the same in all other respects while a single factor like prohibition is introduced or modified.

Nevertheless, these broad methods have to be attempted and their approximations compared. Merely because we can never get an exact result we are not absolved from the responsibility for attempting to get a high degree of probability which comes from the consilience of a number of different methods of approach.

But we are not left entirely in the realm of large, cumbrous, collective economic comparisons and judgments. Just as in matters like inheritance having an influence on economic motive we can postulate some hypothetical value for our factor, estimate the effects of such a postulate, and then compare theory with fact or factual tendency, so in the case of alcohol as an economic product for human consumption certain definite *sample* results of quantitative exactness have been obtained in the physiological field which we can postulate as operative in industry, and from which we can generalise with some degree of risk for a whole community.

I shall naturally deal for the most part with conditions in this country as the centre of enquiry, but with free recourse to comparisons with others abroad.

3. *The Primary Economic Questions to be answered*

(a) *Supply*.—The simple primary issue is that a large part of the working community desire a commodity, x , which ministers to their satisfaction, and for which they give up a portion of their own products. In response to this demand

a section of the community is set aside to produce x , and take these products in return for its labour. Our first questions are, statically, how large absolutely and relatively to its total product is the mass of products thus set aside (in other words, how much money and how much of our total income is spent on x)? and how large absolutely and relatively to the population is the section set aside to minister to this demand? Second, dynamically, if the community ceases to desire x , will it desire y , a new commodity, in its place? or will it take a little more of *all* other commodities to make up the x , so that for y or for the total of such increments it will set aside for exchange the same amount of its products? and will the supply of y (or the total of such increments) employ as many people and as much capital as the supply of x did?

It is conceivable that x might have been high-class songs by prima donnas, and that a given considerable fraction of the products of the rest of the community might have been set aside to keep a favoured or monopolistic fifty producers rich and prosperous. Let this high-class demand for x vanish and the same products be set aside for y —a new habit of cigarette smoking. These products may now “employ” for the exchange, directly, a large number of people in humbler and more average circumstances and indirectly others in general trades producing bricks, steel, etc., for cigarette factories.

(b) *Demand*.—But a more important possibility exists on the side of demand as an active expression of desire powerful enough to show itself in a change in effort or sacrifice. If an important object of general desire vanishes, the community as a whole may not go to the trouble of producing as much for exchange. Suppose that the *desire* to procure x has stimulated the majority to work harder and produce more to exchange for it, then the removal of x might lead to a less total production, adequate to satisfy all *other* desires of life, but *not* any longer yielding the portion exchangeable for a new product (y). Then it would no longer be true to say that the total production of consumption goods will remain constant, and that any changes in some items merely produce

compensations in others. If we say that £1 not spent on alcohol will necessarily be spent on other things, we make this assumption, which may or may not be true. There is, for example, the well-known equalising tendency of consumption habits, which makes certain types of men who are getting an increase in the rate of wages work less, or, with lower rate of wages, work harder, to maintain a relatively constant standard of life. So men might work harder or less hard as it cost more or less to satisfy a certain fixed habit of drinking. On this showing, a removal of this source of satisfaction might diminish the production of other commodities to the extent of such diminished standard of expenditure. I can trace no positive example to illustrate the truth of this theoretical possibility as regards alcohol habits. But there is also the converse possibility that when once the joys of y have been tasted, and consumption of y has been prompted by the elimination of x (drink) as an object of expenditure, it may be so much liked that men will work harder in order to enjoy more y . Or, indeed, x may stimulate no correlative or consequential desire for which men will work harder, whereas y may bring in its train a host of new desires.

Thus Feldman says of America :

The economic disadvantage of satisfactions secured in saloons is that such consumption did not lead to ever-expanding desires for other things. Satisfactions found in liquor began and ended in the saloon ; often they stultified the desire for other things. They took people out of the ranks of consumers of goods in general and confined their demand to a specialised and deceptive satisfaction which often only led them further and further away from their wants. And the more effect this had, the less possible did it become for a man to own other things, the less confidence did he have in himself, or others have in him, that he could be trusted with those things. On the other hand, the man who buys, let us say, a car, is led to want many more things by the possession of that car. It stimulates him to become a different kind of consumer. There is some foundation, therefore, for the assertion often met, that some of the exceptional prosperity of this country is due to the diversion of purchasing power from the self-satisfying utility of alcohol to the goods and services demanded by the ever-expanding desires for other things. It

seems a plausible deduction, if not carried too far, for it is supported both by an analysis of the psychology of wants and by the actual statistics of present-day consumption.

He quotes from Strauss, *Things are in the Saddle* :

Everything of any kind in the great variety of our output must be able to stimulate the appetite for more things of every kind ; consumption, all inter-related, feeding upon itself and stupendously growing by what it feeds on. . . . The more drink men have the less things they need.

4. *Subsidiary Questions*

Having dealt with the immediate effects of a change in factors on total production—both as regards the different number of producers required to supply x or y respectively which exchange for a constant offer of other labour products, and also as regards changes in the offer of such products—we should be ready to turn to secondary or consequential effects. Thus, if by the consumption of x the *power or efficiency* to produce generally is affected, x may be of great importance. Discovery or popularisation of some new food might increase average strength, decrease sickness, etc. These effects on efficiency are susceptible of experimental tests under control, perhaps to a greater extent than collective observation, and great care is necessary in reasoning from the particular to the general. Then come the effects on demand, or social costs ; for undue expenditure on one object by the head of a family may mean that children are less nourished and efficient, and that social cost in prisons, workhouses, remedial and preventive expenditure is greater.

Attached to this aspect is the special question of taxation. If the consumption of an article involves the involuntary consumption of other articles or amenities provided by the State, which might otherwise not have been forthcoming, then the disadvantageous effects of one may be largely offset by the advantages of the other. Much depends upon the impossibility of raising a like revenue by alternative methods.

Lastly, particular consumption may be debasing or degrading to moral character, and on the whole depress intrinsic

but non-criminal moral standards ; men are made more selfish or thoughtless, without being near the criminal ; or they may be made more equable, cheerful, open-hearted. These qualities have some remote and quite incalculable effects of an economic character within the limits of our definition. The influence of smoking, or tea-drinking or travelling (as objects of expenditure) upon character and habit, cannot be without some economic significance.

5. *The Plan of Analysis and Survey of Material*

I have pursued this analysis in the abstract so far because I want assent as to the classification and mode of thinking before we look at the material available for judgment under each head, and before we launch into details and arguments which for many minds immediately introduce complexes and contexts of prejudice and antagonisms from the jungles of past contentions.

A logical order of analysis, and certainly a convenient mode of classifying the different considerations and facts that usually tumble over each other without any regulation, is attempted below. It enables us to determine also the fullness or poverty of the material at each point.

First-line Effects.—The straight-out changes in production and employment that would be involved by the abolition of a particular demand, and the straight-out effects of transfer of demand upon demand itself. In other words, what commodities would men produce in lieu, and would men produce as much in exchange ?

Second-line Effects.—The changes in production that will result from changes in the producer, due to physiological and psychological causes. This covers efficiency in output, power to sustain output, absenteeism, accident rates, etc. On the side of demand, in the person whose nature has been modified, the cumulative effects of changes in desire.

The *third-line considerations* relate to such social costs as are involved by prevention of crime, treatment of disease, average duration of life, etc., and all expenses provided socially out of taxation and otherwise ; also the social asset

of obtaining through taxation various boons that might be more difficult to obtain if the taxation were raised in some other way.

The *fourth-line effects* are those influences upon character, morals and happiness, family life, etc., which, though not primarily economic, have some economic reactions that cannot possibly be measured.

It must be carefully observed that what are called first-line effects relate to a given total consumption, whereas the other effects relate also to the *way* in which that total is spread over the consumers. The same given total might have one set of effects if there is intemperance, and another if consumption is so evenly spread that all is moderation and there is no excess. It will be perhaps best to take things as they are, but it must always be recognised that findings which might have been true for things as they were in 1860 may be quite wrong for 1960, solely upon this point. Statistically we should say that the aggregate and the mode or average have little significance, and what really matters is the coefficient of dispersion.

6. *Lessons from the United States*

While the statistics and illustrations to be drawn from the United States are valuable, it must be remembered that their application to our present problem entails certain formal risks for three reasons :

(1) Prohibition did not by any means represent a complete absence of alcohol. It drew certain specific evils in its train.

(2) Records of greatly improved social and economic conditions are very striking, but a number of causes can be rightly alleged, and the assignment of particular effects to particular causes is very difficult.

(3) A good proportion of the statistics is necessarily drawn from highly excited polemical literature. Even where disinterested and scientific work has been done by means of the questionnaire, those who have assisted by providing the raw material have themselves often violent views on political grounds.

At the same time it is our duty to look at the results as far as they can properly be applied in answer to the questions that we raise of an abstract or theoretical character when we desire to ascertain the importance of "alcohol as a factor in our modern economic life."

7. The Transfer of Employment—Differences between Industries

If we consider £100,000 spent upon the products of the different industries, we should expect to find considerable differences in the number of persons employed directly in those industries. Such differences would arise in various ways. First, the work in one may be all unskilled at relatively low yet adequate wages, and in another highly skilled. One is not entitled to say that the latter employs *fewer* men, as if it were a stigma, otherwise we should want to eliminate all skilled trades, and focus expenditure upon the trades with lower requirements of skill. There must be comparability of work effort before the statement has any meaning. Second, one trade may involve much labour and small machinery or capital, and the other little labour and much capital in machinery. The direct number of workers employed will be smaller in the latter, but capital expenditure in machinery actually represents consolidated labour either originally or through renewal funds. The interest and renewal funds result from the consumable goods advanced to workers during construction. The existence of every trade involves a constant stream of labour employed in producing the current goods, and a constant stream of labour producing and renewing the capital equipment for that industry. To get an adequate economic idea of the number of workers employed by £100,000, it is ridiculous to count only those who work in sight, and to omit those out of sight, by whose consolidated labour they are assisted. If it were not so, we should try to eliminate trades which use a lot of fixed capital, and therefore have fewer direct workers: we should condemn all capital goods. This would be a thoroughly retrograde move when we recognise that growth in economic

wealth is due to so large an extent to the application of "round-about" methods in machinery. So it is impossible to say with finality in the one case that £100,000 in "A" employs 1000 men against 250 in "B," and that if the expenditure were transferred from "B" to "A," you could employ another 750 men. What about the slump in the industries making bricks, steel, etc., for industry "B"?

In the third place, a most important difference in the numbers employed is brought about by the difference in the proportion of money spent on materials, and the products of other industries. In a finishing industry which just adds a few stages to the steel, chemicals, etc., that it buys, the proportion of £100,000 spent in materials for other industries compared with its own wages will be very high, and therefore the relative number of persons employed low. Thus for gold and silver refining in the 1907 Census of Production, we have a gross output per employee of £23,423 against £146 for coal mining. The materials used compared with the selling value of the final product vary from 20 per cent. in mines and quarries, about 50 per cent. in clothing, paper-making, brewing and timber, to 70 per cent. in the food trades, chemicals, leather, and nearly 90 per cent. in metals. Clearly we are not entitled to say that £100,000 employs so many men in a particular industry without going back into the industries supplying it with goods and materials, and reckoning how many have been employed in the production of the goods bought within the £100,000. Otherwise, a composite industry, doing everything for itself, would employ more men than the *same* industry when split up into sub-industries, one passing on to another its half-finished products; and this is obviously absurd.

8. *The Transfer of Employment—the Test by Net Output*

One way to eliminate this factor is, of course, to consider, not £100,000 of gross selling value as a test, but £100,000 of *net output* after allowing for purchase of materials. Or this may be better expressed as "net output per person employed." Now *net output* covers much more than wages,

and therefore when high may indeed connote high wages for skilled labour, but also renewals and interest on capital, so that both total wages and the number of direct workers may be low because much capital is employed. It also covers profit, rents, etc. If the industry is monopolistic, profits may be higher than the average—rents in most cases are mainly interest on capital—but generally competitive forces are always tending to make the yield of capital in each industry approximate to the others, after allowing for its incidents and risks.

The net effect of making allowances for capital employed and for materials bought and adding in the workers employed under both heads is that the total number employed per £100,000 spent for different finished products will much more closely approximate to a common figure than at present appears. The differences will be due to differences in the skill required of workers, differences in skill in management, and certain relatively small monopolistic differences in profits. For, after all, skill of the same order does tend to a level competitively in the long run both in wages and management, and so does the service of invested capital or machinery, and a large permanent difference is almost impossible economically, unless there is a high degree of trustification and a tariff.

9. *Popular Statements about Employment*

You will now be in a position to assess the economic quality or force of the following typical statements ¹:

A. "The Parliamentary Secretary to the Board of Trade has not taken the trouble to learn what his Board has issued thereon. Let him turn to these, and he will learn that where hosiery employs one worker for every £159 selling value produced, brewing employs one worker for every £1844 selling value produced. That £1,000,000 spent on hosiery employs 6,302 persons; that £1,000,000 spent on beer employs 542 persons. That is not hosiery *three* to brewing *one*; but hosiery eleven and a half to brewing one."

¹ These references are taken from articles in a temperance journal.

B. VALUE OF OUTPUT AND THE RELATIVE NUMBER OF PERSONS EMPLOYED

	For Output of £1,000,000	For Output of £30,000,000.
Housebuilding	4,885	146,550
Coal-getting	5,604	168,120
Bread, fruit, milk, vegetables	4,881	146,430
Furniture, upholstery	5,099	152,970
Boots and shoes	5,884	176,520
Calico, cloth, woollens	6,622	198,660
Iron, steel, cutlery	5,593	167,790
Railways—passengers, goods, minerals	5,791	173,730
Hosiery, etc.	6,302	189,060
Shipbuilding	7,044	211,320

Total of the ten trades for output of £300,000,000 . . . 1,731,150
 Malting and brewing for output of £300,000,000 . . . 162,150

“ The £30,000,000 spent in housebuilding would pay for 60,000 working-class houses yearly at £400 each, with another £100 for each new house to provide furniture and fittings.”

It is affirmed :

(a) “ That the nation, its homes, trade and people would be vastly better were that £300,000,000 drink money diverted to the ten trades above enumerated, as there indicated.

(b) “ That the Board of Trade returns show that this beneficial change would call into productive work 1,731,150 persons, instead of, as now, 162,600 persons in the malting and brewing trades, doing destructive work.”

C.

	Net Value of Output (ooo Omitted).	Number of Persons Employed.	Net Value of Output per Person Employed.	Number of Workers per £1,000,000 Value of Output.
Totals of the eighty trades	1,217,307	5,418,677	235	4,262
Brewing and Malting	121,812	66,069	1,844	542

Moral :

	Persons.
The amount of money which in the brewing trade finds employment for	1,000
Would, on the average of the above eighty trades, find employment for	7,863
The amount of money which on the average of these eighty trades finds employment for	1,000
Would, in the brewing trade, find employment for	127

" It follows that the £300,000,000 spent yearly on drink, diverted to the eighty principal trades, would employ 1,278,600 persons ; spent on drink it employs 162,600 persons."

D. "*The Board of Trade Journal* (weekly 6d.) has this year been giving us at intervals the facts gathered by the 'Third Census of Production, 1924,' and some seventy or more trades have been tabulated, the above amongst them. These returns show that to produce £1,000,000 commercial value in coal, there is work for 5,604 persons ; but in beer, there is work for only 542 persons. There our major point is established. The same sum which in coal employs 5604 persons, in beer employs 542 only ; that is, the beer buyer spends to starve wages and create unemployment."

E. " By spending £1,977,087,000 on liquor, not more than £197,708,700 goes to wages, and this would pay the wages of 329,516 men, women, boys and girls at an average of £100 per year each.

" By diverting that sum to *houses and goods*, £1,383,960,900 goes to wages, and this pays the wages of 1,537,734 persons at an average of £150 per year each. So that we get :

" From drink : Wages for 329,516 at £100 each yearly.

" From houses and goods : Wages for 1,537,734 at £150 each yearly."

F. 1. " Of Sheffield's yearly drink-bill, the amount which goes into wages will not exceed £387,760. On a £3 per week basis (£150 per year), this would employ 2,580 persons.

2. " Diverted to building, the amount going into wages would be £2,714,320. On a £3 per week basis (£150 per year), this would employ 18,095 persons."

" Sheffield, with its population of 524,000, will have a

yearly drink-bill of £3,877,600. That sum, diverted to house-building and furnishing, would build, furnish and pay for 7,755 new houses at £500 each. That is, whilst housing conditions and house shortage constitute an evil and scandal of the first magnitude, Sheffield swallows in alcoholic dope every year the price of 7,755 new houses, and of this immoral preference for drink to houses there are no leaders in Church, State, social or commercial life with courage enough to challenge the judgment except the temperance people. So much for the houses which are not because drink is."

G. "A new Census of Production was taken in 1924. Complete figures are not yet published. Those for the building trades are yet to come. But I take the figures published for coal, iron, textiles, leather, ships, motors and allied trades with a total output value of £1500 million at the factory. Adding 25 per cent., the cost to the consumers would be £1875 million. That expenditure employed in production alone 3,743,165 workers. During that year the national spending on drink was £316 million. The number employed in production was 110,247, really less, as these include vinegar and aerated waters.

"Spread in the same proportions over these other industries, the same expenditure would have employed 630,850, so that over and above the number drink production employed, 520,603 would have been taken off the streets and put to work, living on their earnings instead of the dole and often the rates also.

"Unemployment would have been reduced to manageable proportions by simply using the same income in a different way, without a penny more being required. A large income squandered on useless things may leave a man or a nation poorer than a smaller income used to purchase wealth." ¹

H. "He could assert, what was perhaps startling when first uttered, that the wages paid by the brewer are only equal to one-fourth of his profit, while the wages paid by the manufacturer are four-fifths of his profit." ²

¹ *The National Commercial Temperance League Outlook*, September 1928.

² Sir George White, quoted by Murray Hyslop, *Rae Memorial Lecture*, 1931.

Since the foregoing examples were published, this type of argument is seldom used. But it occasionally recurs. After quoting the "employing power" of £1,000,000 in brewing, as 550 workers directly employed, T. P. Ritzema gives the figures for the other industries, with an average 5770 persons "or more than ten times as many."¹ Mr. E. M. Kitch, in a report on South Africa to the Twentieth International Congress on Alcoholism (1934), gives a list of trades showing workers per £10,000 of output, with distilleries 3, brewing and malting 9, up to bricks and tiles 86! But grain mills give 5, butter and cheese factories 8, soap and candle factories 9, and sugar mills 12. His comment is, "We have framed this table by request. *As the figures turn out it does not seem to us to carry any propaganda value,*" and concludes that it would not be fair tactics to make a selection "to form an impressive indictment." The gravamen of the charge is that the product is dangerous. "The additional charge that it employs fewer workers proportionately can hardly be justified while there are industries of equal extent, handling useful commodities, which are in this respect no better off." Mr. Kitch makes no attempt to reach the economic inwardness of the problem.²

In all these cases the possibility that there are some compensations in adding in the workers making current materials, making permanent capital goods, and in distribution, etc., is ignored. It is often the case that the duty on alcohol is not allowed for either. In such a case one has to trace through to the number of workers employed by the Government when spending the duty and add that also.

It will be seen that this popular method of testing the economic factor of persons employed is by itself almost valueless. It may indeed be true that, skill for skill, £100,000 employs fewer people when spent at the "alcohol end" of drink, and paying for labour in, say, making beer, etc., in making bricks, steel, coal, metals of various kinds in the plant, in making the consumed materials, in reimbursing the whole primary and secondary claims which it calls into play or maintains, than the same sum spent in other indus-

¹ The future of Great Britain.

² *Loc. cit.*, p. 143.

tries ; but I cannot trace that it has ever been worked out in detail or proved. It is a suitable subject for detailed research ; in pursuing it the expenditure should be taken as a sum free from Government duty. It would be *prima facie* improbable that the aggregate difference could be very great, save for the fact that there are certain monopolistic features in particular areas, especially with reductions in licences, which may dyke up a rate of profit return upon original capital materially higher than in other industries. But even if this profit is 50 per cent. greater, it forms only a minor fraction of the *gross* output, and does not affect the number employed per unit of expenditure to such a remarkable extent as is usually supposed.

10. *The Census of Production*

In the 1907 Census for Brewing, Distilling, etc., I calculated that about 45 per cent. of the net output went in *profit* and interest on capital. For 1924 the selling value of the output was 159 millions, but, allowing for duty, 83 millions ; as materials cost 37 millions, the true net output was 46 millions, or £685 per head of the 67,000 employees. This 46 millions covers profits and interest on capital. Why should we find capital specially high in relation to labour employed ? For one thing, it is not merely brewery capital, but the whole expensive capital engaged in distribution, for the major part of the interest on the capital involved in a tied house is not covered or returned by the rent charged, but by the price and sale of beer to the publican. So the sale price of the beer has an unusual function to perform, which has no analogy in any other industry. Of course, we are entitled when considering the economic effects of alcohol selling in the abstract, and not any concrete proposition for dealing with the situation as it exists, to ignore all capital paid for goodwill and monopoly values by present holders—on which they naturally and rightly have to obtain a commercial return—but to revert to the original costs of bricks and mortar and physical assets involved. This alone would be a true test of the capital to be remunerated before

judging the employment value of a given net output. But if we perform this exclusion for this industry we must also do it for all others with which we compare it, and we can only suppose that the exclusion would not be of the same magnitude. If it were assumed that the *rate* of interest on capital is maintained at 20 per cent. higher than the normal rate, or 40 per cent. allowing for the extent to which capital may be swollen *beyond* that in other industries, the proportion of monopoly profit to full output price (excluding duty) would have accounted for a deficiency in the number of workers to the extent of an alteration of perhaps 9 per cent. It is a matter for research, which could not, however, be conclusive; and if I had to venture a guess, making special adjustment of this order of magnitude, the economic probability is that £100,000 clear of duty spent in liquor employs right throughout its effects within 12 per cent. of the employment (of a like range of skill) created by the same expenditure in industry in general.

II. *The Pitfalls of Trade Comparisons*

Quotation G given above, taken as an example, commits nearly every economic and statistical fallacy possible. In the first place, the full drink-bill is taken—316 millions, which includes the Government duty; but this duty should be taken off if we do not bring in the people supported by wages paid out of that duty by the Government. The duty accounts for 140 millions, leaving 175 millions. This factor alone would alter the resultant extra employment from 520,000 to 239,000.

In the second place, the figure of employment even for this net 175 million pounds is given as 110,000; but the expenditure covers all the retail distribution, as it is retail cost, whereas credit for employment is given only to *brewing production*, though said with nice precision to be "really less, as vinegar and aerated waters are included"! Now there are certainly well over 107,000 licensed premises alone in England and Wales, and even if they averaged only two persons each paid out of the takings, we have to modify

by this the number of persons employed by the expenditure in question. This gives a figure well below the census returns as employed in distribution. By this time we have approximately the same number of persons employed as the proportion postulated for the other trades would give! (There are, however, certain small errors in the proportion given for those other trades.)

The third error is failure to enquire whether the material, purchases and transport payments bear the same proportion to the selling values in the two groups, as a rough way of avoiding the very difficult task of tracing each £1 through to its destination of original production.

In the fourth place, while this difficulty can be largely avoided by dealing only with net output, no attempt is made to assess whether the part played by capital assets is equal per £1 of net output in the two cases, and without this no valid deduction can be drawn as to the "employment power" of each £1 spent in the respective groups.

I do not think that, short of a really elaborate plan of research work, any valuable conclusions can be drawn along this popular method as to the economic position of alcohol in the productive force in this country, or the influence a *change-over* of expenditure would make in employment—after all effects of dislocation and wiping out of useless plant are eliminated. The whole idea economically is misconceived. I need hardly say I have dealt only in elementary fashion with the economic points and only in summary fashion with the statistical—it is the broad view that we seek to get.

