Industrial profits in the last
twenty years.

by

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Industrial Profits in the Past Twenty Years—A New Index Number.

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1. *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 is rarely 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. In 1918 I read to the Society a paper on the *Effect of Trade Fluctuations upon Profits*, since when no attempt has been made to examine in detail the course and fluctuations of 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 which 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 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 of profit 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.

The economic theory and analysis resting upon this position is not the subject of this paper. But my intention is to assemble the available material of recent times and to ascertain what, if anything, may be gleaned therefrom, in statistical form, concerning relationship with parallel conditions of price, employment, output, etc. My first 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. My second object is to glance at one or two of the more obvious uses of such an index.

2. *The Existing Data.*

The only comparable and aggregated statistics of profit are the assessments under Schedule D of the Income Tax. I would refer to the paper already mentioned and to my *British Incomes and Property* 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 hide 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. These have here been extracted for a period of over twenty years, and are given in Table A in the Appendix. 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. From this 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 will shortly be made, 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 five 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 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 paper on *Trade Fluctuations and Profits*. A series for twenty 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 minimizing results in good years and maximizing them in bad years, through stock, debt, and security valuations and other secret reserves (and releases from reserves), which does not survive the taxation scrutiny,

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 (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 the year 1931 covers examples with terminal dates stretching from December, 1930, to November, 1931, over a third relating to June, 1931, and just under a third to September, 1931. The weighted average terminal date is 8th August, 1931. The sample for the third quarter stretches from December, 1930, (one-fifth of the whole) to August, March, 1931, accounting for one-third and June for nearly one-third. The average terminal date is 17th April, 1931. The second quarter covers reports running from September, 1930, to May, 1931, 60 per cent. ending in December, 1930, and 27 per cent. in March, 1931, and the average terminal date is 4th February. The first quarter of the year covers cases from June, 1930, to February, 1931, and 68 per cent. end at December 31st, the terminal date being 19th December, 1930.

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, 1930, 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 June, 1930, balanced by another in June, 1931.

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, 1930, and 31st January, 1931, 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.

A comparison of the percentage changes exhibited, as in a continuous series, by these two groupings is given on p. 6.

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 above indicate the index of *gross* profits 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 1,552 and 1,463 respectively, a difference of 6 per cent. only.

The chief value of the series of the assessed profit index carried

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	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	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 (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
8	197·7	211·4	204·3	207·6
9	? 200	210·1	210·8	219
1930		162·8	172·8	185·5
1				151·0

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 dis-

persion) 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	93·4 —86·8	106·2 — 87·9
	32·1 net	6·6 net	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 knowledge of 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 1920–1930. 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* (May 4th, 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) Since the main part of this paper was written, the *Economist* has been doing some new work upon its own samples (April 30th,

May 7th, 1932). It gives the "defects" of its series of tables for a continuous series as follows:

(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.

Commenting upon these: (1) is not a drawback for all purposes —only when a direct comparison with home production is desired; (2) is a distinct advantage when measuring 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 makes a picked sample of 700 companies, as from 1924, eliminating trusts and financial companies, holding companies, certain rubber companies, and *adds back* debenture interest. The results for manufacturing and mining are:

	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" are:

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* does 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 summarize 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 12½ 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.

To set against this we have the elimination of some of the equalizing 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 aggregate, as a minus average is 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.