Allied to alternative employment is alternative use of raw materials as food, etc. Professor T. N. Carver subjected the "drink question" to close economic scrutiny, but as it was under the shadow of war conditions, and mainly devoted to its effect on production directed to a particular end, which was not the end of maximum economic satisfaction appropriate to peace, his treatment can be regarded as a special case. He examined the alternative industrial and food values of the materials used for alcoholic beverages and concluded that there is certainly some waste, but it

is most difficult to measure. On the whole, the grain saved would be most economically used in direct human consumption in the form of flour, cereal, starch and glucose.¹

12. *A Dynamic Effect of Transfer to Savings*

While it is difficult to be dogmatic about the extent of the change in total employment which would result from a transfer of expenditure of a given amount to other consumption goods, save to assert that it is usually grossly exaggerated, it is certain that in cutting out all expenditure on alcohol, the transfer would not be wholly to such goods for immediate consumption. The proportion of income of the majority (or the average proportion) now spent in this way is so considerable that it is certain that a part of it, at least, would go into savings or production goods, and part to houses (or permanent consumption goods). In the latter case the purchase by a wage-earner of his own dwelling may not directly aid production, but it frees, upon the capital market, those sums out of current savings for industrial uses which must otherwise be devoted to housebuilding. Thus, to take a reasonable figure, 50 millions of income now spent in alcohol would, if devoted to house-purchase by the tenants, even for existing houses, be a contribution at one remove to the funds for factories, machinery, transport and all the agencies for producing further wealth. In so far as the division of current purchasing power between objects of immediate enjoyment (or spending) and objects for production of future wealth (or saving) is not made at the optimal point—that is, in so far as savings are deficient—then this liberation of funds makes for greater future wealth. The transfer of expenditure (not, of course, the sums paid in alcohol duties) might not increase employment in the way often suggested, but it certainly immediately paves the way for a future general increase in wealth and employment by increased savings at such times as *per capita* savings are subnormal and are not in excess of economic needs.

¹ *Government Control of the Liquor Business in Great Britain and the United States*, 1919, p. 35.

13. *Effects of a Transfer to other Goods, upon Demand for those Goods*

Having now dealt briefly with the effects upon the kinds of production by a removal of the supply of alcohol, assuming an equivalent demand transferred to other things, we must consider whether that demand would be simply transferred or whether it would be diminished or increased as expressed by a different production. This difference must at this stage be simply through a difference of *liking* and not through a difference of *power*. Is alcohol so supreme a boon that men work much longer to get it than they would for any other substituted boon? There is no evidence that I can trace, in America or elsewhere, to indicate conclusively that such is the case. The tendency for substituted boons to be *accretional*, and for one satisfied demand to have another built upon it, contrasted with merely a day's satisfaction for drink which contributes nothing to the future but a desire for *repetition*, has been shown from American experience. I believe it to be psychologically correct for most types. It is the difference between a succession of dreams which, however extended, always total "nil" as a permanent asset, and a succession of thoughts which make an argument, or books which complete a subject. On the whole the capacity for great enjoyment is fuller and more varied and, therefore, the capacity to demand and the will to sacrifice, by work, to secure the satisfaction of that demand, is increased. (All the same, of course, a sudden withdrawal of rights, not voluntarily given up, might be, and would, in this country, so act as a "sulkifier" that immediate ca' canny and disinclination to produce would ensue.) And I am not in any way referring to the enjoyment claimed to be derived from the use of alcohol in full and well-balanced lives, in which the expenditure is not a significant or crippling proportion of income. The actual fact has been, both in the States and here, a large proportion of homes in which the proportion of resources devoted to alcohol has been large, and *prima facie* at the expense of other equally or more worthy objects of expenditure, and it is this state that is under review.

14. *Second-Line Effects on Production*

(a) *Efficiency in Output.*—Now I come to the secondary or derivative effects: The influence of the consumption of alcohol upon men in their capacity as *producers*. These influences are physiological and, derivatively, psychological. They make themselves felt, for example, in absenteeism and unpunctuality, in sickness rates, in liability to accident, in percentage rates of defective work, in decrease or change of output per hour, in discipline and overhead charges for supervision, and in length of active working life. Some of these are capable of separate study and experiment upon individuals and groups. Dr. Vernon and others who have devoted themselves to testing the effects of alcohol consumption have given us much valuable material. Obviously the greatest care is necessary in generalising for a whole industrial community from such figures. Even so eminent a worker as Irving Fisher, caught in the toils of the problems of Prohibition, is censured for unscientific work in this field. Fisher began with the results of some efficiency achievements of small doses (such as Aschaffenburg's 1896 experiments on typesetters showing 10 per cent. to 7 per cent. differences), and took as his basis a general difference of 2 per cent. for each glass of beer per day, reasoning as a result that Prohibition had increased the worker's output by at least 10 per cent.¹ He then took 66,000 million dollars as the 1919 pre-Prohibition income, three-fourths of which is wages and profits. At least two-thirds of this was produced in "wet" areas, and 10 per cent. thereof is 3300 million dollars to be added to production, or 5 per cent. of the total income. In addition, 2000 million dollars were saved merely by transferring energies from alcohol production to something possessing true values. In fact, the 2000 million dollars loss from alcohol production would have been fully 3000 million dollars, perhaps 4000 million dollars later, were it not for Prohibition, or, let us say (in accordance with various other estimates), another 5 per cent. of the total income. In a nutshell, "Prohibition saves 5 per cent.

¹ Irving Fisher, *Prohibition at its Worst*, 1926.

that used to be wasted out of our incomes, and adds another 5 per cent. into the bargain." This double gain, through the transfer of energy and the increase of energy, is over 6000 million dollars without counting any savings in the cost of jails, almshouses, asylums, etc., or any economic savings from reducing the death-rate. Then Irving Fisher looked to see if this gain actually existed in the years after Prohibition came into force, and found that it was amply covered. Feldman criticised the initial argument from physiological tests, in various obvious ways, and concluded as regards this method: "It will require experiments on a far larger scale, and under much more rigorously controlled conditions than those now recorded, to determine the effect of alcoholic beverages upon industrial efficiency with the definiteness expressed. The experiments, considered solely as a basis for the economic calculations made, are inconclusive of themselves. There is nothing in this field comparable to the industrial experiments on such subjects as, for example, varying the lengths of hours of work, in which the output of hundreds of thousands of workers have been studied, and the reductions or increases in output definitely related to the change in working hours." Irving Fisher, in reviewing Feldman's work, admitted the justice of the criticisms, but pointed out that the estimates of others, obtained in different ways, put the increase in total output higher than the 5 per cent. which he had assumed.¹

The Royal Commission on Licensing, 1932, contented themselves with a negative finding: the use of alcohol "as an aid to work, whether physical or mental, is regarded as physiologically unsound"; becoming positive in referring to the finer kinds of work, where the performance "may be temporarily impaired by even moderate doses of alcohol." The present level of expenditure is "definitely uneconomic."²

The table below gives in very summary form, to enable a bird's-eye view to be taken, the results of the various experiments which I have noted at various times:

¹ *Political Science Quarterly*, December 1928, p. 606.

² Report, Paras. 68, 106.

TABLE OF VARIOUS EXPERIMENTS BEARING UPON
ENDURANCE, EFFICIENCY, ACCURACY, ETC.

Name and Date.	Work.	Dose.	Resultant Difference.
Durig, 1906	Walking and climbing	Equivalent of 2½ ounces whisky (with tea and bread) 30 c.c. ale	Normal walk of 50 minutes and climb of 160 minutes, then took 60 minutes and 185 minutes respectively, and 9 per cent. more bodily energy expended (<i>Pflüger's Archiv</i> , 1906, p. 314)
Mernetsch	Shooting	50 c.c. brandy	30 per cent. fewer hits quick; 50 per cent. fewer hits slow
Ogilvy Aschaffenburg, 1896	Gunnery Type composition	Rum Ration 1½ ounces	30 per cent. fewer 9 per cent. less work; nil for errors
Sullivan, 1918	Forge work	¾ to 1 ounce, men	Nil
	Copper band turning	½ ounce, girls	Nil
Vernon, 1923	Dynamometer tests	60 c.c. diluted	strength of pull: negligible
	Co-ordination and combination, assembling links	60 c.c. diluted	17 per cent. longer time
Vernon	Typewriting	60 c.c. diluted	Time, 13 per cent. more; errors, 512 per cent.
Dodge and Benedict, 1915	Target pricking		12 per cent. accuracy
	Eye-closing reflex	30 c.c.	10.7 per cent. extent; 5.9 per cent. speed
	Knee-jerk reflex	30 c.c.	48 per cent. range; 9.6 per cent. speed
	Eye direction	30 c.c.	3 per cent. speed
		45 c.c.	19 per cent. speed
Miles, 1924	Eye reflex	30 c.c.	12 per cent. decrease in speed 40 minutes after; more for 2½ hours
	Eye movement	30 c.c.	21 per cent. distance
	Finger movement	32 c.c.	3.2 per cent. to 4.7 per cent.
	Pendulum pursuit	32 c.c.	11 per cent. and 14 per cent.
	Concentration by rheostat control	3 ounces whisky	½ hour interval; 8 per cent. less skill; 1 hour interval, 15 per cent. less skill; 1½ hour interval, 20 per cent. less skill; 2 hour interval, 15 per cent. less skill (averages of eight men)

Name and Date.	Work.	Dose.	Resultant Difference.
Kraepelin, 1896-1901	Memory tests	58 c.c.	40 per cent. diminution
Furer, 1901	Adding and learning tests	93 c.c. over-night for 12 days	25 per cent. to 40 per cent. depreciation
Vogt, 1910	Memory tests	25 c.c.	5 per cent. to 18 per cent. time taken
		15 c.c. (on empty stomach)	27 per cent. time taken
		25 c.c.	70 per cent. time taken
		30 c.c.	115 per cent. time taken
McDougall and Smith, 1920	Simultaneous mental and physical tests	20 c.c.	300-400 per cent. in errors
	Attention	3 ounces whisky	53 per cent. more errors
Dr. Greenwood	Typing	18.5 c.c. with food	Nil
		37 c.c. with food	69 per cent. increase in errors
	Adding	19.4 c.c. without food	74 per cent. increase in errors
Vernon	Typing	30 c.c. with food	1 per cent. increase
Vernon	Typing	60 c.c. with food	2.1 per cent. more errors
		30 c.c. without food	2.9 per cent. " "
		45 c.c.	7 per cent. increase in errors
		10 per cent. concentration and 28.6 per cent. concentration alternate days	6.8 per cent. " "
Rivers, 1907	Ergographic	5 and 10 c.c.	Nil
		40 c.c.	Slight decrease
Hellsten, 1904	Ergographic	25 to 50 c.c. diluted	Negligible
		80 c.c.	20 per cent. in work after 30 minutes; 17 per cent. in work after 60 minutes; 11 per cent. in work after 120 minutes.
Guillery, 1899	Eye movement	20 c.c.	Negligible
		40 c.c.	Impaired
McDougall and Smith	Tactile discrimination	4½ hours after meal	Errors quadrupled
		Immediately	Errors increased 50 per cent.

Name and Date.	Work.	Dose.	Resultant Difference.
Hollingsworth, 1923-4	Learning a code and writing it rapidly	Equivalent of 3½ ounces whisky	In 2 hours—capacity to learn reduced 10 per cent. (average of 6 men) (<i>Journal Abnormal Psychology</i>)
Do.	Intelligence quotient	Do.	15 per cent. diminution (<i>Idem</i>) 50 persons
Cattell, R. B., 1920	Intelligence quotient	Equivalent of 2½ ounces whisky	"Quotient lowered" (<i>British Journal Medical Psychology</i> , 1920)
Emerson, H., 1932	Marksmanship	Equivalent of 4½ ounces whisky	20 marksmen (over 16 days) scored 2.8 per cent. less (<i>Alcohol and Man</i> , p. 234)
P. Bahnsen and K. Vedel-Petersen (Copenhagen)	(1) Selective reaction (choosing brakes, accelerator or swerve)	0.6 c.c. alcohol for each kilogram of weight or 1½ ounces for average man	2 groups of young men, speed diminished 9.7 per cent.
	(2) Muscular reaction (brake application)	Do.	Speed diminished 17.4 per cent.
	(3) Concentration of attention	Do.	Ability reduced 35.3 per cent.
	(4) Eye and hand co-ordination dexterity	Do.	Alcohol group 59.7 per cent. more errors than control group (<i>Journal, Industrial Hygiene</i> , Sept. 1934)
Dept. of Physiology University of Illinois ¹	Tests of total energy output	1st test : Alcohol average (14) 0.18 per cent. 2nd test : Alcohol average 0.22 per cent.	Contrast with controls (9) 3.85 efficiency against 4.34 Contrast with controls 7.15 efficiency against 3.07

It must be remembered that alcohol well diluted, and also taken with food, has markedly different and lessened results, while the effect of habitual drinking, whether to offset by tolerance or to increase by additive results, is little known. But if we had nothing else to go upon but these experiments,

¹ Proceedings Soc. for Experimental Biology and Medicine, Feb. 1936. Quoted by C. C. Weeks, Son of Temperance, June 1936.

30 c.c. = 1 pint of good ale, or ½ gill of whisky, 1½ glasses of port, ½ pint of red or white wine. "This amount or more was consumed daily by the average drinker in the U.S.A. before Prohibition."—C. F. Stoddard, *Scientific Temperance Journal*, 1928.

they would be consistent with an estimate of difference of efficiency in output of at least 5 per cent. I doubt if they would support any estimate in excess of 10 per cent. by themselves. Many of the larger errors of accuracy would affect output only to a minor extent. Feldman calls these tests almost "humorous" for general application. The Medical Research Council's general report says that $1\frac{1}{4}$ pints of beer (4 per cent.) tends to impair acts requiring skill. But in general, owing to different individual susceptibility, no attempt is made to specify the minimum limit of dose required to produce significant differences in accuracy, accident rates, punctuality and reticence. Again, we cannot afford to ignore the course of individual drinking. A certain quantity taken steadily is more important in its effects than the same quantity used up in occasional bursts, with intermediate temperance.

(b) *Absenteeism*.—Professor Feldman's questionnaire on absenteeism produced 184 out of 287 replies that Monday and after-pay-day absences had been considerably improved, 9 only reporting a worse condition. Of these 184, 88 said the credit was chiefly due to Prohibition, and 40 gave it part of the credit; 83 reported no change, owing often to the fact that they had no problem of this kind before or since. He gives various other corroborative investigations. A large Delaware Company gives exact records showing 6.35 per cent. absent in 1907, 5.59 in 1913, and 2.96 in 1924, but they assign most of the change to "improvement in labour."

Dr. Vernon's statistics relate largely to absence on Mondays and Saturdays, which is tacitly associated with alcohol. The Coal Commission's figures showed that the absenteeism of these two days averaged 40 per cent. higher than the other days of the week. A random test of shipyard workers in 1916 shows that the piece-rate workers had 31 per cent. lost time on Mondays against 22 per cent. on other days. The time-rate workers were better, giving 15 per cent. on Mondays against 12 per cent. on other days. Dr. Vernon compares the better statistics for industries in which women and girls predominate.

(c) *Liability to Industrial Accidents*.—Dr. Chaney, of the U.S. Department of Labour, at a Congress in 1921, said :

I spent twelve years in the attempt to find records which would clearly demonstrate that the use of alcohol liquor was a serious factor in accident occurrence. Now I know perfectly well that it has been : I may say that it still is. But to demonstrate that class of accidents as having been caused by the intemperate use of alcohol was so impossible that I gave it up.¹

Professor Feldman's questionnaire produced 223 answers : 112 reported no change, 47 a large reduction chiefly or partly due to Prohibition, 27 a small reduction, 41 reductions due to other causes. His statement should be read for the interpretation of this result. His final conclusion is : " Nothing more definite emerges . . . than the observations of organisations and executives. The most definite fact is that over a fourth credit Prohibition with reducing accidents due to liquor, while not a single person asserts it made accidents more frequent."

British writers are able to show progressive improvements in accident statistics running *pari passu* with decline in drink consumption, but the connection between the two is only inferential and not logically conclusive. The Federal Statistical Office of Germany has given separate figures for the accident frequency of persons medically certified to be chronic drinkers as contrasted with the remainder, covering a nineteen-year period 1887-1905 all pre-war, showing three times the accidents and three times as many days in recovering. Swedish experience put down 50 per cent. of accidents as due to alcohol.

Dr. Vernon gave observations on 10,000 munition workers, and definitely connected the daily or hourly accident rates with opportunity for drink taking, and generally his statistical evidence is the best available for this country.² He³ quotes T. Voionmaa⁴ and others, including the Sickness Insurance Fund of Leipzig data for 39,793 members from 1887 to 1895, showing that the accident rates for drinkers

¹ *Proceedings of the Tenth Annual Safety Congress*, p. 75.

² See *Alcohol Problem*, pp. 234, etc., and *Accidents and their Prevention*, pp. 71-3.

³ *Accidents and their Prevention*, p. 70.

⁴ *International Labour Review*, XI, 1925, p. 200.

were three times those for the whole membership, and they also lost three times as many days in recuperating. At a foundry in Prussia there was drinking without regulation from 1897 to 1900, and then controlled drinking from 1901 to 1904. In the first period the accidents for 1000 workers were 132.8 and in the second 36.0. A special study of Swedish seamen in 1920 gave rise to the view that 50 per cent. of the accidents "off ship" were due to alcoholic indulgence. Vernon's examples bear mostly on excessive drinking.

There is a good deal of precise evidence for the increase in accident rates after pay-days and the greater opportunity for drinking.

While the combined effects of differences in efficiency and energy per working hour (number of working hours are affected by absenteeism and accident) cannot be quantitatively measured, I have said that under the first head an estimate of a minimum of 5 per cent. seems to be justified by the efficiency experiments alone. Summing up all these causes, Dr. Vernon concluded: "It seems probable that, taking industry all through, the total reduction in efficiency produced by the consumption of alcohol is something like 10 per cent." The evidence is much more in support of this estimate than against it.

The statistics gathered by the National Safety Council of the United States) show that the "had-been-drinking" drivers involved in fatal road accidents in 1934 increased 21 per cent. over 1933, and the "had-been-drinking" pedestrians by 53 per cent. In 1932, the last year under Prohibition, the number of deaths was 26,350 (considerably less than in the three preceding years), but it became 29,323 in 1933, and 33,980 in 1934 (or 16 per cent. increase) and over 36,000 in 1935. Thus 1935 was 37 per cent. above 1932.¹

Dr. Kilmer (Police surgeon, Hempstead, N.Y.) obtained figures from official sources for a number of States showing the percentage increase of "had-been-drinking drivers" for 1934 over 1933, and making allowance for the increase in the number of cars, reported that the number of times the

¹ Dr. E. H. Cherrington in *United States News*.

drivers had increased compared with the cars, varied from 3 times in Connecticut to 60 in Massachusetts, and 69 in Colorado.

Less direct than the influence of alcohol upon industrial accidents, and therefore upon net production, may be its influence upon road accidents as a considerable social cost. The special Committee of the British Medical Association appointed, at the invitation of the Minister of Transport, to say whether it could usefully make any observations on the "place of alcohol in the causes of road accidents, 'reported that it played' at least a significant part in causation." They laid particular stress on *sub intoxicant* amounts which could not come into prominence as the obvious or objective cause. Quoting the Hollingworth psychological tests of power to concentrate,¹ the Miles test of rheostat control for concentration, the Cattell intelligence quotient, the Durig test for walking and climbing, they referred also to tests by two American investigators on six men who took diluted alcohol equivalent to 4 oz. of whisky and 1½ hours after showed 15 per cent. delay in speed of movement; to another test where 13 per cent. was lost with 2½ oz., the effect persisting for 3½ hours. For the quickness of hand movement, Vernon's typewriting experiments were quoted and those also of W. R. Miles, where five male typists, taking the equivalent of 2¼ oz. of whisky, increased their errors 40 per cent. for two hours, and with twice this quantity, 70 per cent. They concluded that the consumption of the equivalent of 2 to 3 ounces of whisky usually affected adversely (though the subject thought the contrary) the power of rapid and accurate co-ordination; the effect would last several hours, and "must frequently affect the driving capacity. . . ."² To what extent this action of small amounts of alcohol may in the aggregate be responsible for motor accidents there is no means of estimating. It is, however, a serious objection . . . etc."

¹ Quoted on p. 197.

² Report published by British Medical Association, 1935. *Vide also* H. M. Vernon, *Accidents and their Prevention*, p. 166, etc., and *Report on the Influence of Alcohol on Motor Driving*, 20th International Congress on Alcoholism, p. 105.

H. M. Vernon says the Committee did not refer to one important effect—the influence on reaction time. A recent investigation¹ made by the Moede-Peorkowski method, showed that a dose of 40 to 50 c.c. of alcohol caused the reaction time to a simple visual stimulus to increase 0.05 second, and when a choice had to be made, it was increased 0.17 second. Vernon concludes that a car travelling 50 miles per hour needs an additional 7.3 feet in which to pull up. The Berlin police authorities issued a warning in which they state: "A large proportion of motor accidents are due to the consumption of quite small quantities of alcohol."² C. C. Weeks gave evidence before the Royal Commission on Licensing, relating to 27,000 out of 33,000 vehicles recorded in the Motor Transport Book, and found that only 5 per cent. of the four thousand million passengers were carried by drivers and conductors who were not under a rule of abstinence when on duty. This goes to show, of course, the expectation of trouble from alcohol, but also the way it is successfully avoided in practice as an economic cost, in one class of transport.

In Finland the Social Minister publishes annually the number of "alcohol" cases in traffic accidents. The figures were :

	Percentage of Total	Percentage of Col. 1 fatal	Percentage with Injuries.
1931 . . .	10.2	31.0	14.5
1932 . . .	11.5	34.3	16.1
1933 . . .	11.9	36.4	19.0
1934 . . .	12.1	37.3	18.2
1935 . . .	10.1	31.3	17.0

It will be noticed that the proportion of fatal cases is highest.

15. *The Difference in Productive Efficiency by direct Comparison*

(a) *General*.—The second kind of test is the "before" and "after" type as applied to a whole community—the Pro-

¹ G. Mayerhofer, *Le Travail Humain*, 1.19.33, p. 257.

² C. C. Weeks, *British Journal of Inebriety*, 1931, p. 178.

hibition division in the United States, for example. Prohibition in separate States, such as Maine since 1851, has provided singularly little scientific evidence, or record, of this type.¹ So far as the Federal movement is concerned I questioned many manufacturers in 1920, and while they differed in their views about the rights of the movement, they none of them desired the *status quo ante* for their workers. The increased efficiency was put at from 10-20 per cent., and 15 per cent. would have been a fair mean. Mr. Molteno² recorded "a general consensus of view" that Prohibition is "responsible for an increase of 10-15 per cent. in the output of industry." President Hoover in 1925 gave 10 per cent. as the amount to be ascribed to Prohibition.

Professor Feldman has made a valuable summary of such opinions. Between 1919 and 1925 output per worker grew 139 per cent. in rubber tyre manufacturing, 100 per cent. in petroleum refining and motors, 59 per cent. in iron and steel, 36 per cent. in meat packing, taken as examples. He referred to a lamp factory with a 400 per cent. increase. The advent of Prohibition was naturally not assigned as the *chief* cause. Feldman's questionnaire went to 195 representative concerns, and produced many valuable comments, but nothing that can be averaged in a single figure. Blue Monday and the five-day week had vanished, and many commented on the much lower labour turnover as being partly due to Prohibition. One hundred and one stated that there was a marked increase, or a small increase, in individual production due to Prohibition; seventy-two could not report either way; but in many of these the problem had not been serious before Prohibition. Many people were in doubt owing to the question being so involved. Only half a dozen claimed that Prohibition had diminished productivity.

But in 1925 the Department of Research and Education of the Federal Council of the Churches of Christ in America issued a bulletin reporting that a questionnaire to a thousand or more business men yielded a "predominantly wet result." As time went on and Prohibition became less effective, the

¹ *Vide* H. Carter, *The English Temperance Movement*, I, p. 64, etc.

² See *Contemporary Review*, 1928.

economic effects were much less prominently cited. At its close, attempts were made to assess the net effects.

The prosperity arguments of the "drys" during the growth of the trade boom from 1925 to 1929 became boomerangs in the subsequent depression, and, as such, contributed much to the change in public opinion. The national Prohibition experiment ended on 5th December 1933, but opinion as to its virtues, as distinct from its expediency, is still sharply divided. The conclusions of Dr. Clark Warburton¹ hold the field, for he has fairly examined all the available sources of evidence, and the result of the convergence of many lines, none of them adequate in itself to support a definite conclusion, is striking. He is careful to show that the situation examined is not that of the absence of alcohol, for he has first to ask, "How far has Prohibition failed to prohibit?" A vast consumption of alcohol still took place, and that too of particularly noxious kinds. His estimates from (a) sources of production, (b) death-rates, and (c) arrests, lead to the conclusion that in the 1927-30 period consumption fell by a third compared with 1911-14 (from 1.69 to 1.14 gallons of pure alcohol per annum *per capita*, beer having fallen 70 per cent.; wine increased 65 per cent., and spirits increased 10 per cent.). In the early years of Prohibition the decline was much greater. At first \$2000 million in purchasing power was diverted to other uses, but this gradually became less important. Milk and coffee consumption went up as a partial substitute. Dr. Warburton said that latterly Prohibition had not been a factor of measurable significance in effect upon industrial efficiency, even in absenteeism. The frequency of industrial accidents had decreased, but the relation between it and effective Prohibition was not measurable. Prohibition had reduced to some extent the "alcoholic" death-rate, but had not had a measurable effect upon the general health. Criminal activity had been slightly reduced. Farmers had gained on balance and the working classes had a billion dollars expenditure diverted to other directions.

¹ *The Economic Results of Prohibition* (Columbia University Press, 1932) reviewed by the writer in *British Journal of Inebriety*, 1933, p. 16.

Dr. Warburton's analysis looks mainly to the later years of the Prohibition period, and is admittedly an imperfect test of the effect of complete absence of alcohol, but it is a valuable examination. A less scholarly but more realistic estimate was made by Samuel Crowther concluding that "prohibition is fundamental to our prosperity"—there is no debit except the slight cost of enforcement.¹ It is claimed² that the movement in Finland followed a very similar course to the United States, from great initial enthusiasm to final decision of the ineffectiveness of legislative fiat.

(b) *Specific Comparisons.*—One of the best known of direct comparisons is provided by the firm of electrical engineers, Creed and Co., of Croydon, which some years ago decided to run on total abstinence lines. It has been stated that at a period when lost time in that trade averaged 10 per cent., the figure for this concern was one-half of 1 per cent. one hour out of two hundred instead of twenty out of two hundred. Even during the war, when the rule was not wholly maintained, the figure was one-third of the average. Returns from firms with 100,000 work people gave an average of 5 per cent. for lost time for sickness and accident; but Creed's figure was 1.4 per cent.³ For the four years ending 1924 their lost time was 1.68 per cent., or one-sixth of the general average. They were so free from accidents that their premium was 3s. 6d. only, as against 8s. 6d. for others.

In the case of a Monmouthshire coal pit, the accountant reported :

Out of curiosity I have tabulated the respective earnings of forty-eight miners who are abstainers and forty-eight who are non-abstainers, for thirteen weeks. The details are these :

	Abstainers.			Non-Abstainers.		
	£	s.	d.	£	s.	d.
Twelve miners, No. 1 pit .	936	9	0	689	12	0
Twelve miners, No. 2 pit .	1,532	0	1	788	8	6
Twelve miners, No. 3 pit .	1,264	3	0	1,076	14	0
Twelve miners, No. 4 pit .	984	6	0	825	13	6

¹ *Prohibition and Prosperity*, p. 81.

² J. H. Wuorinen, *The Prohibition Experiment in Finland*.

³ Vide *Alcohol and Human Life*, by Dr. C. C. Weeks, p. 172.

These figures gave an excess in total earnings of the abstainers of £1,336, 10s. 1d. over the drinkers in the thirteen weeks' period. As the above figures are the normal earnings of colliers who were not working in competition, more reliance can be placed on them than if they had been pitted against one another.¹

These percentage differences are 36, 94, 17 and 19, or 40 over all.

The certificate of the chief accountant of White Oak Coal Company, of West Virginia (based on two Saturday pay-days and Mondays following), in three months with saloons, and the three with no saloons respectively, gave an output of 35,615 tons against 67,813, an increase of 32,198 tons. This is over 90 per cent. increase. He concluded: "The result would show an increased production per annum *due to absence of liquor in the field*" of 128,793 tons.

For the Colorado Fuel and Iron Company for the first eighteen days of April 1919, the average was 5.85 tons per miner. For the first eighteen days of June, when all the saloons were closed, each man produced 6.25 tons.² This is an increase of nearly 7 per cent.

The famous case of the brickmakers given by Professor Helenius³ contrasted the labour of two sets of men for a year—not in a conscious test—one set being mainly "moderate" and the other mainly "abstinent," the latter having a *per capita* output of just under 5 per cent. more. This was in 1841. The same author quotes Captain Pethrick, the manager of Knockmahon Copper Mines, as giving figures for 1000 men, of whom 800 were abstainers: "The output of the latter increased by £5000 per annum." No percentage is given, but it averages about £6 per man, and the ratio can be roughly guessed.

At Mitsui Tagawa Coal-mine, Fukoaka Ken, there are 3200 abstainers out of 6000 miners. For the second time the management have made a test extending over six months, with two groups of 170 each, with the following result⁴:

¹ *National Commercial Temperance League Outlook*, May 1929.

² Professor Collis in *British Journal of Inebriety*, 1922, p. 12.

³ Quoted by Horsley and Sturge, *Alcohol and the Human Body*, p. III.

⁴ The *Kinshu No. Nippon* (organ of National Temperance League of Japan) quoted.

1. In days worked the abstainers were .	14	per cent. better
2. In wages earned the abstainers were .	14.9	„ „ higher
3. In accidents the abstainers were .	50	„ „ lower
4. In time off for accidents the abstainers were .	63	„ „ less
5. In time off for sickness the abstainers were .	42.1	„ „ „
6. In time off for other causes the abstainers were .	38.4	„ „ „
In total time off, (4), (5) and (6) above, the abstainers were .	44.5	„ „ „

Dr. Hennigar gives a slightly different set of figures relating to a different date for 3800 abstainers; results for this group work 25 per cent. "better," accidents down by 40 per cent., sickness 35 per cent., loss of time from other causes 42 per cent.¹

In the South Metropolitan Gas Company a special saline drink has been introduced in place of beer—since this "cramp has been eliminated, a great sense of well-being at the end of the shift has been realised, and the sick-rate has been reduced." ²

The "Buckmaster" Committee in 1931—at the low point of *per capita* consumption—obtained a wide range of "opinions." The general view was that moderate drinking was a normal industrial factor, and "any attempt to ascertain whether industrial efficiency would be increased if there were still less drinking, or none at all, would involve an unjustified expenditure of time and effort." ³ Drinking was not, directly and prominently, seriously impairing industrial efficiency "for the majority were now moderate. Whether the standard would be raised by all becoming abstainers "is partly a psychological but mainly a physiological question," as discussed in the volume on the *Effects of Alcohol on Man*. They agreed that labourers were more affected than skilled workers.

16. *The Statistical Value of General Testimony*

The number of reliable comparisons of this order is surprisingly small, and would not by itself be the basis of any

¹ Report to 20th International Congress on Alcoholism, 1934, p. 297.

² *Idem*, p. 189.

³ *Social and Economic Factors*, p. 77.

statistical generalisation. So far as it goes it would not justify a higher estimate than 15 per cent., but it would not be consistent with a lower estimate than 5 per cent. But, as in the case of other features under discussion, the weight of evidence that a material difference exists is very impressive, not only in the collection of individual views, but also in the results of the replies to a questionnaire such as Professor Feldman issued. In the case where there is a paucity of precise statistical investigation, but where unquantified testimony is plentiful, does it mean that we are deprived of all statistical support and the right to use the material merely because it cannot be quantified? By no means. There are certain fields of information in which it is safe to attribute statistical values. It is true that a consensus of general opinion as to whether a particular state of affairs is above or below the *average* is often most unreliable, and can be disproved by subsequent statistical measurements, but this is because the human mind is generally incapable of forming accurate ideas of averages, particularly where the time element is involved. But in the case of deliberate comparison of conditions side by side, or "before" an "after," a real consensus of view is nearly always found to be justified upon measurement, particularly when it is an objective judgment. Such consensus rarely emerges, however, if the difference involved is very small. There is quite clearly a minimum of difference to which such opinion is susceptible. If the difference is only 1 or 2 per cent. it is not appreciated by many observers, and the result of the questionnaire will probably be very inconclusive; but a two-thirds majority based on impressions nearly always connotes a difference of at least 5 per cent. if it can be tested. Obviously, this minimum difference is greater as the consensus is larger.

We should therefore always be prepared to apply a modest statistical value to a questionnaire where bias was not too obvious a feature in the replies, and to say that a real difference of at least 5 per cent. must lie behind a two-thirds majority on impressions, and that the figure might be raised to 10 per cent. if the majority rose to five-sixths. This

progression has a basis in arithmetic as well as in psychology, because, assuming the replies to be an accurate representation of realities, the larger the minority the more will be the total of the "minuses" which has to be deducted from the "pluses" before striking the arithmetical average.

17. *The Derived Effects of Alternative Expenditure*

Many statistics exist as to the materials used in brewing and distilling which would have greater food value if used directly as foods. For example, a statement to the Royal Commission on Food Prices gave $1\frac{3}{4}$ million acres as devoted to production for the manufacture of beer and spirits. Sir Thomas Middleton gave the food value of an acre for bread as 31.6 pounds of digestible protein (or 126 days' protein ration), and as $2\frac{1}{2}$ pounds when used in beer (or ten days' ration as a liberal estimate).¹ It is put that 92 per cent. of the food value is lost. The contribution of nearly 500,000 acres devoted to products for distilleries as a food value is nil. This acreage is not all at home, but the tonnage represented is about equal to home supplies. It is said that it would increase the whole food supply by about 20 per cent., but it is not necessarily true and *prima facie* unlikely in home acreage. This supply would certainly lower the price of food generally, the tendency being offset, but not to the full extent, by the released purchasing power which would express itself in a higher demand for foods. A recent analysis by Mr. F. W. Richardson, F.I.C., analyst for the West Riding of Yorkshire, and for the city of Bradford, compared the content of half-pint of extra stout costing 7d. with new milk, the latter containing 12 times as much protein and 28 times as much lime. A pint of milk costing 3d. would contain "as much body-building substance as 12 pints of stout costing 14 shillings."²

The experience of America as to the shift of expenditure is interesting, and, so far as it goes, corroborates much theoretical argument, especially about milk. The consump-

¹ *Journal of the Ministry of Agriculture*, Vol. XXII, p. 529.

² *National Commercial Temperance League Outlook*, February 1932.

tion of milk in the United States between 1917 and 1924 increased 50 per cent., an increase far exceeding the population increase of 15 per cent. Prosperity and advertising account for much, but Feldman says that official views and every study and survey of the milk position assign an important part to Prohibition. The Illinois Agricultural Association's questionnaire gave 33 out of 51 quite definite on the subject and only 7 negative. The individual testimony was very emphatic. In Professor Feldman's questionnaire a very large number reported in the same sense. A prominent hotel service reported in 1925 that 25 per cent. of all orders for beverages were for milk. Tea-drinking shows no increase, but coffee has slightly advanced. Ice cream shows an increase of 50 per cent., but there is a difference of opinion as to whether this is due to the *substitution* of expenditure or the *new* spending power brought about by cessation of alcohol expenditure. "Candy" shows an appreciable change; cigarette smoking is enormously on the increase, but it is not generally asserted that this is due to substituting expenditure for drinking. At a recent convention of the soda-fountain industry it was computed that the Americans spend £300 million on soft drinks, etc., being £100 million on ice-cream sodas, £60 million on fountain lunches, and £140 million on confectionery. The comment of *Defence*, May 1929, is:

If we took to soda-water, like the good Americans, what would happen to the new boots and the wireless sets, to say nothing of the important contributions to the Exchequer? We should be worse off than ever in a financial sense, and, physically, simply hideously inflated by millions and millions of pounds' worth of measly mineral waters.

If anybody objects that there are solids as well as liquids in the American Bill, we would remind him that they properly belong to the account. The total abstainer nearly always craves for sweet-stuff, and gives his poor body a task which has already been wholesomely accomplished for him and outside him in fermented beverages such as wine and beer.

Feldman states: "According to vivid and almost universal testimony, the pay envelope is first brought home, whether it stays there or not. The worker's wife and family

are at least given a chance at it." A questionnaire issued in 1925 to the members of the National Conference of Social Work asked whether wives and families now get a larger or smaller proportion; 203 out of 233 stated it was larger.

If the real marginal utility of the beer consumed by a working-class household is equal to the marginal utility of any other expenditure, can the economist allege any economic advantage by a transfer? There are two lines of enquiry—*first*, the subjective satisfaction; *second*, the objective physical results. On the first, we can only conclude that while the marginal satisfaction of the third pint of beer consumed by the father might be equal to the marginal satisfaction of the third glass of milk consumed by the child, the marginal satisfaction of the sixth pint consumed by the father cannot conceivably be equal to the first glass of milk drunk by the child, or his first helping of jam with his bread. In other words, the family expenditure is not so spread over the family likes as to give equal marginal satisfaction. We derive our *prima facie* authority for this from a general inspection of the *proportion* which one class of expenditure has of the total resources compared with the other. Under the second head, it ought to be demonstrable that, for the best physical results, the sixth pint of beer to the father should not have priority to the first glass of milk for the child. In the preface to the Report of the Medical Research Council on "Diets for Boys," issued by H.M. Stationery Office, occurs this important statement:

It is startling to learn, as we now do, that the addition of one pint of milk a day to a diet which by itself satisfied the appetite of growing boys fed upon it could convert an average annual gain of weight of 3.85 lbs. per boy into one of 6.98 lbs., and an annual average increase of height from 1.84 inches to 2.63 inches. This unmistakable betterment in nutrition was proved by trial to be due, not to the small increase in the fuel value of the dietary, nor to the extra protein supplied in the milk, but rather to more specific qualities of milk as a food.

Where alcoholic liquor makes undue inroads into the family income the children have often had to go without

milk. The Empire Marketing Board was responsible for the statement that the daily consumption of milk in England and Wales per head is only $\frac{2}{3}$ pint, whereas in Sweden it is $1\frac{1}{2}$ pints, in Switzerland and Denmark $1\frac{1}{4}$ pints, and in Norway and U.S.A. 1 pint.

It is estimated that to provide every child in this country under fifteen years of age with a daily pint of milk (say, 45 gallons a year) and every person over that age with, say, $\frac{1}{3}$ pint (or 15 gallons a year) would require about 1030 million gallons, as against the 850 million gallons consumed at the present time, as stated by the President of the Board of Trade in the House of Commons last year. If the consumption were increased to that of Sweden, we should require at least 2900 million gallons per annum. To increase the milk consumption would be an enormous gain to the child-life of the nation and a permanent benefit to agriculture.

The developments in the public supply of milk since this declaration go far to modify it. The potentialities for a transfer of family expenditure, still great, are *pro tanto*, reduced. Sir John Orr declared that $13\frac{1}{2}$ millions with incomes over 30s. per head per week drank 400 million gallons a year, whereas $13\frac{1}{2}$ millions below that income drank only 155 million gallons.

The *prima facie* evidence that the expenditure is too high in one direction until other greater needs are satisfied may be glanced at. The consumption per head was falling, it is true, from £8, 10s. in 1921 to £6, 17s. in 1926, £5, 3s. in 1934, and £4, 19s. 4d. in 1933; then it began to rise again with increased prosperity to £5, 1s. in 1934 and £5, 7s. 6d. per head in 1936, the average adult expenditure, including abstainers, reaching £7, 16s. The total expenditure has not tended to be a diminishing fraction of the national income. The decline was almost entirely confined to wines and spirits; "beer consumption still retains its hold as the first mortgage on the family income of a large number of wage-earners." In 1898 a reasoned conclusion was that over 17 per cent. of the average family wage went in drink. Out of $29\frac{1}{2}$ million adults, if we allow for 10 millions, including total abstainers, whose expenditure does not exceed 20 million pounds, we now get an average expenditure per head for the

others of £13.¹ Others work from £7 per head for all, and a family of five representing the units in this class brings out 14s. to 15s. per week or £35 a year as the average family expenditure. The "Buckmaster" Committee put the figure (1930) between £21 and £28 per annum. They concluded that the *proportion* of drink expenditure to income was very nearly the same in 1930 as in 1913.² The large proportion of skilled workers spend from 3s. to 5s. per week, and the highest expenditure is found in the lower paid workers' homes; 5s. to 6s. a week from the dole was not uncommon.³

In dealing with the statistics of 1926 Mr. G. B. Wilson made an estimate that roughly 70 per cent. of the total expenditure, or £210 million was spent by persons whose family income did not exceed £200 a year. For 1924 the estimates of total income made by Professor Bowley and myself gave £1600 million as the aggregate wage earnings, and if 70 per cent. applies, then 13 per cent. of the wage fund went in alcohol. This, in individual concrete terms, is a man who drinks a quart of beer a day at 1s. His annual expenditure will be £18, 5s., and if his income is £3 per week we get an approximation to the general average quoted, without allowing for his wife. The precise year, the precise level of income, the size of family, all affect these comparisons. But the general comparison with the place of food and clothing in the budget makes the main issue of disproportion *prima facie* obvious.

The Royal Commission on Licensing (1932) reported that "in only too many cases amounts are being spent . . . which cannot be afforded if the necessities of life . . . are to be supplied in adequate measure." Referring to the transfer to other ends they considered "the greater proportion would be likely to be better spent. . . ." ⁴

In the *New Survey of London Life and Labour*, it is stated that for every ten glasses of beer a man drank in 1891 he

¹ The Colwyn Committee on National Debt and Taxation, of which I was a member, took two hypotheses: five million and eight million actual abstainers, and the representative duty paid on an income of £150 was £10, so that the full amount paid for liquor would be about £22, or 14½ per cent.

² *Social and Economic Aspects of the Drink Problem*, p. 37.

³ *Ibid.*, p. 103.

⁴ Report, Paras. 99, 102, 103.

now drinks only six, but the cost is, of course, more nearly equal.

Summing up this second line of effects, not so much on happiness, as upon ultimate economic efficiency, through improved health and physique of the person *to* whom expenditure is transferred, we cannot quantify it, but can only assume that it would be a really measurable magnitude. (The removal of negative efficiencies in the case of the person *from* whom it is transferred has been dealt with already as a second-line effect on output.) This magnitude must not, however, be exaggerated, for a considerable section of expenditure on drink would not be available for transfer—it would continue as taxation in other forms to maintain existing amenities.

I imagine we could place the effects of transfer somewhat in the following order :

1. Substituted beverages for the adults.
2. More and better food for the children.
3. Clothing and house amenities.
4. Permanent assets in the home.
5. House purchasing.
6. Additional saving.

Here, however, we come to the important feature ; the expenditure on alcohol is non-cumulative in its satisfactions, but not infrequently accumulative in its drawbacks. The expenditure on the substituted assets is in the main cumulative. If to £150 million net we add something for savings in taxation, to be referred to later, we get £175 million of expenditure.¹ Suppose that one-half of this is not spent in tobacco, tea, etc., but on children's food, better home conditions, and various kinds of assets and savings, with a cumulating rate of $2\frac{1}{2}$ per cent., we get an additional national asset of great value, in less than a generation, of 1000 millions sterling of accumulation on top of the *annual* sum spent.

¹ Referred to by Sir M. Hyslop without explanation as £225 million from the original lecture, *Centenary of the Temperance Movement*, p. 57. This figure was "derived" in cross examination before the "Amulree" Commission, Q. 10708, and includes other aspects.

18. *Economic Costs of Crime caused by Drink*

The economic costs of crime must not be confused with its ethical aspects. In the well-known Swedish test over a ten-year period, when 71·2 per cent. of the 24,000 men working out hard labour sentences connected their crime with alcohol, we have a valid test ; but in the Massachusetts case it tells us nothing to say that out of 155,000 arrests 98,000 were for drunkenness. In such statistics, often confused with the former, we may learn something of the cost of dealing with drunkenness, but we get no light upon crime causation in the non-drunkenness cases. Thus Horsley and Sturge say the following figures show the *connection* between drinking and crime in England and Wales : " Persons tried in 1913 for indictable offences, 63,269, and for non-indictable, 680,290 ; of these 204,038 were cases of drunkenness." But they show nothing of the kind. Dr. Sullivan, however, definitely concluded that out of 200 homicides 158 were of alcohol habits, and in 120 of these, or 60 per cent., the criminal act was " directly due to alcoholism." ¹ In 500 cases of aggravated assaults 82 per cent. were so attributable. He asserted half the sexual offences to be due to this cause. The instances of progressive diminution of crime accompanying diminution of opportunity for drink are numerous, but not very susceptible to statistical summary. Dr. Weeks gave some of the best correlations without specific coefficients. We must not jump to the conclusion that if the number of crimes due to drink becomes less the total crime will necessarily be less, for the Swedish figures of four decades belie this. The percentage due to drink dropped from 71·2 to 35·7 when the consumption of drink fell from 4·9 to 2·9, but the total prisoners increased from 24,398 to 27,086.

The best estimates for Great Britain are given by the " Buckmaster " Committee in great detail. They concluded that 40 per cent. of the common offences are attributable directly or indirectly to drink, 25 per cent. of the

¹ *Alcoholism*, by Dr. W. C. Sullivan, pp. 162-164.

violent crimes, 15 per cent. of cruelty, and 25 per cent. of the matrimonial cases.¹

The results of Prohibition in America are extremely confusing. In the dust of controversy the truth is hardly to be seen. Peabody concluded that intemperance figures as one of the causes of crime in nearly 50 per cent. of the cases, or a first cause in 31. In Massachusetts it was sole cause in 16 per cent. The Committee of Fifty (1905) investigating the cases of 13,402 convicts, found intemperance to be directly responsible in 16·87 per cent., but a primary cause in 31·18, the total 50 per cent. agreeing with the Massachusetts figures.² But as regards post-Prohibition figures, Feldman says there is a mass of statistics to show that the situation has been appallingly worse and remarkably better. But, of course, these figures are no real test of what follows from the absence of alcohol, since they are avowedly put down to the failure of Prohibition and the existence of very bad liquor. Feldman concludes: "To the serious student of crime these statistics are fragmentary, unstandardised, and difficult to interpret."

Professor Carver estimated from *convictions* for drunkenness in 1912 that Great Britain lost the work of 3,128 men for a year. He refrained from estimating the effects of excessive drinking on efficiency as producers, and the social costs he regarded as outside measurement or test.³

Recent figures show a 16·4 per cent. increase for beer consumption and 37·9 per cent. for convictions for drunkenness comparing 1934-5 with 1932-3.

A comparison of Fraserburgh and Peterhead shows a very rapid proportionate reduction in the latter for convictions since 1920, 83 per cent. as against 31 per cent. in Fraserburgh, and for Breach of the Peace cases, 24 per cent. against 9 per cent. In Peterhead the licenses have been reduced from 29 to 10 in the period.⁴

¹ *Social and Economic Effects of Alcohol*, 1931, p. 149. Lord Brentford, as Home Secretary, made a very cautious statement in his Norman Kerr Memorial Lecture, 1931.

² For further figures and criticisms of the conclusions, *vide* Catlin, *Liquor Control*, pp. 28, etc.

³ *Ibid.*, p. 36.

⁴ *Survey of Scotland* in Report of 20th International Conference on Alcoholism, p. 154. *Vide* also Dr. Salter's report on Social Legislation in

"The steady regular drinking of the well-to-do leads to cirrhosis and death rather than to appearance in the police court." As position improves the same consumption may get transferred. Weeks finds a negative correlation (-0.360 ± 0.067) between the death-rate from cirrhosis and the per cent. decline in convictions in the County Boroughs, and it is much higher (-0.556 ± 0.053) for the upper classes (I and II).¹

In Denmark, the proportion of police to population in dry areas is very low, and the jails are striking evidence.

Now we can use such results for two estimates: (1) Economic cost of crime itself, and (2) the economic cost of dealing with criminals—expenditure on police, justice, jails, etc. The first estimate is usually far too high in my judgment. The number leading a *life* of crime is relatively small; the community lose what they would produce if properly employed. A life of crime is rarely an excessively alcoholic one if it is continuous and successful—such as burglary or forgery. Most of the alcoholic crimes of impulse and violence, etc., do not involve such a life, and the criminals may well be for the most part full producers as ordinary citizens. There is a partial loss during their times in prison, and their subsequent inability to get employed up to their full ability. This loss of production is relatively insignificant, but to it must be added the withheld products of unemployed chronic alcoholics. (The loss in the case of such workers *in employment* has been dealt with under Output.)

19. *Economic Costs of Poverty due to Drink*

The expenditure *upon* such people in relief of destitution is considerable. But to stop it does not count as additional wealth, for it is only wealth already produced which is transferred. We should correct such mal-distribution, but the only real loss of wealth is the wealth that has failed to be *produced* and the ultimate effects of non-saving of such

the same Report p. 238, where the effects of wartime restrictions are set out.

¹ Vide *National Temperance Quarterly and Medical Review*, 1937, p. 106, and 1929, p. 347.

wealth. So when we come to deal with true costs of such cases, relief of poverty is not a true cost in the same sense as the cost of keeping a policeman who might be producing something else, or the value of the time of a charity worker. We may thus consider the statistics of poverty due to drink rather by the output of those who have rendered themselves incapable of producing than by the cost of *keeping* them. The three aspects—loss of production in the victim, loss of production in the people preventing or dealing with him, and the cost of maintenance of the non-producer and his dependents—are usually hopelessly confused; but the latter is quite different. Mark O. Prenters, of the National Crime Commission (February 1927), estimated United States costs of crime at 2600 millions sterling, or two-thirds of the whole British national income!