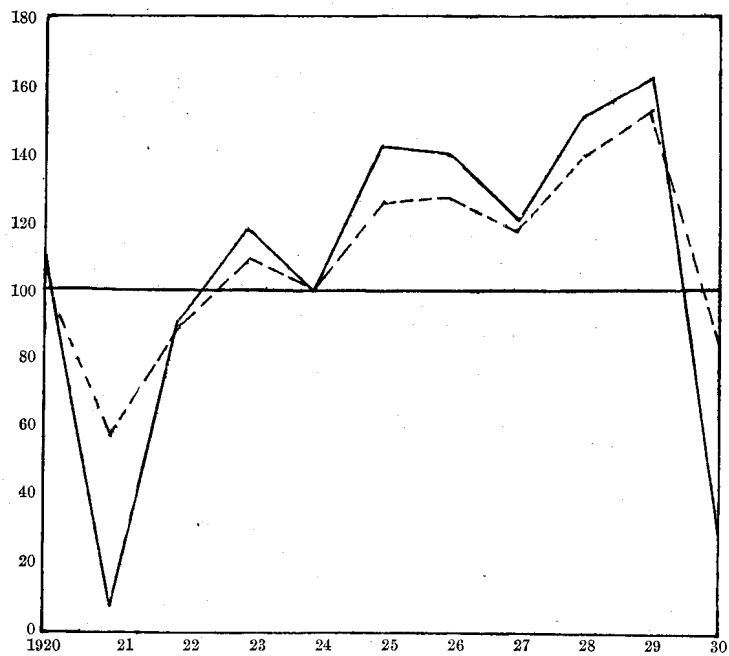
TABLE II.

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
3	109·8	90·6	117·6
4	100	100	100
5	126·5	88·3	143
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 est.	213·0 est.	30·6 est.
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 profits, which in the eleven years aggregate is 31 per cent. for the United States, is necessarily the same in this country. (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.)

GRAPH 1.



- - - - Aggregate of cases making profits (Index 1924 = 100).
—— ,, ,, all cases after deducting losses.

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 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. The details are given in Appendix C. This 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 represent-

ing 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 the Table below. (See Appendix D for details.)

If the two indexes I now offer prove to have any utility to investigators and economists, I propose every July, to add the latest year and to revise the provisional items in the series in the light of the latest material, and to make the results public.

TABLE III.

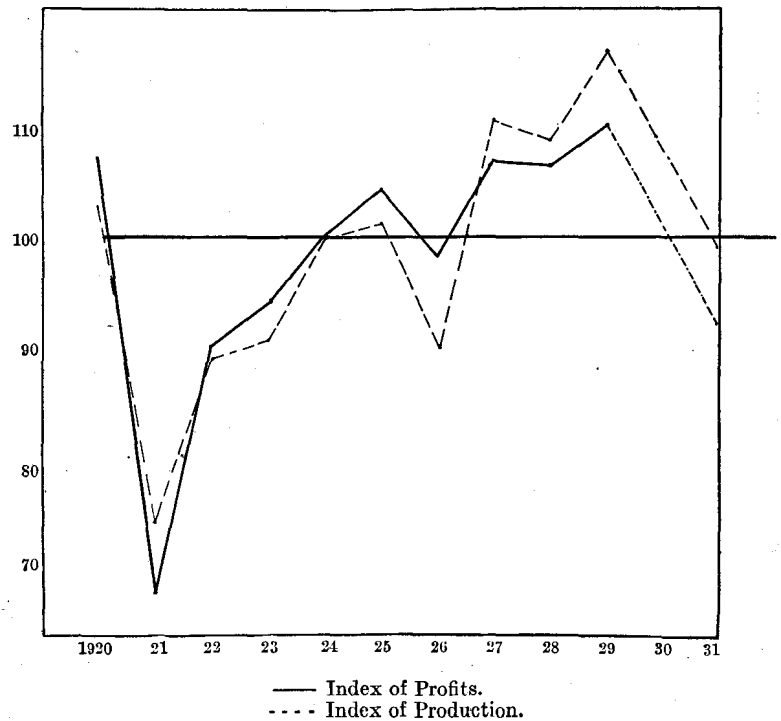
Year.	General Profit Index.*	Sub-index for Ordinary Capital.	Index of Production.†	Prices.			Col. 1 divided by Col. 6.	Foreign Trade.				Bankers Clearing (Country).
				Board of Trade.	Statist.	Cost of Living Index.		Retained Imports Values.	Exports of British Produce.	*Volume* of Gross Imports.	*Volume* of Exports.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
1920	107·0	112	104·7	184·9	180·5	142·2	75					144
1	68·7	57·3	75·3	118·6	111·5	129	53					103·5
2	90·4	84·5	89·3	95·5	94·2	104·5	86					96·8
3	94·1	90·6	91·1	95·6	92·8	99·4	94					97
4	100	100·0	100	100	100	100	100	100	100	100	100	100
5	104·1	109·3	101·1	95·8	98	100·6	103	98·8	97·3	103·4	99·1	102
6	98·3	103	90·2	89·1	90·7	98·3	100	90·4	91·7	106·3	88·3	97·2
7	106·5	111·4	110·2	85·2	88	96	111	86·6	86·5	109·3	100·3	102·5
8	106·2	110·7	108·5	84·4	86·3	94·8	112	87·7	86·3	105·7	102·2	104·8
9	109·9‡	114·3	116·2	82·1	82·7	93·7	117‡	85·7	84·1	110·9	104·8	106·2
1930	100·9§	94·4	107·5	71·9	69·8	90·3	112§	75·6	80·3	108·1	87·6	102·2
1	90§	73·3‡	99·1	62·6	59	84	109§	61·2	71·8	110·6	69·0	94·9