The cost of poverty due to drink can very easily be of this non-economic order, though economic, of course, in the distributional sense. Moreover, much care is needed not to duplicate estimates with costs of sickness, crime and accident when poverty is due to these causes. There are some pertinent and certain figures of poverty causation which may be recorded.

In 1900 Charles Booth concluded that about 14 per cent. of the poverty in East London was due to excessive drinking. In America at that time it was computed that 25 per cent. of the people helped by charitable societies owed their troubles to drink. Feldman, basing his work on Cora Stoddard's investigations, gives a table for twenty-three societies or groups of societies. The average percentages of all cases handled in which intemperance was a factor is given for each for a period of years; the most recent year is lower than the average of 1916–20 in 18 cases. The average of all these averages for the early period is 10.9 per cent., and for the latter 8.7. There are many difficulties of interpretation and construction in this table, and inferences can only be drawn very guardedly. Another instance of definite figures gave a drop from 8 per cent. in 1916 to 3 per cent. in 1925. The Massachusetts Society for Prevention of Cruelty to Children found intemperance a factor in 48 per

ment. of the cases in 1916, and 20 per cent. in 1926. A record of 1000 cases at the Madison Public Welfare Association showed a drop from 22 per cent. to 4 per cent. Lord Buckmaster's Committee (1931), said: "From 25 to 30 per cent. of the whole of the poverty in a typical working-class district is caused wholly, or in part, by drink. Drink is a predominant cause of 'Secondary' poverty, that is poverty in families where the income would be adequate to provide for the necessities of life if part of it were not expended extravagantly or wastefully. The proportion may be as high as 85 per cent." Ten or eleven per cent. of primary poverty in urban class districts may be attributed to drink.¹

All that one can say is that the loss of production due to "drink-caused poverty" must be at least equal to cost of maintenance and relief, and in this sense these figures would be a useful guide to the minimum figure of such loss. But the cost of relief must not be added. One can only guess roughly at the total of out-of-pocket "social costs" in sickness, crime, etc., by divisions of the known expenditure. I personally think it would lie between 25 millions and 50 millions of taxation cost. The figures to include voluntary payments in charity, hospitals, etc., would be much greater, while any test of the "unborn" production is statistically indeterminate.

20. *Economic Costs of Sickness, Accident and Greater Mortality, due to Alcohol*

We now come to the connection between alcohol and sickness, and between alcohol and mortality or length of life, and I shall not have the temerity, as a non-expert in both subjects, to attempt any summary or analysis.² It is

¹ *The Social and Economic Aspects of the Drink Problem*, 1931, p. 127. Vide also many other figures given by Catlin, *op. cit.*

² A good summary was given in a paper by Mr. W. Bingham, J.P., Chairman and Managing Director of the Sceptre Fund of the Eagle Star and British Dominions Insurance Co. Ltd., 18th September 1933. The difference between the "actual" and "expected" mortality in the Temperance and General Sections is given for various societies: typical ratios are 61 : 80, 77 : 88, 74 : 87. Dr. Bandel, Nurnberg, in a report to

a well-fought field, and I imagine I know who is having the best of it, but I am not a real judge of the issues. I certainly do not care for the formal aspect of some of the statistics and the inferences therefrom, but I am quite unable to judge where there is a multiple causation fallacy, or the *post hoc, ergo propter hoc* argument. But let me assume that 10 per cent. of sickness is found to be avoidable as alcohol is the cause. Then the economic cost is the loss of wealth-production due to the patient's inability to join in wealth-making, also the loss of wealth of all those involved in hospitals, etc., who, but for them, might be doing other things. In the case, however, of absence of alcohol giving a longer average life by ten years, the situation economically is much more complicated. For it is only certain types of mortality difference which affect us economically. It is an economic loss to the community for a man, on whom much has been spent in preparation for sixteen or eighteen years or more, to be cut off in the prime of his life. The overhead charges and cost of human "construction" are spread over only a few "machine hours," so to speak, before the human machine is wrecked. But it is no such economic loss if the man, having ceased to be producer at sixty-five, dies at seventy instead of eighty. Humanity apart, *and here we see clearly how the economic aspect is only a small part of the whole*, it would be an economic gain. Anything which suddenly caused the average age of death to rise from seventy to one hundred years would be a severe economic drain on the producing life, if it meant maintenance out of the common stock for all that extra time, with no extra contribution to the stock. So the economic significance of increased length of life merely as such, due to absence of alcohol, may easily

20th International Congress on Alcoholism (p. 85) contrasts the experience of different countries on the relation between Alcoholism and Mortality: before the war, in Prussia for the male age group 40 to 60 years, 22-23 per cent. of the deaths, and in Switzerland, since the war, 16-18 per cent. are directly certified as due to this cause. The main battle of the inference to be drawn from the insurance statistics was joined by Professor Raymond Pearl. Much depends on the definitions. The British Medical Council concluded by accepting some validity for the ordinary inference. (*Vide Catlin, Liquor Control*, p. 65). The mortality from cirrhosis of the liver has been exhaustively analysed by Dr. Weeks, *loc. cit.* It is 37 per cent. in alcoholics against 2 per cent. in others.

be exaggerated.¹ It is clear gain, in so far as more men are kept alive during the working period, and in so far as the working period is extended. But otherwise it has other kinds of value and significance only.

Some suggestive statistics on infant mortality come from Scotland :

	Per 1000 Births.			
	1932.	1931.	1930.	1929.
All Scotland	86	82	83	86.8
Average for 8 no-licence Burghs	65.6	78.4	75.4	63.5

(Vide *Survey of Scotland, loc. cit.*, p. 153.)

Forty friendly societies in South Australia, over a period of fifteen years, showed that the percentage of actual to expected deaths was 5.8 per cent. less, the abstainers showing 33.8 per cent. less. (These and other statistics are cited by C. C. Weeks, *The Alcohol Problem*, p. 166, etc.)

21. *Economic Gains of Alcohol as a Taxing Medium*

We have now to consider briefly the position of this trade as a taxing agent. It raises a very large sum of revenue, and if we deduct therefrom all social costs attached to consumption of alcohol, we have a large net balance which is applicable to other general national purposes. We must assume that these purposes are necessary and must be continued independently of any particular method of raising revenue. What would be the economic repercussions of raising it in other ways? We will assume that the payer, through the price of the article, is unconsciously purchasing not only the article, but also a social service or amenity by which he benefits. That is to say, I am going to make the assumption that the *class* who pay these taxes also in the

¹ "It cannot be held to be an anti-social act to prefer to add slightly to the present amenities of life rather than to prolong slightly the duration of one's senescence." (Catlin, *Liquor Control*, p. 73.)

main benefit from the objects of expenditure, though the individual identity of payment and benefit is non-existent. By paying no longer his pound in this particular way he no longer pays a pound, representing 11s. for the article and 9s. tax. He has now to devote to other expenditure 11s. plus 2s. of social costs no longer to be met, but he has to continue to devote 7s. to the purchase of Government amenities of whose benefit he was barely conscious. It must be assumed there are two ways by which it might conceivably be accomplished: (1) By direct taxation; (2) by continued indirect taxation. The raising of direct taxation over this field of the taxable population is exceedingly difficult. Some of the problems have been explored by the Royal Commission on Income Tax and the Colwyn Committee. It is true that the exemption *limits* for direct taxation have had regard to indirect taxation paid by those exempt from direct; but, nevertheless, the fact remains that the whole modern machinery of taxation to secure the faculty principle with sensitive adjustments for individual and family circumstances becomes extraordinarily difficult to administer either through wages or otherwise when we get below £4 a week for family income. I have no great hopes that we can extend the practice of direct taxation successfully to recover a large part of the sum we are now considering in suspense. We have, therefore, to consider the effects of securing it indirectly. Attached to luxuries or semi-luxuries with a high elasticity of demand we have the consciousness that if the demand goes on we are getting the tax, or if it does not go on then consumption is reduced, so that no great harm is being done. But to apply it to a luxury, the demand for which is inelastic so that consumption is unchanged, means that the whole increase in expenditure due to the tax must really come out of the rest of the family budget. If there are no articles of greater luxury in that budget, then it must be paid at the expense of necessities. We hesitate to apply the tax in any large amount to tea or sugar, because they come intimately into the family life of all the members of the family. The tax on tobacco is already high, and on betting is not very effective—certainly

not for sums of this size. The existence of a large but relatively unnecessary item of expenditure, which is actually a benefit if it is cut down, provides a magnificent vehicle for taxation without injury. Heavy taxation of alcohol in most countries, for example Denmark, has an immediate effect upon consumption, so that it may be said, at one point, one either gets revenue or reform. We have to face the fact that a first-class problem of taxation arises if this opportunity no longer exists. It may be, indeed, that in time that growth of income of which we have spoken already would be sufficiently great to make good all that is wanted here, and the only escape from our dilemma is to take it in the long view. A 5 per cent. increase in economic power will no doubt cover it; 10 per cent. will meet it handsomely without the weight being felt. But the machinery of its application represents a field of taxation yet unexplored. My own view is that a part of the expenditure might have to be cut down, even after taking out social costs, as being no longer so vitally necessary in the first instance. There would be some slight extension of direct taxation and increases in the taxes upon the less important articles of consumption, including the substituted beverages. By a general spread of the burden, and with increasing prosperity, it is probable that the difficulty could ultimately be met, but there is no disguising its seriousness at the outset. However, as the problem we are considering is not that of Prohibition, and its feasibility or desirability, but an endeavour to abstract the effect of this trade upon the total economic position, we can only say that in its absence, apart from any effects of transition or changes, and viewed under its long period effects, there would be a considerable modification of ideas and practice in the taxation of the working classes, which need not finally be to their detriment in any way, in either the weight of its impact or enjoyment of its results. The Royal Commission on Licensing considered the probable loss of revenue, though the gradual reduction of expenditure which alone was practicable need not "be a matter for any great alarm."¹

¹ Report, Para. 104.

At one time alcohol and sickness were related in an opposite sense from that dealt with above. Its use for diminishing or curing sickness in hospitals has almost got to vanishing point. On the assumption that this is a correct condition, the economic cost of its wrong use until recent times must have been considerable, not so much in the article itself as in the cost of its inefficacy in curing illness. Dr. C. C. Weeks has given very detailed statistics. In 57 general London hospitals the cost of wines and spirits *per capita* has fallen from 15.1d. in 1900 to 9.5d. in 1923, and 4.6d. in 1934, and in 222 provincial hospitals, from 11.3d. to 9.5d. and 4.3d. in the same years. Compared with 1900 the cost of wines and spirits in 805 hospitals was £37,138 instead of £319,851 (the quantity is of course not exactly measured by these figures).¹ What this change represents in the more important cost of less expeditious recovery we cannot possibly guess.

22. *Reduction and Elimination contrasted*

With every effort to keep issues clear throughout the above consideration, very little distinction has been drawn between economic effects of alcohol as a general problem without excess and the effects of alcoholism. The first-line effects belong entirely to alcoholic consumption in general; the second-line mainly to the general, but also partly to the special consumption from which alcoholism arises: the third-line of social costs is almost entirely related to alcoholism. A decline in general consumption per head is formally consistent with either a declining, stationary or increasing alcoholism. In the absence of evidence to the contrary, it is *most* consistent with a decline in excess drinking, greater moderation by average people, and an increase in total abstention—a change in proportion all through. The economic point is that if a certain total effect is taken to represent the difference between the present position and complete absence of alcohol, it does not follow that that total effect is approached by stages which are proportionate to the

¹ *Alcohol in Hospital Practice*, 1936, p. 8.

stages of reduction in consumption. It might be possible to get 90 per cent. of the advantage with only 50 per cent. reduction. It may matter much more economically to eliminate excesses than to reduce the average. But a reduced consumption will have different economic effects according to the times and ways of consumption. The example of France indicates that even a high *per capita* consumption is not necessarily associated immediately and subconsciously with alcoholism. But this goes mainly to the point of reducing social costs. It is clear that *per capita* consumption, apart from alcoholism, must be very much reduced before the economic effects in my second line on industrial efficiency and a family expenditure maximised in economic value can be attained. I am also very sceptical whether the proportion of alcoholism to average drinking is susceptible of reduction indefinitely. There is no statistical evidence for the assumption. It is probable that the "distribution" is in an asymmetrical or skew curve.

23. *The Fourth-Line Effects*

The fourth-line effects of alcohol are those influences on temperament, cheerfulness, kindness, unselfishness, hope, poise, etc., which make the difference between a rounded and complete character and the ill-balanced, unhelpful, anti-social. We must each determine for ourselves what part, if any, alcohol plays in this regard. But if it is a factor which makes a difference in these respects, then there are, of course, reactions of an economic character. But they can hardly be scientifically defined, still less quantified. The part claimed for alcohol in good cheer, in the removal of social inhibition, in mental "stimulus" for particular tasks, must be weighed against the defects of these very qualities, and the question as to whether some of the best effects are not attainable by other means. Certainly different temperaments have different reactions. At any rate, while many believe alcohol is still a national evil, this belief will regulate their own habits by considerations and impulses quite distinct from those which would control them if its consumption

were no longer attended by social ills. The lowest estimate of teetotallers in Great Britain is seven, and the highest eleven, millions.¹

One of the greatest economic factors is invention and discovery in the scientific and industrial field. If the releasing powers of alcohol remove mental inhibition, and thus enable great ideas to be born, then an immense economic value may be attributed to it. I have no doubt that various feats of literature and art, certainly of eloquence, have owed a little to this influence. But I have failed to find any discovery of a scientific or similar character that has economic consequences, and that would not otherwise have been made then or in the near future, which is seriously attributed to the influence of wine and spirits on the mental powers.² I conclude we cannot add anything to the economic credit of alcohol on this account. On the other hand, it may, in its worse effects, have taken toll of some fine minds, and put them below their true inventive powers.

24. *Conclusion and Summary*

Nothing has been said about the influence of costs of alcohol in general upon the costs of industrial alcohol. But the latter is in demand on its own account in sufficient quantities for that influence not to be necessarily great. Nor has the effect upon foreign trade been analysed. Obviously this is far reaching, and, in particular, the diversion in home-growing areas would be great. I should conclude on the whole that for some time the effect of cessation would be to reduce the proportion of foreign trade to total trade possibly increased again when the general increased output had attained due effect. In other words, if alcohol had never existed, I do not think foreign trade would necessarily be less than it actually is.

¹ Report to 20th International Congress on Alcoholism, 1934, p. 239.

² Dr. E. T. Bell says it is "a moot question whether mathematic inventiveness is accelerated or retarded by moderate indulgence," requiring a controlled experiment for its settlement. He gives some interesting biographical suggestions about Sir W. R. Hamilton. (*Men of Mathematics*, p. 396.)

When estimating the difference between the *status quo* and a completely free condition, one must do it by reference to a particular time. I think it probable that the *status quo* has slightly improved, economically, on a balance of all the heads considered, compared with a few years ago.

The whole matter may be summed up by my saying that those who put the economic difference to-day at less than 7 per cent., and those who put it at more than 14 per cent., both speak against the weight of evidence.

I have endeavoured to get an impartial view of the economic position of alcohol quite uncoloured by any ideas of it as an "evil to be cured." For no one would contend that economic output is everything, and an economic price may well be paid for some other non-economic value. No one would want 5 per cent. more goods if we were 10 per cent. more miserable in getting them. So we have to consider the boon and the price. Nor have I considered any question whatever of methods of control, purchase, abolition, or any other programme of reform. I may have disappointed because no hard square polemical bricks for the disputants have been produced ; but it has been looked upon just as the economic position of tobacco or sport, or any other thing for which the community spends its time and effort.

VII

THE ECONOMIC DISTRIBUTION OF THE NATIONAL CAPITAL

VII

THE ECONOMIC DISTRIBUTION OF THE NATIONAL CAPITAL ¹

THE ordinary descriptions of industrial and commercial activities and the way in which they are distributed geographically do not convey any very exact idea of their relative importance or magnitude, still less of the respective rates at which they have been growing and how each stands in relation to the size of the whole economic organisation. There are no precise tests by which these aspects can be shown in a manner satisfactory to all questioners. For example, the relative "importance" is not exhibited properly by the statistics of foreign trade, inasmuch as the proportions of the several branches of economic activity which are represented in exports and in home consumption respectively are very different. To many people relative importance might be measured better by the number of people employed in each industry, and an attempt is made to show this through the details of the occupational census every decade. This, however, is not free from ambiguity and difficulty inasmuch as such occupations as clerks, engineers or carpenters run throughout the great industries and are common factors. Moreover, the numbers of people employed on relatively low-grade work may be partly and functionally related to the amount of capital employed ; thus an industry with a large amount of fixed capital may for that very reason employ fewer men than others, as in the chemical industry, and an industry could not be said to be getting lower in the scale of "importance" merely because it was so successful and progressive as to attract a large investment of new capital without adding to the number of men employed at

¹ From a final chapter contributed to *The British Isles*, by Dr. L. D. Stamp and S. H. Beaver. 1933.

the same time, as compared with another industry which was less advanced industrially. Moreover, *per capita* employment as a measure in itself could not stop short at the men directly employed, for the industry that might be in process of taking fewer men directly might be responsible for a growing addition to employment in building and engineering industries, in providing and maintaining its capital equipment, and in the transport and distributive industries in handling the product. A more satisfactory measure of relative importance is found in the "total net output" of the several industries classified under the Census of Production, because out of the net output has to come the return of both labour and capital; it is the value "added" to the cost of raw material by the industry when it passes the product on to the next industry or to the distributor, and that added value is distributed to the people, workers and shareholders, who have produced it. The actual profits made in each industry are not known, although those few who have experience of the confidential statistics of profits shown for income-tax purposes are able to get a shrewd idea of their relative importance; but profits are not an ideal test of relative importance for special technical reasons. From time to time, estimates have been made of the *National Capital*,¹ and this subject has a literature and technical apparatus of its own. Broadly speaking, a particular business has a "capital value" at which it is worth to be bought and sold as a whole, and as a going concern, without particular regard to the amount of money sunk in it in the past, and if these values for all the businesses in an industry are aggregated we have a "capital value" of that industry, although as a matter of strict fact, no one could or would buy a whole industry, and the "value" of one part of it is affected by what is done with another part. In the same way, the value of all the industries may be added together, giving a "national capital," and although in many senses this is only a "notional" capital it does at any rate serve to give aggregates which, apart from larger changes in

¹ See Chapter I and also my *British Incomes and Property*, which gives a summary of such estimates.

the value of money, are comparable over periods of time and in which, even *without* regard to changes in the value of money, we may observe changes in the different parts.

The chief items of the estimate for 1928 are given on page 30. Reference to the official statistics showed that the profits for the year following, the last year reasonably normal before the great depression set in, was about 5 per cent. greater than these, so the aim of this particular analysis is towards a rather higher total capital.

The reader must refer to Chapter I to follow the differences in the significance of the gross as compared with net wealth, and to appreciate the degree of statistical accuracy attaching to the several parts. For the purposes of this chapter, I shall be concerned with the net figure £18,045 million plus an addition to bring it up to the following year, say, £18,950 million, of which £10,400 million, or 55 per cent., represents industrial and commercial activities, and £5500 million real property, and £450 million farmers' capital. Although the total in Chapter I is actually made up in greater detail, it is not very useful for the purposes of this chapter, because it includes the value of income derived from businesses situated abroad; and the capital values of mines, oil fields, etc., situated abroad, but owned in this country, have no geographical relation to the businesses or properties actually situated here.

From the best of the detailed information of possession, and with some reserve on the question of statistical exactness, the following detailed industrial totals are suggested as being appropriate sections of the total valuation :

Agriculture, 14.0	Agriculture (owners and farmers)	1,400	
Railways, 8.6	Railways	860	
Mines, 2.4	Mines		2,260
Gas and Water, 3.0	Gas and water		240
Textiles, 4.2	Cotton	130	300
Metals, 7.4	Wool	100	
Brewing, etc., 4.4	Other textiles	190	
Other Manufactures, 17.4	Iron and steel	420	420
Distribution Wholesale, 11.0	Small ferrous industries	240	
Distribution, Retail and Industrial, 14.5	Copper, etc.	80	
Other transport, etc., 5.8	Brewing, etc.	440	740
Finance, 7.5	Tobacco	135	
	Sugar	250	
	Soap, chemicals, etc.	275	
	Leather, etc.	275	
	Paper, etc.	320	
	Timber and building	325	
	China	160	
	Distribution and wholesale		2,180
	retail		1,100
	Transport (shipping, trams, electric power)		1,450
	Banking and finance		580
			750
			<u>10,020</u>

FIG. 1.—Percentage Analysis of National Capital, 1928
(percentages are approximate).

The relative importance of manufacturing transport and distributive activities has shifted somewhat during the past few decades. Comparisons of actual aggregate capital values are not very satisfactory, because of changes in the value of money: of recent years the totals would be rather over double the pre-war totals, and three and a quarter times the totals of forty years ago. A better approach is a broad comparison of the percentages of each section at each period, which is attempted in Fig. 2. From this it will be seen

that transport, despite the huge growth of road traffic, is less important relatively, but distribution shows a striking advance.

Forty-five years ago.	Pre-war.	1928.
Manufactures 42	Manufactures 48.5	Manufactures 49.5
Distribution Wholesale 18	Distribution Wholesale 17.5	Distribution Wholesale 18.5
.....		
Retail 10	Retail 8	Retail 15
Transport 30	Transport 26	Transport 17

FIG. 2.—Comparative percentage of Capital engaged in different activities at different periods.

The relative proportions of the different manufacturing groups have also changed a little during the same period,

and, with even wider reservations on the question of statistical exactness, the comparisons are given in Fig. 3. From this it will be seen that the extractive industries are less in

Forty-five years ago.	Pre-war.	1928
Metals 25	Metals 24.5	Metals 26.5
Mines, etc. 13.5	Mines, etc. 16	Mines, etc. 8.5
Textiles 16.5	Textiles 20	Textiles 20.5
Brewing 18.5	Brewing 13	Brewing 12.5
Gas and Water 12	Gas and Water 12	Gas and Water 9.5
Miscellaneous 14.5	Miscellaneous 14.5	Miscellaneous 22.5

FIG. 3.—Relative importance of manufacturing industries at different dates.

relative importance, reflecting, too, the depressed state of the coal industry, and, as might be expected, the miscellaneous industries have gained ground on the large staple industries.

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It must be appreciated that the foregoing computations represent in no way the actual capital put into the respective industries in the past, and depression in the coal or textile industries reduces the capital value as "going concerns" although the past capital involved remains unchanged, if we are not concerned whether it is "dead" or "alive."

But the method does tend to reflect the true relative vigour of industries. The Census of Production figures, inasmuch as the "net value" includes the fund available for wages as well as profits, give a wider view of relative importance, but over a limited range. A rough comparison may be made between 1907, 1924 and 1930 :

	1907.	1924	1930.
Mines and quarries . . .	119.5	226.2	153.5
Iron and steel, engineering and shipbuilding . . .	153.1	298.3	304.5
Other metal industries . . .	11.9	25.1	22.8
Textiles	94.3	210.6	134.8
Clothing trades	47.7	74.8	70.9
Food, drink and tobacco . . .	89.5	169.8	179.0
Chemical and allied trades . .	21.6	65.5	70.1
Paper, printing and stationery .	33.6	92.0	98.8
Leather, etc.	8.6	11.6	9.9
Timber	21.4	26.7	28.8
Clay, stone, brick, etc. . . .	60.4	112.2	119.1
Total in £ million	661.6	1,312.8	1,192.2

It will be seen from this that the percentages in the main groups were roughly :

	1907.	1924.	1930.
Mines and quarries	18.0	17.0	13.0
Engineering and metals	25.0	25.0	27.5
Textiles	14.5	16.0	11.5
Other manufactures	42.5	42.0	48.0
	100.0	100.0	100.0

Fig. 4 shows this graphically, taking the mean between 1924 and 1930.

It is clear from this table that, as in the case of the test

1907.	1924-30
Mines, etc. 18	Mines, etc. 15
Engineering and Metals 25	Engineering and Metals 26.3
Textiles 14.5	Textiles 13.7
Other Manufactures 42.5	Other Manufactures 45

FIG. 4.—Relative importance of industries according to the results of the Censuses of Production.

of capital values, the mining and textile industries have increased much less than the average, and engineering and

miscellaneous trades much more than the general average. The range between 1907 and the mean of 1924 and 1930 by the census is an average increase of 88 per cent., and as between "pre-war" and "now" on capital tests, 115 per cent. (But if the census is taken to 1924 only the average increase is 100 per cent.)

Within the group of miscellaneous industries food and drink production showed a mean increase of 100 per cent. in the census; clothing and leather and timber and building increased less, but chemicals and paper increased more than the average. The capital values between "pre-war" and "now" show that food and drink production increased rather less than the average, chemicals and paper more than the average.

Greater precision in the comparisons of relative importance through capital values and other tests is unfortunately not possible, because over a considerable period there is a material change, either in the statistical measurements where they are available, or in the character of the industries, while changes in the value of money and the rates of interest affect certain sections, such as agriculture, very differently.

VIII

THE EFFECT OF TRADE FLUCTUATIONS UPON PROFITS BEFORE THE WAR

VIII

THE EFFECT OF TRADE FLUCTUATIONS UPON PROFITS BEFORE THE WAR ¹

I. IN his *Science et Hypothèse*, M. Henri Poincaré remarks that it is "far better to predict without certainty than never to have predicted at all. We should never disdain to verify when opportunity presents itself. But every experiment is long and difficult, and the labourers are few, the number of facts which we require to predict is enormous, and besides this mass the number of direct verifications that we can make will never be more than a negligible quantity. Of this little that we can directly attain we must choose the best."

Some years ago there presented itself to me the practical problem of estimating from any available indications what the current amount of profits—that is, the profits of any particular time through which we might be passing—would prove to be, compared with previous years. This had to be done when no considerable body of completed and published accounts could be used. I soon found that while there was much literature on economic cycles and crises, on the correlation between different measures of trade prosperity and vital or social statistics, there was nothing which connected the trade movements with their trade *results*, and no indication as to their relative degrees of profitability. With all the recent mass of writing on trade cycles,² and the skilful

¹ Reproduced with further notes from the *Journal, Royal Statistical Society*, July 1918.

² Among others, Juglar, *Des Crises Commerciales*; Professor Aftalion, *Les Crises périodiques de surproduction*; Jones, *Economic Crises*; H. L. Moore's *Economic Cycles*; and notably D. H. Robertson's *Study of Industrial Fluctuations* (P. S. King & Son), 1915, which is invaluable on the phases of the subject with which it deals.

production of "business barometers," there was little to show us, from the most accurately adjusted barometer and skilled reading of its movements, what precisely is the "change in the weather" that may be expected to follow or accompany its indications. The reason is not far to seek. While we have various partial measures of trade changes, continuously and regularly kept, it is difficult to get any aggregation of profit, made up on a sufficiently uniform plan, to correspond thereto. If we select a given group of businesses, of which we know the profits, it is almost impossible to get uniform details of their total trade; moreover, the group is probably too small for us to be confident that individual idiosyncrasies will have cancelled each other, and it is not easy to keep a complete series for a sufficient number of years to secure that the cycles of trade shall be fully represented. In short, there are very formidable difficulties in the way of making a proper comparison between profits and trade statistics.

In our pre-war experience when monthly statistics of foreign trade were quoted, or the bankers' clearing-house figures were referred to, all kinds of inferences were drawn for and against the political features of the day. If the "returns" were up by 10 per cent. on the previous year, it was held to be something for jubilation; if they were down, perhaps the tariff controversy took on a new twist. But we do not do increased trade for its own sake—we do it because we hope for increased profits. And there was always the assumption that the up and down movement of trade connoted a related degree of altered "profit" prosperity. (There was the further ethical or teleological assumption, I suppose, that if we all made more profits, then we were all so much happier and better off.) But in many of our minds, as we looked at the figures, there were misgivings and unsettled questions: what would the increase be like if the natural growth of population were taken into account, and how far was it a *real* increase in output of commodities, as distinct from an increase due to higher "prices" for the old quantity of goods? If a given measure of trade has risen, say from £100 to £120, and we rejoice in a rise of 20 per cent., it may be either that 120 units have been sold

instead of 100., at a regular price of £1, or that 100 units have been sold at a price of £1, 4s. each instead of £1, or the result may be a combination of both changed quantity and changed price; it may even be that one factor has actually *diminished*, but that its effect is more than offset by the increase in the other. What is the actual or probable change in profit that accompanies such a change of 20 per cent., according to the cause of the change? Will a like change accompany a second or third ensuing rise of 20 per cent.? Will the relations found to exist for increases hold also for decreases, or what difference may we expect? These are all questions to which we should like answers, and they suggest many more. For trade in general it may be said that our notions about the relative influence of quantity and price upon profits are very theoretical and abstract, and here we direct our attention to some preliminary investigation of the actualities so far as the United Kingdom is concerned. I have found business men quite ready to answer these questions, but their views are so special or local in point of time and place, and so frequently cancel each other out, that they are almost useless as a basis of general statements. "Practical" business men will generalise and theorise with a fearlessness and freedom from restraint that any "abstract" professor might envy, but would certainly not imitate. More particularly is it impossible to obtain from them a clear idea of *net* effects to the whole community as distinct from particular results in single industries.

2. In my earlier efforts I was mainly concerned to find which set of industrial statistics moved most closely in relation with the profits represented by the assessments to income-tax under Schedule D, both as to actual correlation and as to the degree or percentage of variation year by year. For this purpose I took the official records of those assessments from the 'seventies, and patched up some awkward breaks or faults in the series, due to changes in taxation law and conditions, sufficiently well to get broad results. The necessity for thoroughly probing those figures before I could feel comfortable in using them in such problems was

one of the things that led me to spend three or four years in the work of exploring, bridging and preparing for the statistician the chief series of statistics relating to income-tax, etc., the results of which were published under the title "*British Incomes and Property*." ¹ I shall perhaps be pardoned, therefore, if I take the stages reached in that book for granted, and if I make numerous references thereto in the interests of brevity and, in effect, treat it as part of this paper. I have no reason whatever to complain of my critics, who have, indeed, been sufficiently generous, but from several widely separated quarters the note was touched, that I might well have advanced my work to its more complete application in current problems—which was really a criticism that I had written one book instead of four! However, this sketch is a contribution to such a task.

Broadly speaking, the first result that I reached was on the following lines. Setting out the Schedule D assessments upon profits, which as a whole for any given year represent the average of the profits of the three preceding years, the percentage increase or decrease of each year's assessments compared with those of the preceding year was ascertained from 1879. The statistics of railway tonnage, railway receipts, bankers' clearing house, and foreign trade, were then each arranged in triennial averages to correspond, and the annual percentage change for each series was ascertained. Thus the Schedule D assessments for 1900-1 amounted to £466.19 million, and for 1901-2 to £487.73 million, or an increase of 4.62 per cent. The average of the imports for 1897-8-9 was £468.82 million, and the average for 1898-9-1900 was £492.83 million—an increase of 5.12 per cent. Similarly, special exports (exports of products of the United Kingdom) showed 5.43 per cent., total foreign trade 5.34 per cent., railway tonnage 4.33 per cent., railway receipts 3.79 per cent., and bank clearings 5.93 per cent. If, therefore, a forecast of the increase in Schedule D assessments had been made, based on these different series of

¹ *British Incomes and Property: the Application of Official Statistics to Economic Problems*, 534 pp., P. S. King & Son Ltd. Referred to hereafter in the text as "*British Incomes*."

statistics as indicative of the course of profits, it would have been erroneous to the following extent :

On imports	·5	per cent. too high
On special exports	·81	„ „
On total foreign trade	·72	„ „
On railway tonnage	·29	„ low
On railway receipts	·83	„ „
On bank clearings	1·31	„ high

Computing this “ error ” for each of the thirty years, it was found to average as follows (without regard to its plus or minus character) :

Imports	2·37	per cent.
Special exports	3·40	„
Total foreign trade	2·59	„
Railway tonnage	1·81	„
Railway receipts	2·35	„
Bank clearings	2·41	„

In the case of the railway tonnage, the error over the last twelve years only was ·8 per cent. The most accurate measure for the whole period was found to be the mean of the figures for railway tonnage and bank clearings, which gave an average error of 1·7 per cent.

Fig. 1 (B) shows the deviations of four of the series from a straight line, which represents 100 per cent. (or an unchanged figure annually) so that any increase on a preceding year is shown above the line. “ A ” gives the same set of figures, except that the series fluctuates about the line of increase of profits as though it had been uniform.

I worked out certain coefficients of correlation to which I will refer later on, but did not then pursue the matter further. I have, however, recently applied to the problems involved a wider range of statistical method and analysis in order to see whether answers can be obtained to any of the unsettled questions to which I have referred. Space will not permit of more than a selection from the various tests I have used, and present economies altogether preclude the repetition of long series of relevant statistics or correlation tables, interesting though they may be. If the statistics are available elsewhere they are not repeated here. I have, for similar reasons, almost entirely abstained from com-

ments on the theory of fluctuations and from assigning reasons for the results obtained.

As there will probably be twelve persons interested in the problems generally for every one person to whom statistical and technical terminology bears any significance, I shall devote the greater part of my space to the statement of results in broad general terms and percentage expressions. There will be but a plain statement of the statistical constants, coefficients, etc., the full bearing of which will probably be sufficiently obvious to those to whom they carry meaning, without extended comment. In view of the different preferences that statisticians have in this field of their activities, I have endeavoured to take as many points of view as possible, in order to satisfy each line of thought, and also so that it may be seen whether similar results emerge from various tests.

3. It is obvious that the question of the methods employed to test relationship is very important. I have not troubled to correlate the annual items in each series, because the high coefficients that result include the spurious correlation from the common increase due to the common cause (*e.g.* growth in population).

Correlation of deviations from the moving average.—This recognised method has been used in most cases, but, of course, when the series of years is not a long one, it is wasteful of material at both ends, and limits the value of the coefficient because of the small number of items.

Correlation of variate differences.—Recent developments (1919) in this method have raised high expectations as to its value in this class of investigation.¹ It has just been subjected to a very close scrutiny in a masterly paper by Professor Warren Persons, "On the Variate Difference Correlation Method and Curve-Fitting,"² and he has clearly shown that it contains certain inherent defects. He concludes as follows: "The method involves the assumption that the taking of multiple differences leads to series of random variates. In practice for short series this assumption is not fulfilled.

¹ *Biometrika*, April 1914; November 1914.

² *Quarterly Publications of the American Statistical Association*, June 1917.

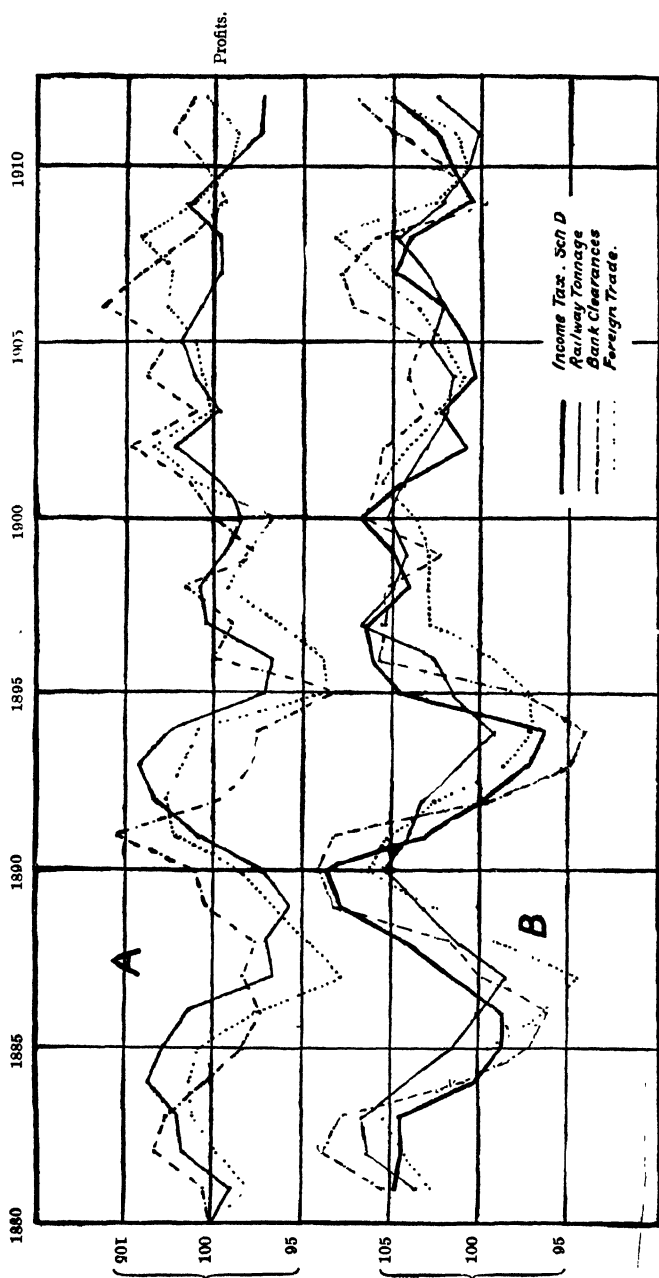


FIG. 1.

A. Percentage fluctuation of each series *about* the line of profits (horizontal).
 B. " " " " including profits (horizontal = 100).

Coefficients for higher differences of short series tend to alternate in sign and to conceal rather than to reveal the nature of the correlation between the series being tested." I have employed the method freely, but am bound to say that I have seen nothing to indicate that it is an improvement upon the other methods.

Correlation of deviations from the linear secular trend.—It is usually found that a linear trend can properly be "fitted" to these series of statistics. This trend, fitted by the method of least squares, gives an excellent point from which to measure deviations, and in my judgment is superior to the moving average in almost all respects. Professor Persons comes to the conclusion that these correlation coefficients, together with the coefficient for first differences, "constitute a reliable basis for judgment." He considers that "coefficients of correlation between second differences may give information concerning minor oscillations as distinct from secular trend and major cycles." Even for this purpose the use of higher "than second differences appears to be unreliable, especially so for short series." He has further demonstrated that coefficients between second differences are identical with those between deviations from three-year progressive averages. So far as I know this is the first application that has been made of the method to this class of statistics in this country.¹

In a few cases, where one series has a cyclical or pseudo-cyclical fluctuation, and the other (such as price level) has no such periodical wave, I have used a method of my own, viz., the correlation between the first differences of one series, after eliminating the linear secular trend, with the first differences of the other. I have also made a sparing use of the multiple correlation formula. It will be seen, therefore, that I have attempted to apply the simpler methods of statistical analysis to very intractable material in order to register a few facts in a region hitherto occupied by unexamined assumptions and generalities.

¹ The method of correlating variate differences, especially second and higher differences, has now been discredited (especially by G. Udny Yule, in the *Journal of the Royal Statistical Society*) as giving "nonsense" or spurious correlations. I have, however, left the text as originally given, and no part of the conclusions is affected by excluding the difference correlations.

There is no doubt that the application of these methods to statistics of this character is difficult and not without a fair amount of risk. There are some, indeed, who would deny that they have any valid application at all, on the ground that the human volitional element enters so largely into the questions of rise and fall in trade activity and into profit making, that the phenomena under investigation are quite unlike those which vary on a physical or biological basis. But my answer to this is that if the statistics relate to businesses as a whole and not merely to small groups of selected cases, we are simply postulating the normal measure of hedonic impulse, the normal psychological reaction to the prospect of rising or falling prices, existing in a given nation at a given epoch, just as if they were physical constants, the larger effects of which are not subjective at all, but quantitative and quite susceptible of broad statistical treatment. Moreover, we are not trying so much to establish causal relation, as to find, amid a mass of difficult and confusing facts, evidence of the existence and extent of concomitant variation. If we found that x units of change in profits has, in fact, accompanied y units of change in prices of z units of change in quantities, and we then proceed to *expect* that relation to hold good in the future, we could state our "law" only as a purely empirical one, like Pareto's formula for the distribution of incomes. Of course it is quite possible to formulate the conditions under which almost any combination of such related functions may be found, and even to find the businesses which exhibit those conditions. Business A may inevitably show a decrease in the rate of profits upon an increase of output, while business B shows the reverse—indeed, one and the same business working at different pressures in comparison with its normal or natural output may successively be working under conditions of increasing, constant or decreasing returns. When times are slack and the machines are half used, overhead charges are distributed over a small output, and every additional unit of product gives a more than proportional rate of profit; while, at the other extreme, when the business is pressed beyond its true capacity, the cost of making room for additional plant, the

higher rates for overtime, the breakdown of effective supervision and the costs arising from general congestion, may make the extra profit gained per unit less and less to the point where the profit per unit vanishes. What we ask is, Where does British business as a *whole* stand, in regard to the connection between profits and fluctuating trade?

4. The inherent difficulties of the subject are made worse by the complexities of statistics of "profits." I have shown (*British Incomes*, Chap. VI) that the income-tax test secures homogeneity and constancy—a uniformity both in space and time. But unfortunately the assessments are mostly expressed as successive three-year or five-year averages. We have then two courses possible: (1) to resolve those averages into the actual profits of separate years, or (2) to throw all the other series that are to be compared with the profits series into a like set of successive averages. Now the first course is, I believe, mathematically impossible unless we can get a clear start with one definite year, when it becomes theoretically quite easy, for, apart from the annual trend, the difference between the two successive triennial averages is the difference between the first and the fourth year divided by three. But that single clear year is unattainable. I have, however, devised a means for getting a close approximation to a part of the true series, and I will refer to it later. For the moment let it be assumed that the second is the only available course. Throwing all the figures into three-year averages, and then treating those results as unrelated successive items in an historical series, means that the sharp edges of comparison are rubbed off at the very beginning, and that some unknown statistical perils may lurk beneath all our tests. Nevertheless, we must make the best and most of it and proceed. I have shown that on an evenly falling or rising curve the Schedule D assessments for a year, say 1908–9 (6th April 1908 to 5th April 1909), would approximate to the actual profits of the year to June 1907 (*British Incomes*, p. 178), so that if we were sure these conditions of uniform change existed our series might be taken to be an ordinary historical series of which each item was slightly prior in actual time to the label it bore. But the

assumption is unwarranted. Further difficulties in regard to the material under investigation will be referred to in the appropriate place.

5. *Coal Mining*

For simplicity in introducing the several methods, the profits of business as a whole will not be considered until after those of the coal-mining industry.

Owing to a happy accident of legal classification in the earliest income-tax systems, we have always had the statistics of assessment on mines shown separately. The complete and corrected series is only to be found in *British Incomes* (p. 220), and it is used here. The basis of assessment is the average of the five years preceding the year of assessment, and the figures include the assessment on the profits of *all* mines in the United Kingdom, and not merely coal mines. For the purpose of watching *fluctuations*, I am satisfied that the series does not differ materially from what the coal mines alone would show, for (a) "other mines" form so very small a proportion of the whole, that the profits would have to fluctuate in a widely different way from coal-mining profits seriously to affect the total figures as an index to coal only, and, moreover, we have (b) an occasional glimpse of the profits of "other mines" as a separate class (*British Incomes*, p. 223) and find that the proportion to the whole is practically constant. We have the annual output of coal given for fifty years, the "receipts" also for a similar period, with one complete break in the series, and the "price per ton" on a uniform basis unbroken for thirty years, all from the Home Office Reports. Throwing these series into five-year averages, a comparison may be instituted. The course of profits is shown in Fig. 2, together with the nine-year moving average, and the linear secular trend. The following are some statistical results:

Deviations about the moving average. Tonnage (x) and Profits (y).

$$\left. \begin{aligned} x &= 2.29 \text{ (millions of tons)} \\ y &= 2.187 \text{ (millions of £)} \dots \\ r &= .63 \pm .06 \end{aligned} \right\} \text{for thirty-nine years.}$$

(or, divided into periods)

·56 for first twenty-three-year period,

·68 for second sixteen-year period.

But if profits are lagged forward a year, we get

$$r = \cdot 4$$

or
and

·68 on the first twenty-three years,

·22 on the second thirteen years.

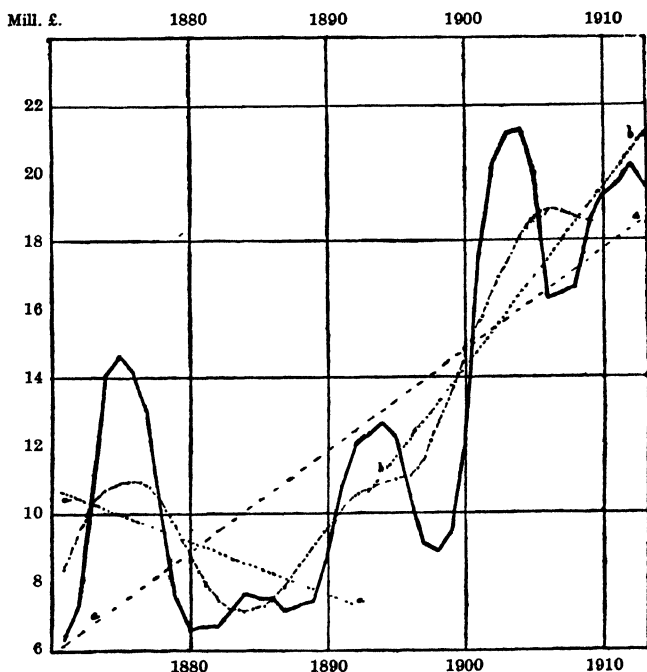


FIG. 2.—Coal profits 1871-1913 (five-year averages).

———— Nine-year moving average.
 aa Linear Trend 1871-1893.
 bb " " 1893-1913.
 ----- cc " " 1871-1913.

Why should putting the 1870 profits against the 1871 tonnage, and so on continuously, give such a markedly superior co-efficient ?

A lag in the opposite direction showing that changes in output did not make their presence felt in changes in profits instantly would have been comprehensible, but what pos-

sible connection could there be between the profits of one year and the trade activities of the next following year?

A search for the cause of this peculiarity soon resulted in a complete and convincing explanation—a not uninteresting example of Mill's "Method of Residues." It consists in a certain statutory provision for special relief in income-tax assessments when there is a sequence of diminishing profits, known as the "133rd Section" which I was fully aware of, but had not hitherto considered in its statistical connections. It has the effect of partly advancing the profits a year, *i.e.* the assessments recorded for 1873 would approximate actually to those for 1874, and those for 1874 to 1875 and so on. As the point is rather technical I have explained it in detail at the end of this chapter (Appendix) together with other technical points relating to the assessment of mining profits. Suffice it to say that its discovery led to the solution of several difficulties in other directions that previously were given up as hopeless. We are justified in regarding the coefficient here as $\cdot 68$ *throughout* the thirty-nine years, because it is necessary to take the lag forward in the major part of the first twenty-three years (during which the xy series is wholly positive) but not at all in the subsequent period.

Variate differences.—Tonnage and Profits.

First differences (lagging profits during first twenty-three years): $r = \cdot 52 \pm \cdot 07$.

Second differences (not materially different with the lag)
 $r = \cdot 42 \pm \cdot 08$.

Prices and profits (1887 to 1913).

First differences:

$x = 4.7d$, $y = 1.67$ million £, $r = \cdot 84 \pm \cdot 038$.

Second differences:

$x = 3.9d$, $y = 1.54$ million £, $r = \cdot 81 \pm \cdot 039$.

Deviations from the linear secular trend

Trend of profits:

1871 to 1893, *aa* in Fig. 2. $y = 10.58 - 1.58t$.
(Origin at 1871.)

1893 to 1913, *bb* in Fig. 2. $y = 10.62 + 5.3t$.
(Origin at 1893.)

Whole period :

$$1871 \text{ to } 1913, \text{ cc in Fig. 2. } y = 6.3 + 3.07t. \\ (\text{Origin at } 1871.)$$

Trend of prices :

$$1893 \text{ to } 1913 \text{ (in pence). } y = 83.8 + 1.06t. \\ (\text{Origin at } 1893.)$$

Coefficient for *deviations*, 1893 to 1913 :

$$\text{Profits : } \sigma^1 = 2.806 \text{ (million } \pounds \text{).}$$

$$\text{Prices : } \sigma^2 = .71 \text{ (pence).}$$

$$r = .89 \pm .03.$$

The ratio of variation (approx.) : .4. (The term is used for the ratio borne by one set of deviations—expressed as percentages of the items of the series—to the other set, viz. the deviations in the profits series, the latter being treated as unity.)

General conclusions from the foregoing results

When the annual tonnage output of coal is thrown into the form of a series of five-year averages, the series is a steadily rising one, and the separate items vary from a "trend" of the items by only a small deviation. The annual average *prices* of coal (which are known accurately only from 1882) fluctuate much more than tonnage. The assessments upon profits (already actually in five-year averages of annual profits) have deviated from their trend *much* more violently than the tonnage statistics, and considerably more than prices—approximately two and a half times as much in fact.

Apart from the *degree* of deviation, the *correspondence* of deviation in the case of tonnage compared with profits is close—profits have generally increased more than the average where tonnage has increased more than the average, and decreased similarly. But the effect is of course mixed up with increases and decreases in price. In the comparison of price-changes with profit-changes the correspondence is found by all tests to be very close indeed.

I can well understand, however, that people will ordinarily

be reluctant to accept results based wholly upon a comparison of fluctuating results which are thrown into *averages*, and thus necessarily robbed of their sharpness and clearness. It may be thought that the comparison of the results of the years themselves would lead to a substantially different conclusion, and considerable attention has accordingly been devoted to the problem of "unravelling" the averages in the assessments of profits. There is no method of ascertaining the *actual* aggregate profits for any given year which enter into those averages. But if by observation of a collection of results (such as those given in the *Economist* quarterly articles) one can get a large unbiassed group of actual instances of colliery profits for a sequence of five years, one is in a position to ascertain the approximate assessment for the next ensuing financial year on that group as a whole.

For example, let it be assumed we know the *actual* annual profits of a large group of collieries for the five years 1902 to 1906, then we are in a position to give the assessment for 1907-8 on the group :

			£	
1902	.	.	6,000,000	} Average £7,000,000 for 1907-8 tax year.
1903	.	.	5,000,000	
1904	.	.	7,000,000	
1905	.	.	8,000,000	
1906	.	.	9,000,000	

If the actual aggregate assessment is £21,000,000, we may assume the aggregate profits of each of the years 1902-6 to be in the same proportion to those in the group, *i.e.* £18,000,000 for 1902 and so on.

Over a period of years I have made a number of such observations, and so by applying this method where possible I have a set of figures—in some years several different values for one year, closely approximating, and in other years no results. Where there are gaps, the later five-year averages may be unravelled backwards with the aid of the above values, the earlier averages unravelled forwards, and where the two results meet, they must of course agree. In the result I go back to 1888 or two years earlier than my earliest actual sample figure (which is as far as I care to go without the risk of a fair margin of error by the process of

“ unravelling ” alone) and can confidently assert that the series cannot be far removed from the truth.¹ For it satisfies very severe tests :

- (1) It fits all the sample results.
- (2) It fits the recorded series of assessments throughout.
- (3) It answers to the “ 133rd section ” test, where that applies.

For comparative purposes the series is reduced to an index-number (100 = average of 1896 to 1905) and the other colliery statistics for single years are similarly tabulated (Table I). This makes the lines in Fig. 2 quite comparable. In that graphical presentation the secular linear trends are also given, and the equations for the trends are :

$$\text{Profits : } y = 71.80 + 3.35t.$$

$$\text{Tonnage : } y = 76.38 + 2.14t.$$

$$\text{Prices : } y = 87.9 + 1.2t.$$

$$\text{Receipts : } y = 64.3 + 3.4t.$$

(All origins at 1889.)

The statistical constants are :

$$\text{Profits : } \sigma = 40.73.$$

$$\text{Tonnage : } \sigma = 3.67.$$

$$\text{Prices : } \sigma = 14.55.$$

$$\text{Receipts : } \sigma = 16.48.$$

$$\text{Profits and tonnage : } r = .50 \pm .1.$$

$$\text{Profits and prices : } r = .89 \pm .026.$$

$$\text{Profits and receipts : } r = .92 \pm .02.$$

In the case of profits and prices the coefficient of variation is approximately .38. It will be observed that these coefficients agree closely with those obtained from the five-year averages (linear trend), viz. : $.89 \pm .03$ for profits and prices, with variation .4, and would lend support to the view that the former series would be authentic for a single-year series.

In order that the results may be intelligible to the non-statistical reader, let me endeavour, by studying Table I, to express them in general terms.

¹ These figures assumed such importance shortly afterwards for entirely unexpected reasons, that a Note on the Subsequent History of the Coal-Mining Statistics is given at the end.

TABLE I.—*Coal Statistics*

Year.	Quantity. Million tons	Values, Million £.	Price in pence.	Profits, Million £.	Index-numbers: 100 = average of 1896 to 1905.					
					Quantity.	Difference.	Receipts.	Difference.	Price.	Difference.
1888	160.9	43.0	61	7.1*	77.5	—	51	—	67	—
1889	176.9	56.2	76	12.4*	81	3.5	67	16	83.5	16.5
1890	181.6	75.0	99	16.6	83	2	89.5	22.5	109	25.5
1891	185.5	74.1	96	14.4	85	2	88.5	—1	105.5	—3.5
1892	181.8	66.0	87	11.0	83	—2	79	—9.5	95.5	—10
1893	164.3	55.8	81.5	9.1	75	—8	67	—12	89.5	—6
1894	188.3	63.7	79.5	10.4	86	11	75	8	87.5	—2
1895	189.7	57.2	72.5	7.6	87	1	68	—7	80	—7.5
1896	195.4	57.2	70	7.7	89	2	68	0	77	—3
1897	202.1	59.7	71	8.9	92	3	71.5	3.5	78	+1
1898	202.1	64.2	76	12.4	92	0	76.5	5	83.5	5.5
1899	220.1	83.5	91	22.9	100.5	8.5	100	23.5	100	16.5
1900	225.2	121.7	130	35.6	103	2.5	145	45	143	43
1901	219.0	102.5	112	25.2	100	—3	122	—23	123	—20
1902	227.1	93.5	99	16.9	104	4	112	—10	109	—14
1903	230.3	88.2	92	14.4	105	1	105.5	—6.5	101	—8
1904	232.4	83.9	86.5	12.8	106	1	100	—5.5	95	—6
1905	236.1	82.0	83	13.0	108	2	98	—2	91	—4
1906	251.1	91.5	87.5	16.6	115	7	109.5	11.5	96	5
1907	267.8	120.5	108	26.4	122	7	143.5	34	118.5	22.5
1908	261.5	116.6	107	24.5	119.5	—2.5	139	—4.5	117.5	—1
1909	263.8	106.3	97	16.1	120.5	1	127	—12	106.5	—11.0
1910	264.4	108.4	98.5	17.2	120.7	0.2	129.5	2.5	108	1.5
1911	271.9	110.8	98	16.6	124	3.3	131.5	2.0	107.5	—0.5
1912	260.4	117.9	109	22.9	119	—5	141	9.5	120	12.5
1913	287.4	145.5	121.5	30.4	131	12	174	33	133.5	13.5
1914	265.7	132.6	120	23.2	121.5	—9.5	158.5	—15.5	132	—1.5
1915	253.2	157.8	149.5	29.6	115.5	—6	189	+30.5	164	32

* Or less.

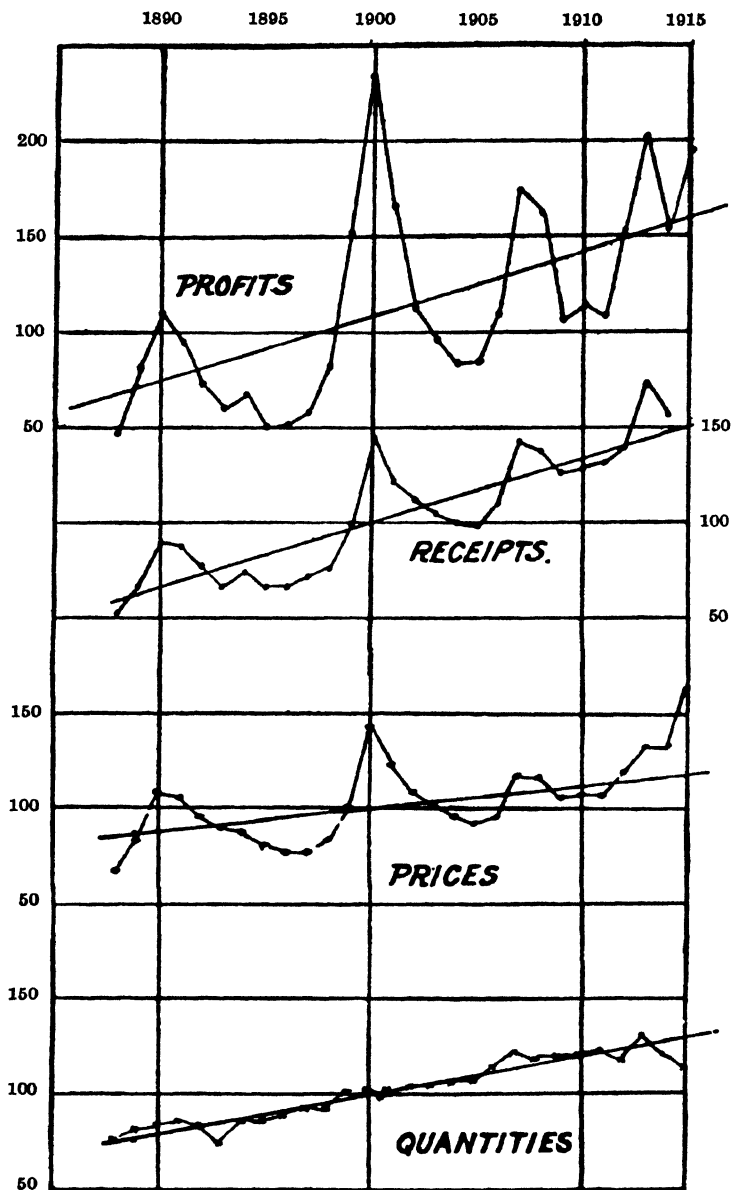


FIG. 3.—Coal Mining, 1888–1915.

As the resultant effect of two forces, sometimes moving together, sometimes against each other, are shown, we have a series of rough equations. Analysis of the details gives the following results :

(a) Looking first at the years in which there is a negligible change in *quantity*, the whole change in profits may be taken to be due to change in price, and from this it appears that for a change in price represented by one point, profits change three and a third points. This result is on the whole the most satisfactory with the years taken together, but from it one judges that if the quantity changes by one point, the profits will change by rather more than unity. It does not appear possible that the profit-change per unit of quantity change can be *greater* than 1.5.

(b) Taking the years in which there were *increases* in profits (compared with year preceding) and dividing them into two groups : (1) small changes (less than 30 points) ; and (2) large changes (more than 30 points), and using 1.5 as the common factor to eliminate the effect of the quantity change, we find that the group (1) gives a profit-change of 2.5 per unit of price change, and the large-change group (2) gives 2.7 ; or 2.57 for all increases.

(c) Taking in the same way the years when there were *decreases* in profits, it is found that the smaller changes give 3.7, and the larger 4.1 ; or 3.8 for all decreases.

(d) From this it would appear that a rise in prices has had rather less effect in raising profits than a fall in prices has had in diminishing profits, and also that where the rise or fall has been large, the change in profits has tended to be greater in proportion than it was for a small rise or fall.

(e) Where a year of rising profit is followed by another rise (or a year of fall is followed by another fall) the succeeding year tends to show a diminished factor, *i.e.* the effect of the price change in altering profits is not so great. (There are ten such sequences in which this result holds good against two where it does not.) Doubtless the rapidity with which wages follow prices is instrumental in bringing about this result.

(f) Looking at the case theoretically and knowing what a

large part of the price of coal is made up of wages, it would appear probable that an additional *output* of 1 per cent. would entail additional expenses of nearly 1 per cent., and that there could only be a fractional saving in on-costs, so that the net profit could increase only by a fraction over 1 per cent. This being so, we may take it that the profit change per unit of price change is actually about three times (*see* Appendix I). The above result is quite intelligible so far as it relates to the effect of a quantity change, but theoretical reasoning alone could hardly yield the conclusion as to the effect of the price change.

Attention must, however, be directed to one feature that runs throughout all the foregoing treatment of colliery profits. The profits include *royalties*, and, in this industry, royalties do not to any extent vary with the price, so that the amount charged is practically constant with the output. It amounts to about £6,000,000 (*British Incomes*, p. 223), or about one-third of the whole profit. If we are thinking of "colliery profits" as those profits pertaining to the industry rather than to the ownership of the coal, then the fluctuation due to price must be regarded as greater than that given above. It is reckoned above on a base of 100, of which the colliery proprietor, who bears the fluctuation, keeps from 65 to 70 only, and upon this base the fluctuation of three becomes $4\frac{1}{2}$ to $4\frac{1}{2}$ per cent. The broad fact, therefore, emerges that price has been fully *four* times as powerful as output in causing fluctuations in the profits.

It is possible to get substantial corroboration of these results from an entirely independent source, unconnected with taxation. A Parliamentary Return (No. 197 of 1903) on "Wages and Profits in Coal Mining" gives for the years 1886 to 1902 the average price, the computed wages, the computed receipts at the average price and the balance, or gross profit before charging royalties and other expenses. This is reproduced graphically in Fig. 4 (with a deduction for royalties), each series being reduced to an index (100 = the mean). The average deviation of the values is 18 points, of wages 15 points, and of *gross* profits (after charging royalties) 45 points. Thus the average deviation of the

gross profit is two-and-a-half times that of price, and obviously the deviation in net profit would be considerably greater.

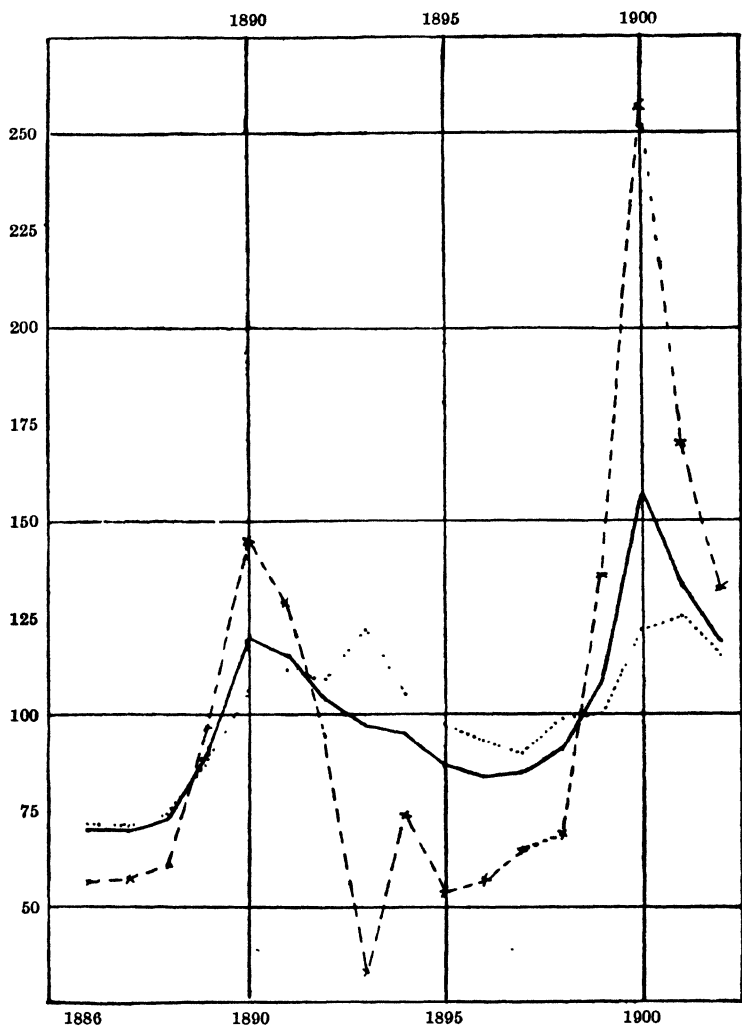


FIG. 4.—*Coal Mining, 1886–1902.*

----- Profits (after charging wages and royalties only).
 Wages.
 ————— Price.

When we come to consider the "prosperity" in the colliery industry as part of the prosperity of the country as a whole, important qualifications have to be made. In so far as it arises from increased output it may be symptomatic of increased trade generally, for coal is of course used in many industries. But in so far as it arises through increased price, it may be a positive bane to other industries using coal if they are not in a position to pass on the increase in price to their customers. We may look briefly at the profits of railways.

6. Railways

The profits of railways are assessed to income-tax on a single-year basis (*i.e.* for 1914-15 on the 1913 profit), and the figures have for years been published separately. Strictly speaking, in the case of railways there is no variation in "price," save for periodical revisions of rates, and the gross receipts (given in the Statistical abstract) correspond to what we should call in other industries the "output," or work done. There is no significant correlation between the profits and the "output," they are practically independent in their fluctuations.

(*Linear trend* fluctuations 1880-1912, $r = .29 \pm .10$, or for the period from 1889, $r = .12 \pm .11$.)

Are there then any factors to which railway profits are related? On a comparison of the *price of coal* each year with railway profits for the same year, or more particularly for the following year, I find the series is closely correlated, in an opposite direction, *i.e.* if the price of coal is markedly increased, then the railway profits are clearly less in the following year. The negative correlation is high and significant. This may be clearly seen in Fig. 5, where the fluctuations of each series about its own trend, on a comparable basis, are shown.

Linear trend.—Years 1892 to 1912, with a lag of one year, $r = -.65 \pm .08$. The deviation of railway profits from the trend is about one *quarter* of the opposite deviation of coal prices,

First differences, deducting the amount of the trend, annually, $r = .50 \pm .09$.

7. *Profits of Gasworks*

In a similar way we may examine the facts relating to the profits of gasworks, for these have been separately classified in the income-tax tables. Two recent Parliamentary Papers (311 and 312 of 1915) give details for the years 1882 to 1913 of the quantity of gas sold and consumed, and also the receipts, from which I have computed the average price of gas in each year. Fig. 5 shows the chief results graphically. There is practically no trend in the price ($y = £.190 - £.0005t$) so that the ordinary deviations have been taken.

Correlation : Prices with profits $r = .22 \pm .11$.

Output with profits $r = .48 \pm .09$.

The first differences in gas profits (minus the annual trend : $y = £503 \text{ million} + 16t$) are correlated with coal prices :

Gas profits with coal prices $r = -.61 \pm .07$, and the average deviation of profits compared with coal prices is as 1 : 1.55.

8. *Merchants' Profits*

In considering what increased or decreased trade returns may mean for the commercial and industrial community as a whole, we must pay regard not merely to cases like the foregoing where increased profits in one trade are partly offset by decreased profits in another, as the direct result of the same cause, but also to the large body of trade or professional business which is done at fixed prices or on a fixed margin and in which fluctuations in profit are related entirely to fluctuations in quantity. In a merchant's business the prices may fluctuate widely, but the margin between

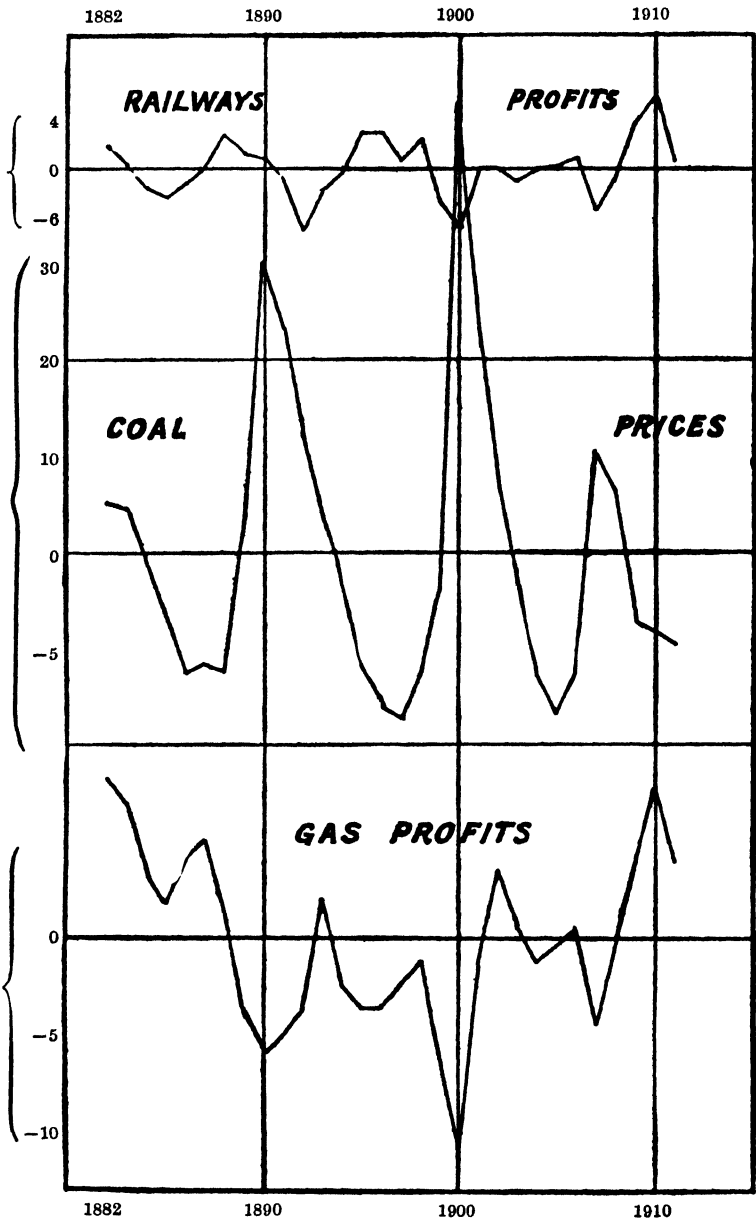


FIG. 5.

buying and selling price remains fairly constant. Fig. 6 shows an actual case where the buying price of a raw textile in an Eastern market and the selling price in London are given for each month for seven years to 1913, and the correlation coefficient for the eighty-four items is .97. It is clear that fluctuations in total profits must be the result of fluctuations in the amount of sales only, and there is a *prima facie* presumption that sales will be largest when prices are lowest.

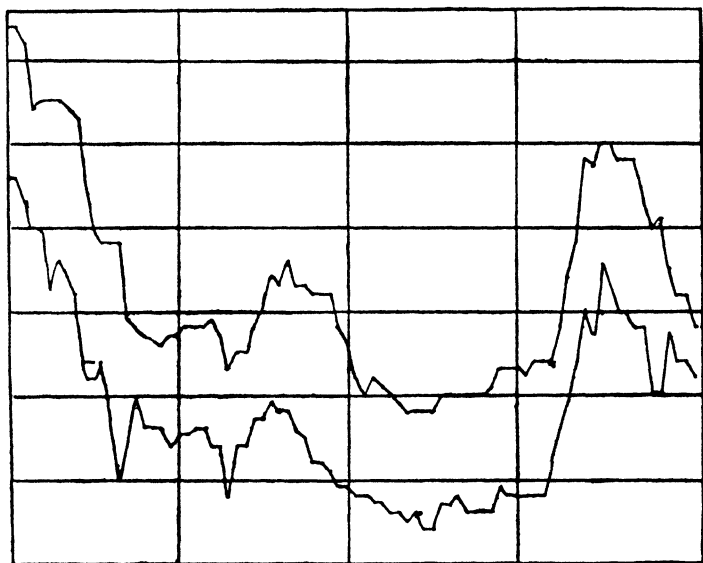


FIG. 6.—Merchants' buying and selling prices, 1907-13.

$r = .97.$

9. General Profits : Data and Examination

In my first attempt to ascertain the relative values of the several series of trade statistics, I took the *percentage* deviation of each year's assessment from a trend ascertained by taking the average of the preceding seven years' assessments. The banking and other figures were thrown into corresponding triennial averages, and these were then reckoned as

deviations from a similar seven-item trend. The modified coefficients were as follows :

	τ (1887-1910).	V.
Profits and railway receipts .	$\cdot 931 \pm \cdot 018$	$\cdot 90$
„ railway tonnage .	$\cdot 965 \pm \cdot 009$	$1\cdot 09$
„ bank clearings .	$\cdot 852 \pm \cdot 037$	$1\cdot 11$
„ special exports .	$\cdot 594 \pm \cdot 088$	$\cdot 69$
„ imports .	$\cdot 698 \pm \cdot 069$	$\cdot 50$
„ total foreign trade	$\cdot 693 \pm \cdot 071$	$\cdot 57$

The ratios of variation in the last column were the mean of the percentages which the successive deviations of the trade series bore to the deviations in profits treating the latter as unity.

Of course, these are not true coefficients. Each particular item being measured from a trend wholly *preceding* it, the deviations are nearly all positive, and the result obtained contains not merely variations about a trend but the correlations of the trend itself, and therefore has a large spurious element, due to the position of the items in point of time. But this was the way that for practical purposes I had to look at the relationship, and so I was desirous of placing the different series *in order of merit*, so to speak, from that point of view.

The actual correlation coefficient for profits and railway tonnage, measured about the mid-point of this moving average, is $\cdot 60$, which will serve as a guide to the corresponding value of the remainder. In this case if the fluctuation of profits about the mean is represented by unity, the tonnage fluctuation is $\cdot 67$, *i.e.* changes in quantity average only two-thirds of the changes in profits. I took the seven years' average partly because I then thought the cycle was becoming shorter.

On approaching the matter later, I was concerned with variation only and not with trend, and with questions of business profits as such, and not with total assessments under Schedule D. The Schedule D figures contain a variety of unlike "ingredients," and so I confined myself

to the section which is actually based on the three years' average, and described on the official reports as "Businesses not otherwise detailed," or the series given in the older reports as "trades and professions." These will represent the fluctuations of profits as well as any figures that can be obtained, though even in that series is contained a considerable constant deadweight of small cases which hardly move with any fluctuations in trade. It is true that the profits for different businesses are made up to different dates in the calendar year, but, on the *average*, the year of account does not deviate materially from the calendar year (*British Incomes*, p. 177).

The secular *trend* may be said to take up all increase due to growth in population; but it also covers all *gradual* change of habit, *e.g.* the growth in the "cheque" habit will make the trend of the bank clearances steeper than it otherwise would be and continuous bank amalgamations would have the reverse effect; competition in other methods of transport would make the railway tonnage upward trend less steep; improvement in income-tax administration would quicken the rise in the trend of profits. But the chief dangers to be guarded against are sudden "faults" in the figures, such as changes in tax-law might occasion (and these have been carefully corrected) or such as a number of simultaneous bank amalgamations. A single serious break does not however wholly mar the comparison of fluctuation, and the only real danger is some periodic or erratic repeated change which does not come out evenly in the trend.

There was a change in the method of making up railway tonnage statistics in 1903 (according to the *Statistical Abstract*) which does not seem, however, from any tests that I have been able to apply, to have been of great magnitude, and it has been ignored. The bankers' clearances statistics have no warnings as to any special changes in method, but an interesting point arising in research may perhaps be recorded. After working upon these figures for some years it gradually became forced upon my attention that the year 1896 had most unaccountable peculiarities and steadily refused to take its "natural" place in various correlation

workings. I have no particular knowledge of banking history, but I inferred that there must have been an epidemic of bank amalgamations (which, of course, have the effect of reducing the number of cheques passing through the clearing house), and on searching the matter out in contemporary literature the inference was verified to the full.¹

In addition to these two series, I have taken "total foreign trade," and have not thought it worth while to make the computations for the other series referred to above. But I have been very anxious to make a comparison of fluctuations in price and fluctuations in quantities. For prices, it was unwise to trust wholly to one index-number, in view of the comprehensive interests under examination, and so three series were taken, the *Sauerbeck Statist*, the *Economist* and the Board of Trade indexes, each as equated to 100 at 1900 in Mr. Joseph Kitchin's tables, and the mean value for each year was adopted. These were then thrown into three-year averages like the other figures for profits.

To exhibit the fluctuations in "quantity" or output, only the railway tonnage statistics exist as a comprehensive indication. Minerals are, of course, an important feature in trade, but it seemed too much to say that variations in the quantities carried must necessarily be a measure of variations in trade as a whole. Minerals have, however, a commanding influence in those tonnage statistics. So another independent measure of changes in trade volumes at a constant price was sought. Foreign trade was not very suitable, but it seemed that if the bank clearances could be freed from the influence of changing prices, they would afford a reliable test of the quantity of business done. I experimented along these lines, and put the various results to crucial tests. I divided each year's "clearances" by the triple price index referred to above, but found the effect was very violent. The reasons are obvious. A large proportion of the clearances represent transactions almost uninfluenced by price fluctuation, *e.g.* rents, mortgage and debenture interest,

¹ *Bankers' Magazine*, 1896 and 1897, various articles on the numerous amalgamations.

preference dividends and customary or regular payments of all kinds, including payments for professional services, capital payments and repayments of debt. Accordingly *one half* was finally taken as subject to the price change, and the clearance figures were modified to that extent.

It is necessary to refer briefly to the character of the "profits" which have been under examination, for that term covers many different ideas for different purposes. Being made up on strict statutory lines for taxation purposes, these figures for profits represent a higher degree of uniformity than could possibly be obtained on commercial lines. From the commercial standpoint they may be said to include all business profit, before payment of interest on loans borrowed on fixed terms (but after payment of "short" interest) and of debenture interest except so far as such interest is payable out of the annual value of real property. Generally the profits include the remuneration for management in private concerns, but not in public concerns, but do not include the rental return on real property. Bad debts are allowed for, but the figures taken here (unless otherwise defined) are profits before any allowance is made for "wear and tear" of plant. The fluctuations shown must be increased by about one-seventh to get the fluctuation of net profit after allowing for such depreciation. From the point of view of economic definition, the "profit" here adopted is far wider than that elusive residuum of analysis which is usually allowed to claim the title. Not only does it include some elements of economic rent, but it covers also pure interest, and special interest, risk-taking (whether borne by the separate businesses, or taken up as a separate *class* of business) and some remuneration for management, and entrepreneur's profits.

The linear secular trend of the different series is shown in Fig. 7. The percentage fluctuations about the trends may be compared in Fig. 1. It may perhaps be said that the long downward drag or depression to 1894 was so different in character from the subsequent recovery following the expansion in gold production that there were *two* trends, and not one. As many think that these trends were domin-

ated by price tendencies, and not by population changes, or other radical differences in business life, I was anxious not to "beg the question," and I have accordingly, after doing some work on the double trend, thought it best to present

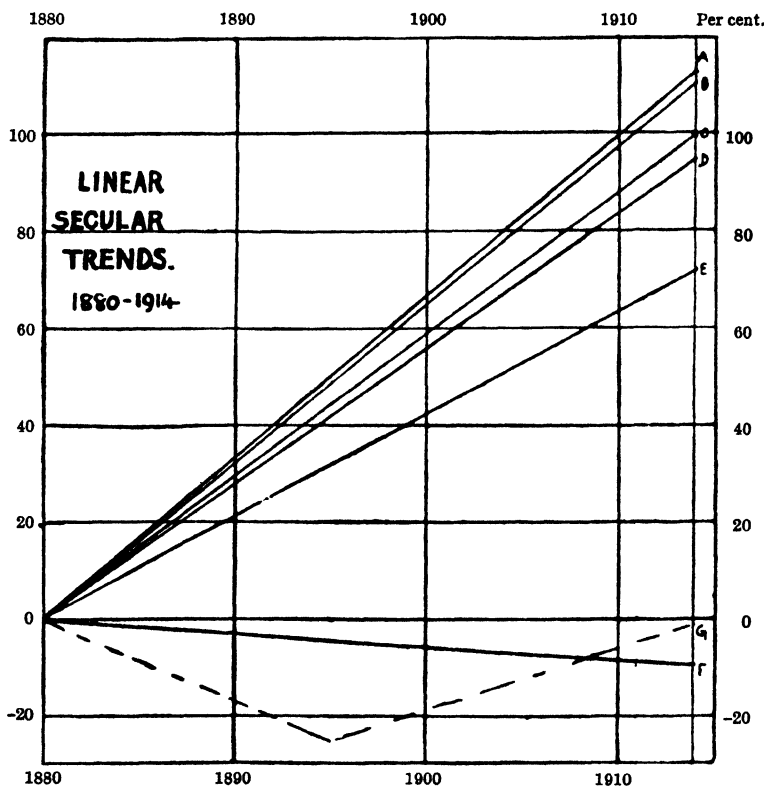


FIG. 7.

A = Quantity (bank).
B = Bank clearings.
C = Profits.
D = Quantity (tonnage).

E = Foreign trade.
F = Price index.

G = " { 1880-1894.
1894-1914.

the figures as one series for thirty-five years. But in Fig. 7 the two trends of price are shown, for it seems a little difficult for us to realise that the whole trend is a downward one to 1913, when prices had not reached the old levels of the 'seventies. It is indisputable that trade quickened remarkably after the rise in price began. I have undertaken not

to theorise, but we all know the *disproportionate* effect which the rise has upon business psychology, in the direction of stimulus to enterprise, and of engendering a *feeling* of prosperity. I am far from asserting that it is entirely an evan-

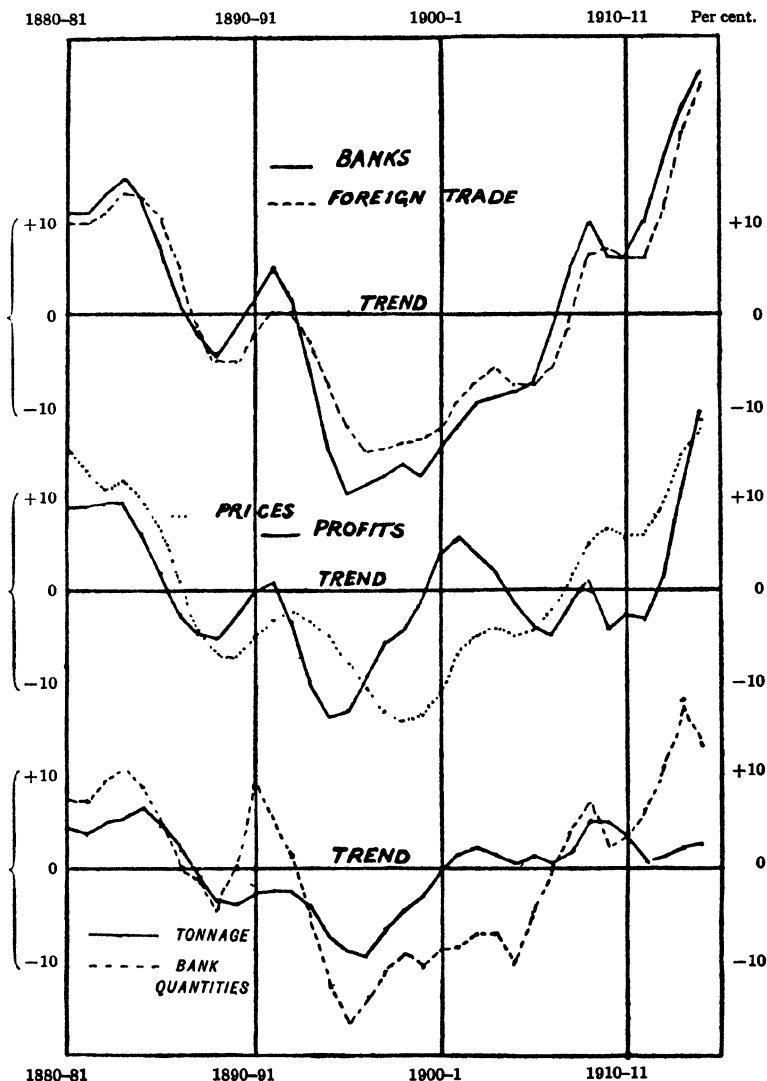


FIG. 8.

escent result and that it leaves no solid gains. A shrewd observer of the business "economic man" ¹ has recently well said that it is a matter of experience that the rise "does leave behind a general residuum of benefit, even after the temporary inflation which accompanies it has subsided."

In a classic essay on "the Energies of Men" ² William James, referring to the stored-up reserves of energy and power that are not ordinarily called upon, deals with the psychology of their conquest and exploitation. Men are the victims of habit neurosis. Improvement and progress when they occur are due either to "some unusual stimulus filling with emotional excitement" or to some "unusual idea of necessity inducing them to make an extra effort of will. Excitement, ideas, and efforts, in a word, are what carry us over the dam. . . . Most of us may learn to push the barrier farther off, and to live in perfect comfort on much higher levels of power." War necessities at the present time (1918) are a conspicuous example of such a stimulus putting industry on to new planes of possibility, and the psychological aspect of rising prices has in the past had this influence on business. But when measured by objective tests it is difficult to prove that the increase in profit is proportionately *greater* than the increase in price, *ceteris paribus*.

Table II shows in summary form the various coefficients. In the case of the moving average, the low coefficient for

TABLE II

Correlation of profits and	Coefficients.			
	Deviation from linear trend.	Variate difference.		Deviation from nine-year moving average.
		First.	Second.	
Railway tonnage .	.68 ± .08	.60 ± .07	.38 ± .10	.59 ± .08
Bank "quantities" .	.68 ± .06	.35 ± .10	.42 ± .10	.79 ± .05
Bank clearings .	.67 ± .08	.70 ± .05	.65 ± .07	.78 ± .05
Foreign trade .	.60 ± .07	.62 ± .07	.50 ± .09	.49 ± .07
Price level .	.68 ± .08	.48 ± .08	.36 ± .10	.31 ± .11

¹ G. B. Dibblee, *The Laws of Supply and Demand*.

² *Memories and Studies*, 1912.

price level is probably accounted for by the fact that prices have a secular trend, but no cyclical variation.

Table III shows the linear secular trend for each series, and these results are given graphically in Fig. 8, where the rise from 1880, in 34 years, is shown as an aggregate percentage. Table III also gives various measures of the degree of fluctuation in each series, the deviation in profits standing as 1 in each case. It will be seen that the mean deviation and standard deviation for the same items give closely similar results, but there is some difference in the proportions according to whether the trend or the moving average is taken. These results are not so much contradictory as complementary, for they express different aspects of the case.

TABLE III

	Trend. Annual rise as a percentage of the mean of the series.	Relative size of average deviation from		Relative size of standard deviation (as a fraction of the mean of the series).		First differences. Relative size of	
		Trend.	Moving average	Trend.	Moving average	Aver- age.	Standard deviation.
Profits . . .	2.85	1.00	1.00	1.00	1.00	1.0	1.0
Railway tonnage .	2.72	.65	.58	.60	.57	.71	.51
Bank "quantities" .	3.23	1.38	1.00	1.27	1.12	.97	.81
Bank clearings .	3.18	1.91	1.15	1.76	1.18	1.18	1.13
Foreign trade .	2.05	1.63	.97	1.50	.93	.89	.92
Price level . . .	— .27	1.42	.79	1.28	.76	.55	.73

All of the foregoing paragraphs relate to partially smoothed curves, owing to the adoption of triennial averages. These have some virtue in subduing minor disturbances and differences due to the dates of accounts, etc., so that the more stable short-date tendencies may emerge, but they also have obvious drawbacks. As in the case of colliery profits I have endeavoured to supplement them by annual results, obtained over a wide area. I have obtained in the course of business an experience of these figures that enables me to weight them accurately to represent the importance of each industry

in the whole. Back to 1903, numerous duplicate and tripliate samples give a firm basis for my statement, but prior to that year I have information that I care to put forward as reliable for only five "pairs" of years. The percentage changes in each year's profits compared with the previous year are set out in col. 2 of Table IV. The third column shows the change in the quantity or output, which is the mean of the railway tonnage and the series referred to as "bank quantities." The fourth column gives the change in price level, on the triple index already referred to, and the percentage change of the two factors is *added* together in the last column.

TABLE IV

Years.	Annual percentage changes.			
	Profits.	Quantity.	Price.	Quantity and price changes added together.
Five isolated years prior to 1903 . . .	+ .4	+ 5.75	- 5.5	+ .25
	+14.5	+13	- 2.5	+10.5
	+ 3.7	+ 3	+ .25	+ 3.25
	+ 8	+ 4	+ 2	+ 6
	+10	+10	+ 4	+14
Total change . . .	36.6	35.75	14.25	34
1903 to 1904 . . .	+ 3.4	+ 2.25	+ 1.75	+ 4
1904 to 1905 . . .	+14.4	+ 8.75	+ 2	+10.75
1905 to 1906 . . .	+13.3	+ 3.25	+ 6	+ 9.25
1906 to 1907 . . .	+ 4.6	+ 2	+ 2.50	+ 4.5
1907 to 1908 . . .	-12.4	- 3.75	- 7	-10.75
1908 to 1909 . . .	+ 8.4	+ 6.75	+ 1	+ 7.75
1909 to 1910 . . .	+ 8.2	+ 3.50	+ 6	+ 9.5
1910 to 1911 . . .	+ 6.3	Nil	+ 8	+ 8
1911 to 1912 . . .	+10.5	+ 3	+ 5.5	+ 8.5
1912 to 1913 . . .	+ 6.6	+ 2.25	+ .25	+ 2.50
1913 to 1914 . . .	-12.8	-11.0	Nil	-11.0
Total change 1903-1914	100.9	46.50	40	86.50
Total, all years . . .	137.5	82.25	54.25	120.50

It will be observed that, except at the beginning, price and quantity have moved in the same direction. If each element accounted for a unit per unit change in profits, the total change in profits would be 120.5 points against an actual change of 137.5 points, and speaking generally the annual changes in col. 5 are of the same order and comparable with the changes in col. 2. But where percentage changes in quantity and price act together, the effect on the percentage of profit cannot be confined to the sum of their separate effects; there is also the price change upon the additional output. For example:

Goods costing £100 are sold for £120 = £20 profit.

On an increase in price of 50 per cent.: goods costing £150 are sold for £180 = £30 profit, or an increase of 50 per cent. also in profit.

But if output has also gone up 50 per cent., we have goods costing £225, sold for £270 = profit £45, or an increase of 125 per cent., which exceeds the sum of two increases of 50 per cent., by 50 per cent. upon 50 per cent. The actual effect of the combined percentages for the years 1903-14 in cols. 3 and 4 is therefore not 85.5 only (on the unit per unit change hypothesis) but a further 40 per cent. of 46.5, or 18.6, making 104.1 in all, against the actual aggregate change of 100.9 points in col. 2. (In discussing the similar table for coal statistics this feature was taken into account, but not specifically referred to.) The profits in col. 2 are perhaps more "mobile" than the whole profits dealt with in Table II, which carry a deadweight of small non-fluctuating cases, but this is counterbalanced by the fact that if depreciation of plant were deducted from profits the percentage changes would be about one-seventh more. These are broad results worth studying in detail, but in all the circumstances it would be a mistake to expect them to answer to the finer statistical tests of uniformity and consistency.

10. *General Profits : Conclusions*

The following findings may I think be fairly stated, in

general terms, from the foregoing examination and from the materials upon which it is based :

1. Speaking for the results of trade as a whole, the statistics of the Bankers' Clearing House and of the railway receipts (or tonnage) have afforded a reliable test as to the *direction* of the movements in profits, and the movement of foreign trade is also a fair but less important criterion.

2. The fluctuation in profits has generally been rather less in *magnitude or range* than the fluctuation in statistics of "turnover," such as banking or foreign trade statistics, which reflect both quantities and prices, and it may be taken roughly at two-thirds to three-fourths of such short-period changes in trade returns.

3. The influence of a change in price level on profits *as a whole* is far less than is frequently supposed by those who base their views upon observations of the striking effect of price changes in particular industries.

In times of rising prices, increases in profits have been made over and above the amount that would arise upon the increased output that such prices induce, but the additional profit is not usually much greater in proportion than the rise in price, if the period taken is not less than a year. There is no evidence as to the effect of such changes measured over shorter periods than a year.

Although the increased quantities evoked by increased prices have followed quickly enough to keep profits within such limits the check has not been permanent, and continually renewed stimulus by the raising of the price level has resulted in increases of profits much greater than could have followed the ordinary increases in output (due to increasing population) at a constant price level. Similarly the drop in prices from 1880 to 1895 kept profits down considerably below what would have resulted from the actual output at a constant price level, and in itself was instrumental in depressing that output.

4. The "turnover" of foreign trade has become a *relatively* less important part of the whole trade of the country during the last thirty years.

5. The annual trend of increase in trade freed from all

fluctuation has to a great extent been made up of the larger output of existing businesses increasing continually in size, and to a relatively smaller extent of the output added by new businesses.

II. *Cotton-Spinning Profits*

The material furnished by the income-tax records of profits has now all been utilised, and if it is desired to pursue the subject further, we must resort to statistical material of a partial or sample character, which does not cover the results of an entire industry for the United Kingdom. The periodical figures in the *Economist* have been in existence for a few years only, and it would be premature to put forward my own collection of data, which, though wide in range, does not cover a long enough period at present to be satisfactory. As an example, however, of what may be attempted along these lines, we may refer to the well-known series of figures for cotton spinners' profits from 1882 which Mr. Kidger, of Oldham, continued annually for many years.¹ The profits and losses for a hundred mills are given, as the profits of one huge mill. It is probable that the constitution of the sample changed somewhat over the course of twenty years, but at the same time that it was kept as little changed as circumstances allowed and that the *difference* from one year to the next is negligible. In such a case the method of differences may be tried. If the tendency of the change in the constitution is to get a larger number of spindles into the sample, there may also be a secular trend, and from the figures it appears that this is not unlikely.

The average annual profit of all the mills taken together is £218,000, the highest profit being £1,321,150 in 1907, and the worst year 1910, when the aggregate loss was £368,000, and generally speaking the range of fluctuation is very wide. The following coefficients for *first differences* may be recorded:

Profits and purchase price of raw cotton	—	·07
„ sale price of yarn	.	+ ·17

¹ Referred to in detail in the *Economist*. Vide also D. H. Robertson, *A Study in Industrial Fluctuations*.

Profits and difference between purchase

„ and sale price	$\cdot 46 \pm \cdot 09$
„ <i>value</i> of raw cotton imported	$\cdot 35 \pm 1\cdot 06$
„ quantity imported	$\cdot 41$

(or a coefficient for the last 14 years of $\cdot 60$ and a negligible coefficient for the earlier period). For the whole period of the correlation between profits and the quantity imported, after taking out the trend from the latter (on the assumption that the additional mills not in the sample have taken the increasing quantity in the trend), the coefficient is $\cdot 41 \pm \cdot 10$.¹

First differences, coefficient for purchase and sale price is $\cdot 86 \pm \cdot 03$.

The broad conclusions are therefore :

(1) There is very little regular relationship between the profits of cotton spinning and either the purchase price of raw cotton or the sale price of yarn, but the changes in the *difference* between the two prices is more indicative of changes in the amount of profits. Of late years the quantity of raw cotton imported has been some criterion of the prosperity of the trade. The purchase price of raw cotton and the sale price of yarn are very closely related indeed.

(2) The fluctuations in the profits of spinning are very violent. The deviation of the price from the trend of prices is 14·4 per cent. on the average price, but the deviation of profits from the average profit is 154 per cent. or nearly eleven times as great ! (Standard deviation taken.) Reckoned by another method also, it is ten times as great (average deviation). It may fairly be said that fluctuations in profits are ten times as great as fluctuations in prices.

12. *Profits and Prices in War Time*

While there can be little doubt as to the utility of obtaining more exact knowledge than has generally been available on these subjects so far as normal times are concerned, it cannot be expected that similar conditions will obtain during war time. It is hazardous to attempt even the roughest

¹ The coefficient of correlation between profits and the sale price after taking out the trend or secular tendency to increase in the latter (y pence = $11\cdot 75 + \cdot 23t$) is $+\cdot 03$.

examination of current relationships, and indeed most of the essential data are lacking. We have not even a broad idea as to the *quantity* or output of trade in general, nor is it easy to form estimates of aggregate profits. Professor Plehn has chided me gently for being unwilling to go beyond available evidence, and suggests that there is an obligation to impart any "educated guess." An estimate as to the progress of total profits during the war, which will, I think, satisfy the tests of weighted samples, and the aggregates of income-tax profits and excess profits duty (as stated in parliamentary replies and official reports) is given below, together with the average of the monthly *Economist* index-number of prices :

	Pre-war (1912 and 1913).	1914.	1915.	1916.	1917.
Profits . . .	100	110	125	175	180
Prices . . .	100	98	122	159	201

But, of course, these figures are put forward with great reserve. The most that can be said, I think, is that business profits *in the aggregate* (including the part paid away as excess profits duty) rose to an extent rather less than the rise in prices.

13. *Real Value of Average Profits*

I referred at the beginning of this chapter to the fact that our instinct and individual experience have generally assured us that an increase in "profit" results from an increase in "turnover," and that on examining the facts, dissociated from psychology feelings and theories, we could perhaps see whether, and to what extent, we might be deceived. I also mentioned our tacit assumption that increases and decreases in profit, when verified, must mean increases and decreases respectively in our *real* prosperity, a state of being genuinely "better" or "worse off." To what extent is this assumption true, for the community as a whole, apart from the effect upon individuals? For short-period fluctuations one feels

bound to believe that it must be true, but in regard to "progress" over a long period the results of an experiment I have just made have surprised me. I do not think there is much scope for error in the details, so they are set out accordingly, and I will refrain from theorising to account for the conclusions which may be drawn. In *British Incomes* (p. 319), Table G 4 gives what is the main work of that book, the "Taxable income" in a true comparative series substituted for the official tables (hitherto generally used for comparative purposes but not properly adapted for such use). These were arrived at after minute detailed labour upon the effect of every statutory change in the basis of assessment or administrative change in statistics, and by numerous checks must certainly be correct within a very small margin of error, which has been duly shown. For the present purpose I have selected the column giving the "taxable income" on the statutory conditions which obtained after 1894 (viz. an exemption limit of £160 and an allowance for repairs under Schedule A). In Chapter XIII I gave an exhaustive examination of all the estimates that had been made as to the *number* of taxpayers, and by a new method which is totally unrelated to the computations of income above referred to, I arrived at an estimate for certain specified years, viz. 1860, 1874, 1881, 1894 and 1909 (p. 448) and 1913 (p. 449), and gave the upper and lower limits of that estimate, which I believe is far more soundly based than the work of Baxter, Levi, Mallock and others. I have taken the upper limit for my present purpose though the lower limit gives similar results in effect. These data are set out respectively in col. 2 and col. 3 of Table V. The total taxable income in each year was then divided by the number of taxpayers, to get the average individual income as assessed. It will, of course, be within general knowledge that for most of this period the income-tax was a highly impersonal tax, a tax on sources of income, and there was hardly any internal administrative evidence as to the number of taxpayers; for the individual "total incomes" of taxpayers, now so important a feature, were hardly ever required to be known for taxation purposes. The result shows some wide varia-

tions (col. 4 of the table), and would indicate that although the average had been steadily mounting during the twenty years 1898-1918 it is actually not greater than it was fifty years before, and far below its level forty years before. There is a general belief that "colossal" incomes have increased under modern capitalism, out of proportion to the increase in the population, but it is also pretty certain that the numbers of persons enjoying an income of modest dimensions (£200 to £250) has vastly increased. These effects combined would serve to account for the fact that the *average* income of *all the persons with incomes over £160* has not greatly increased, but the number of persons with such incomes has increased in a much greater ratio than the population, viz. 320 per cent. against 59 per cent. I am, however, concerned rather with the fluctuating fortunes of this "average" taxpayer than with his position in the whole population. When he gets his nominal income, what is its real value or purchasing power? I have divided the average by the Sauerbeck *Statist* index-number (wholesale for the three years immediately preceding) and also by Mr. G. H. Woods' retail index-number (continued by the Board of Trade retail index-number) for the actual year itself, and taken the mean of the results, in order to get figures which shall be as firmly based as possible and free from the accidents of individual methods or series. (Each index-number has been taken on the series in Mr. Joseph Kitchin's charts as equated to 100 at the year 1900.) The "real value" of the average assessed income is given in col. 5 of Table V, and it will be seen that its course has been much freer from wide fluctuation than the nominal average, and the maximum range of £200 has been lowered to £100. It would appear that the widespread depression in trade that had followed the decline in price levels after 1872, had by 1881 affected the average profit to a greater adverse extent than was made good to the *spender* in the reduced prices themselves, but that by 1894 business had become more settled at the lower levels of prices (before the 1896 turning-point in gold production began the new upward trend) and the spender had the full benefit of the cheapness of commodities. After that, as a spender

of income he lost the apparent advantage that he had obtained as a maker of income. But a further stage is necessary. Those who have studied Chapter VIII of *British Incomes* will, I think, have no doubt that between 1860 and 1909 there was an improvement in income-tax administration which would amount to *at least* 10 per cent. in its effect upon the amount assessed ; and I have therefore corrected the figures in col. 5 of Table V, by showing in col. 6 what the figure would have been in each year at the present level of

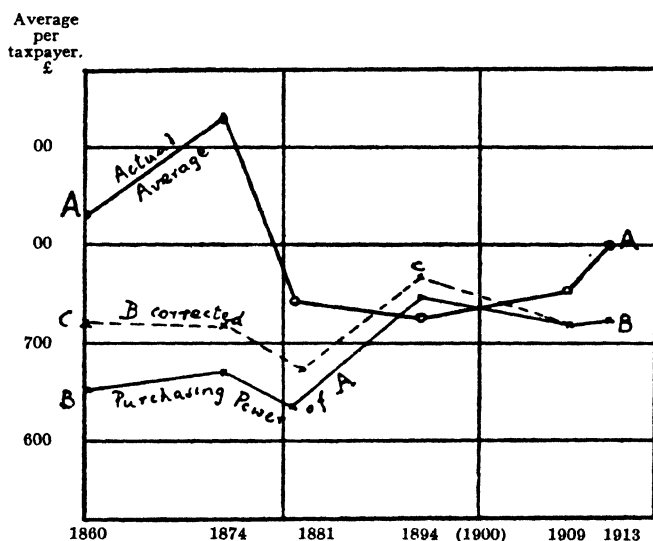


FIG. 9.

administrative efficiency and *statutory powers*, by giving an increase of 10 per cent. fifty years before, and diminishing the addition by $\cdot 2$ per cent. per annum. The results are, I think, notable, and are shown graphically in Fig. 9, where the dotted line *c* represents the real value of the true average assessable income in each year observed. Apart from the depression in 1881 and the appreciation in 1894 the line is almost level, and with regard to the latter I would only remark that the income-tax law has throughout been such that the fluctuations in the agricultural interests (farming) are hardly represented at all, and if the true income of

farmers had been given its effect upon the general average, the depression in that industry in 1894 was so great that it would have reduced the prominence of that average for that period. I will refrain from any attempt at this stage to account for these interesting results.

TABLE V

(1) Year.	(2) Taxable income (millions).	(3) Number of taxpayers (incomes over £160) (thousands).	(4) Average taxable income per taxpayer. Col. 2 ÷ Col. 3.	(5) Purchasing power of average income Col. 4 ÷ index- number of prices.	(6) Purchasing power of <i>real</i> taxable income. Col. 5 corrected for improve- ment in income tax adminis- tration.
1860-61	£ 232·9	280·4	£ 830	£ 656	£ 721
1874-75	440·3	473·8	927	670	718
1881-82	468·7	632·2	741	635	672
1894-95	551·4	761·7	723	746	769
1909-10	831·0	1100	755	719	719
1913-14	951·0	1190	799	723	723

14. I should like to conclude by saying that I am very conscious of the shortcomings of this study, pursued, as it has been, in the odd moments of scant leisure. I can only urge that it is difficult new ground which others have been reluctant to traverse. Jean Henri Fabre's processionary caterpillars went round for days in an endless circle because no one of them had the wit to break it, or was capable of new impulse. It may well be that a statistician who is so familiar with his "tools" that their use necessitates no attention on his part can free his energies from their manipulation for the invention of new methods to meet new needs at each moment of his task. I can perhaps plead that in this instance the material is so peculiar in its grain and temper that having had a long and close acquaintance with its vagaries of structure I may in some respects make good my failings in other directions. But perhaps there is required a higher quality even than knowledge or mental agility, to discern the truth in such a sphere. As Bergson says: "Il y

a des choses que l'intelligence seule est capable de chercher, mais que, par elle-même, elle ne trouvera jamais. Ces choses l'instinct seul les trouverait ; mais il ne les cherchera jamais." ¹

APPENDIX

The 133rd Section.—Relief under this Section for many years down to 1907 was given on the following lines :

		£
1902	.	7,000
1903	.	2,000
1904	.	7,000
		<u>3/16,000</u>

5,333 Assessment for 1905-6.

If actual profits of 1905 were £3000 a new average was taken :

		£
1903	.	2,000
1904	.	7,000
1905	.	3,000
		<u>3/12,000</u>

4,000 Assessment for 1906-7
and substituted assessment
for 1905-6 also.

But if the profits of 1905 had been £5000, the average would have been :

		£
1903	.	2,000
1904	.	7,000
1905	.	5,000
		<u>3/14,000</u>
		4,666

And as the profits of the year of assessment 1905-6 were *greater* than this average, the 1905-6 assessment was reduced to £5000 only. (The same test applied to colliery profits, although the average for assessment was five years.)

Where the average is an average loss, the effect in depressing the aggregate assessments is no greater than if the average were nil. Moreover, the dead rents and royalties of the year would be assessed, although the profits might be nil. In these ways, the

¹ *L'Évolution créatrice*, p. 164.

effect of bad times is not fully reflected in the income-tax statistics, and the actual fluctuations from the highest to the lowest point of aggregate profits is wider than the figures would indicate. This feature is of importance in highly fluctuating industries.

NOTE ON THE SUBSEQUENT HISTORY OF THE STATISTICS OF COAL-MINING PROFITS

The coal-mining statistics here given form an important part of the history of the industry in the past twenty years, the most conspicuous example we have of the principle of the "division of the product of industry" on a formula. They have been so often the subject of misconception and even the basis of misstatement that it is desirable to set out the actual facts.

The table of profits in col. 4 of Table I came from this relative academic calm into the area of fierce public controversy almost immediately afterwards. For during the course of the Sankey Commission on the Coal Industry 1919, Sir Arthur Lowes Dickinson, as assessor, and others, used the figures as the basis of evidence and discussion upon the profits of this industry. The series had to bear stresses from quite unexpected directions and for which they had not been considered. I had not been primarily concerned with the *absolute* accuracy of the totals, *i.e.* whether they included something more than coal-mines profits or something less than the total number of mines. The point aimed at was the validity of the *extent and time of fluctuation*. I then gave evidence and addressed my mind to the question as to the accuracy of the figures as *absolute* totals, and had no reason for considering that they were materially inaccurate from that point of view. I indicated the kind of adjustments that would be necessary to make them represent the profits of coal mining as commonly understood.¹

The next stage was in 1921, when I advised the Mining Association as to the ratio of profits to wages in the Coal-Mining Industry in pre-war years, particularly by reference to certain suggestions and data that were given to me.

¹ *Minutes of Evidence*, Q. 764-793.

After examining carefully the data referred to I came to the conclusion that, even though the results might prove to be approximately correct, they would be almost accidentally so, for the tables were by no means the best possible basis for justifying or explaining the conclusions. They did not make the most of the available data, and contained more pure estimates, without any measured range of error, than was strictly necessary. For this reason I had a completely new table built up (different in details from the previous tables), which utilised, wherever possible, official tables and expert information, and was in detail reconcilable with the best particulars obtainable. These figures came under discussion in 1924 by the Buckmaster Court of Enquiry. The point at issue had become the determination of the pre-war *ratio* of profits to wages, and my figures indicated that it had been just over 17 per cent., whether measured by the period of 10 years, 1904-13, or of 20 years, 1894-1913 (the percentage 1899-1903 was nearly 24, and for 1894-8 only 10). In my view this figure is defensible as being *probably* correct within a range of $\frac{1}{2}$ per cent. and *certainly* not in error by more than $1\frac{1}{2}$ per cent. (*i.e.* not less than 15.7 and not more than 18.7 per cent.).

The probabilities are very heavily in favour of the truth being much nearer to my main approximation than to these outside limits.

The broad results are tabulated below :

	Wages.*	Profits after deducting Depreciation and Royalties.*	Percentage of Profits to Wages.		
			Estimated.	Lower limits.	Higher limits.
Average 1894-1898	Million £ 44.25	4.422	10.02	10.1	9.8
„ 1899-1903	60.67	16.044	23.82	24.59	22.72
„ 1904-1908	61.32	11.542	18.53	19.15	17.68
„ 1909-1913	73.68	12.78	16.87	17.89	16.23

* Higher and lower limits not inserted here—most probable figure given.

Aggregate profits to aggregate wages throughout 17.3 nearly
 Average of separate average percentages for four
 periods of five years each 17.31 „

I considered that the period of 20 years was a fair one to adopt in the first place, seconded, if desired, by the alternative period of 10 years.

- (a) The period of 20 years starts a new economic era of a general character on the changing trend in gold values and trade.
- (b) It represents a new or independent era for coal after the great coal strike of 1893.
- (c) The period beginning with 1899, if suggested as a basis, would give a downward trend for the successive quinquennial periods, whereas there is little evidence that there would ever have been a rise to the original figure. The period itself was abnormal, and to base action upon it as a beginning would unnecessarily prejudice the issue.

After the sliding scale of wages based upon the selling price was abolished, the fixing of wages had to be based upon the principle of relating them to the proceeds of the industry. " For each mine there are recognised basis rates, both for day-wage men and for piece-workers. Some of these have been in operation for a long period of time. They are themselves subject to local adjustment but are not readily disturbed. The machinery devised in 1921 was designed to arrive at the appropriate percentage to be added for each *district* to the basis rates for each class of workmen prevailing in each *mine*. The calculation prescribed is of a complicated character, into which there enter as factors the aggregate proceeds of the sale of coal for each district over an agreed period and a percentage apportionment between the mine owner and the workers. But this method of wages ascertainment was qualified by two important provisions. If the wages yielded by the calculation proved less than 20 per cent. over the current basis rates plus the district percentage addition in force in 1914 the apportionment principle of the Wages Agreement ceased to operate and this minimum percentage became payable. Further, where the Agreement did not otherwise yield a subsistence

wage to low-paid day-wage workers, provision was made for additional allowances per shift to such workers, to be determined separately for each district.”¹ The Wages Agreements of 1921 and 1924 had not altered this principle, but by 1925 the tension was very great, and as a member of the Special Court of Enquiry in 1925, I dealt with the new principles put forward by the Mining Association, which involved ascertaining the total proceeds of the industry in each area, deducting the costs, taking 87 per cent. of the balance, and then, after an allotment to specially low-paid men, expressing the net balance as a percentage of the wages paid at basis rates over a period. The rate of 87 per cent. and 13 per cent. had its basis in the statistics put up in 1919. In the Samuel Commission, 1925, shortly after, this again came under scrutiny.² First, the return or yield upon Capital in the industry was found to be lower than the general yield, after considering the special incidents and risks. Then, on the question of completeness and the “purity” of the statistics, I stated that the profits of coal mines as given for taxation tend to be excessive in two directions and deficient in one. “They are excessive by the inclusion in mining profits of coking profits, and by the inclusion for tax purposes, in some instances, of other subsidiary undertakings, such as brickworks. There is some evidence that the pre-war coking profits would not exceed 3 to 4 per cent. of the total, and I am disposed to put the estimate for all the allied profits at not more than 5 per cent. or 6 per cent. *throughout*. The profits given do not allow for losses where the losses are not fully covered by profits (excluding royalties) over a period of five years, *i.e.* where the income-tax assessment, excluding royalties, would be a minus quantity. Such cases are mainly commencing collieries that are mining coal, and dying collieries. If these minuses were included in the aggregate, I think, though it is only a matter of broad individual judgment, the reduction might have been as much as £500,000 in 1910-14, or, say, 3 to 4 per cent. of the total.”

¹ *Report of Court of Inquiry concerning the Coal-Mining Industry Dispute, 1925, Para. 24.*

² *Minutes of Evidence, pp. 262-280.*

(The strict rendering of liability tends to put it in excess of commercial standards, but, on the other hand, a good deal of development that might be put to capital has been passed through revenue accounts and, on the whole, the net result would be neither severe nor lenient.)

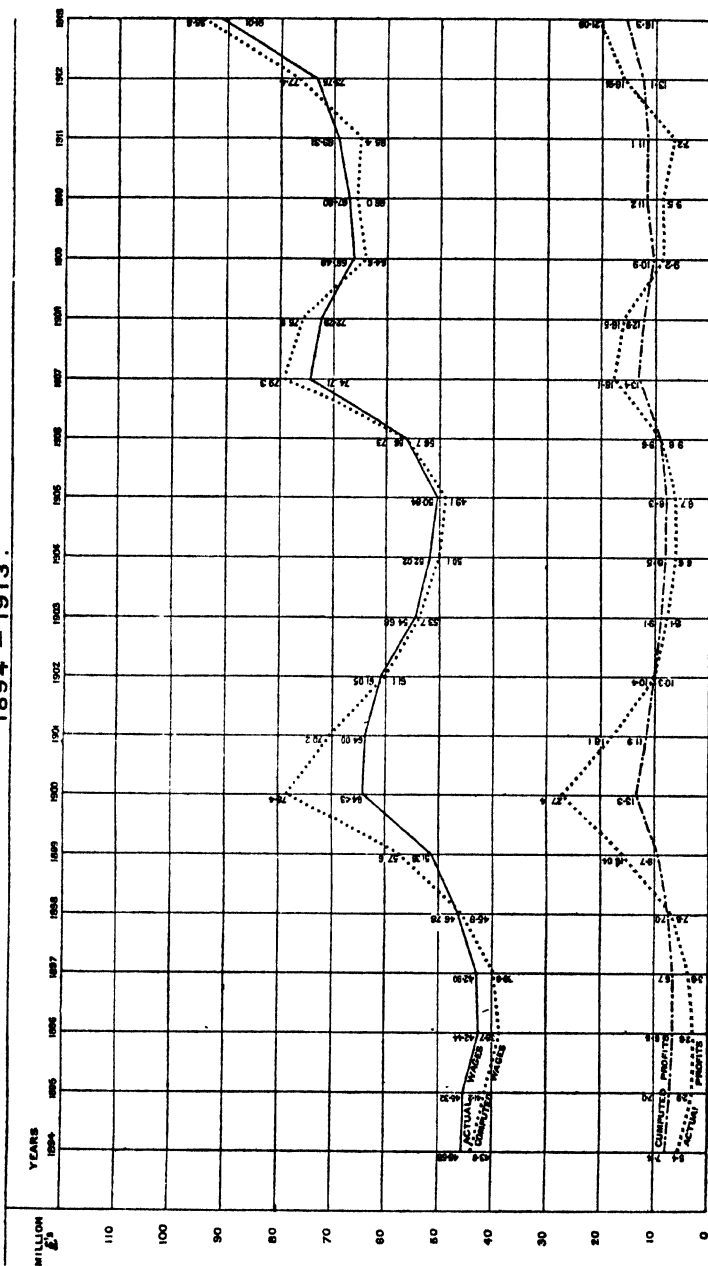
Against this combined tendency to excess, amounting to 8 to 10 per cent. of the whole, has to be set the fact that there are profits from coal mining assessed to income-tax in three-year or one-year concerns, not classified as mines, the coal part being subsidiary to other activities in large composite concerns. We have the important fact officially established that in 1914 the coal output of this class was 12 per cent. of the whole output of coal. "As the tendency of modern times has been towards more, rather than less, integration, or "large business," I think there were probably fewer, rather than more, large composite concerns (requiring assessment on a three-year's average) in earlier years, and I tend to regard this as a maximum."

The net effect of the reduction of £100 of profits to, say, £90 on the first two grounds, and then an increase of that £90 to the extreme ratio 88 to 12 or 90 to 10, is to bring back, approximately, the original 100. "I think, therefore, the profits as stated will be correct, with a possible range of error of 4 or 5 per cent. This range of error is taken into account, together with the possibility of other errors in wages, in arriving at the above results."

I was at great pains to show that however exactly the ratio of profits to wages might be determined as an historic fact, and however good it might be over all, it was only an average, and might work badly in any particular year, and that dispersion was all important. "A ratio was reached on the experience of 20 years before the war, showing that profits over that period in comparison with wages were in the neighbourhood of 17 per cent., not as is so frequently quoted, 17/100ths, dividing 100 into two parts, viz. 17 and 83, but 17/117ths, dividing 117 into 17 and 100. If it were expressed as parts of 100, it would be $14\frac{1}{2}$ and $85\frac{1}{2}$. But the actual ratio worked out on the 20 years figures at 17 : 100."

The point I wanted to bring out was that, however correct that may be (and I do not think it is incorrect to any material extent), it does not mean very much unless the degree of deviation in particular years is known. If the 17 were an average ratio over the whole period, and in no part of that period had the ratio diverged very much from 17, then, of course, 17 might be a satisfactory average to apply to any practical agreement, but if the degree of deviation were very wide, then, of course, its practical application might be either full of fallacies, or full of human difficulties. The average ratio is 17, but the average deviation from that ratio is 7. Now 7 is a very high proportion of 17; it is practically 40 per cent. Therefore when you look over the sequence of years you will find although the average is 17, in only about two or three years were the facts in the neighbourhood of 17. The facts went as low as a ratio of about 6 or 7 per cent. in some years, and as high as 42 per cent. in others. So that although there is an average of 17, that average does not fit the facts in more than a very small proportion of the years, and in most of the years the facts are widely divergent from it. Supposing there had been some such agreement as came after 1921 to divide the total fund that was available for profits and wages in a fixed ratio, say 117 to 17, there would have been certain different results from those actually obtained. "Assume for the moment the total to be divided were the wages and profits in any particular year added together, and that the division did not make any difference to the prosperity of the industry—I am making the assumption for the moment that you had a fund which was the actual profits and actual wages that you could add together and then re-divide in this average ratio—you would have got a series of computed wages and profits which would have operated under an agreement. I am not speaking now, of course, of any provision for a minimum wage. If you had divided that total fund in that fixed ratio, you would have a certain series of profits and wages." I then produced the following graph showing how the computations differed from the actual results :

WAGES & PROFITS IN COAL MINING.
GRAPH OF ACTUAL AND COMPUTED WAGES & PROFITS
1894-1913.



“ Even a ratio like 17 per cent. throughout has the effect of taking away in good years something from the profits and putting it on to wages, and in bad years adding something to the profits and taking it away from wages. It therefore has the effect of steadying out that highly fluctuating profits line, and it has the effect of making the wages line more fluctuating. What is the extent to which that operates ? If you look at those graphs you will see that the actual curve of wages, compared with the computed curve, was less fluctuating than it would have been if you had had a fixed ratio. On the other hand, with regard to the profits, you find the actual fluctuation was very great, but it would have been very much minimised if you had had a fixed ratio. The extent to which that fluctuation is minimised is rather important. Obviously the transfer of a fixed sum from one fund to the other is more important on the small sum, namely, the profits, and less important on the larger sum, namely, the wages. It therefore works out at something like 5 or 6 per cent. *more* fluctuation on wages, and something like 35 per cent. *less* fluctuation upon profits. The burden of this is directed to the point as to whether any average arrived at over a long period of years can form the basis of an agreement which is to work under good and bad years, without throwing a considerable strain upon one side or the other in the majority of those years : either that the profits will not be high enough, or that the wages will not be high enough, according to the period of depression or boom. I do not want to labour the point, but only to bring it out for you to see what the great difference was in the reward that went to the two parties before the war, and what has been tried to be got at by the agreement since. If you had had before the war that system that we have had recently, you would have had a much less fluctuating industry so far as profits are concerned, and considerably greater fluctuations in wages than you actually had. May I now just look at the assumption I made, namely, that the total to be divided is the same under all conditions ? That, I think, from an economic point of view, is subject to some doubt. If wages have the potentiality of greater fluctuation

they probably will actually fluctuate less for this reason. When you have a very highly fluctuating margin like the coal profits—high prices bring about prospects of very high profits, obviously—the correlation is extraordinarily close. But the fact that there are high prices, and that costs are not accommodating themselves quickly to them, gives the owners and others a great incentive to produce terrifically at that point. If they knew that wages and other costs were going to rise and the margin of profit would not be so great, there would not be that incentive; but they have had in the past a great incentive to produce at high prices. Similarly, in times of depression their prospects of losses have been great, and they have had every incentive to hold back. That means the natural swing of the industry had been a violent one. It is open to argument, it seems to me, that if it were a known fact that other costs would rise along with prices, more rapidly than they have done in the past, and that prospects of profit would not be so good, there would not be the same incentive to boom.”¹ “The costs include wages, and similarly in times of depression if it were known that wages were more accommodating to that depression there would not be the same holding back. Although you would still have fluctuations in an industry, those fluctuations would not be so violent. It might therefore be that the potentiality of the movement of wages up and down would mean that in practice there would be less fluctuation. It does not apply to the Coal Industry only, but to all industry. While it is true that the function of capital, particularly in an industry like this, is to bear the major part of the risks in booms and depressions and to leave wages steady, industry as a whole has carried that too far, and if there were more pliability about the reward of labour there would be smaller fluctuations. The greater apparent fluctuations in wages would really result in a less fluctuation in the long run. I know that what I have said moves in two directions; the first direction is against the application of an average of this sort, and the second is rather to indicate that some greater pliability than the old method was desir-

¹ Question 5060.

able. If I had to give a theoretical statement as to how I would combine those two, I would say that the principle of the agreement, namely, a fixed average over a period, is all right as the main line, but it should be modified by enabling wages to decrease rather less rapidly in depressed times than the agreement allows—and conversely. That is to say, there should be the broad principle of the general division, but there should be the potentiality of greater elasticity than existed under the agreement.” The actual effect of the principle of 1921, if it had been operating over the pre-war period, would have been to stabilise profits to some extent but render wages more fluctuating. The effect of an untrammelled average might be never to fit the true requirements. “It is just the same as if you were going on a journey round the world via the North Pole and the South Pole, and you were to say the average temperature of my journey will be 60°, and I will wear suitable clothing for that temperature: half the time you would be freezing and half the time you would be boiled.” I proposed to alter the ratio of division when the total proceeds passed a certain point, and I also developed the dynamic effect which the ratio had upon the productivity of industry. Many other economic and statistical questions were dealt with in the evidence, but the chief points derived from the Table on page 259 are covered in the above analysis.

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Professor of Commerce, University of Stellenbosch.

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