* Third grouping and assessment series combined.
† London and Cambridge Series.
‡ Provisional estimates, subject to early verification.
§ Very provisional estimate.

10. *Profits and Production.*

The graph on p. 15 shows the movements of Col. 1 and Col. 3 of the Table, and the degree of correspondence between the volume of production and the amount of money profits. Turning the volume into total values, by the price index, does not improve the correspondence with profits, and the effect of lower prices in reducing production has been very marked. For a comparison with the previous conditions I would refer to my paper on the *Effect of Trade Fluctuations upon Profits* (*Statistical Journal*, 1918, p. 591). I had reason to conclude then that the Bankers Clearing House figures moved most closely with profits, and I have given the Country clearings in Col. 12 of the Table above.

GRAPH 2.



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

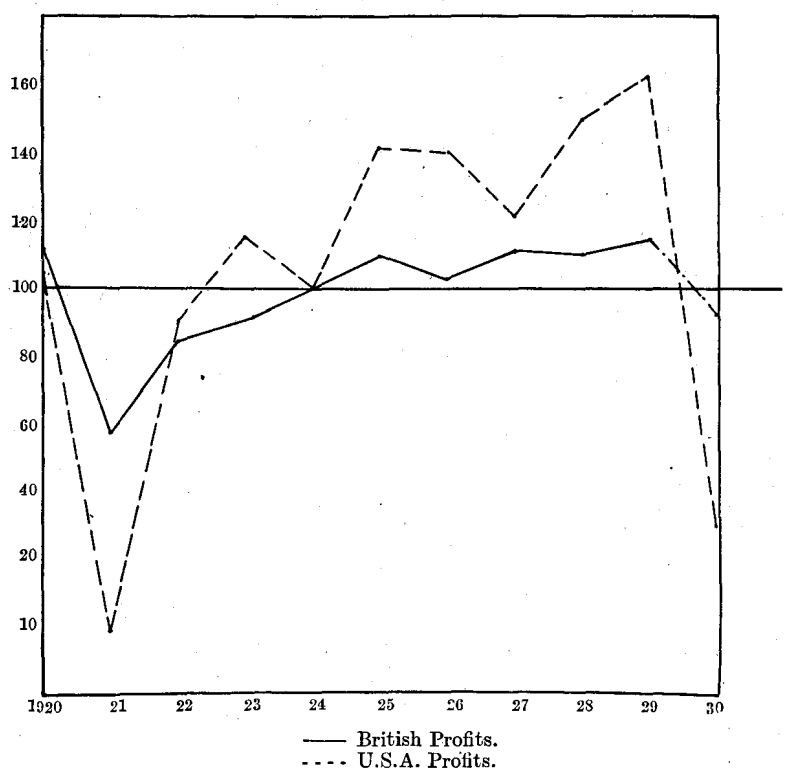
In Graph 3 below, I compare the two countries, using the sub-index as the "liveliest" for this country, and an index derived from the taxation returns (vide Appendix B) for the United States. The capacity of the States for enjoying depression and prosperity to the fullest extent possible is well illustrated.

12. *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 are any obtainable in the nature of the case.

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

GRAPH 3.



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 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—itself capable of many different con-

ceptions and uses—any objectively independent and self-regulating mechanism for an index number will ever be possible.

I have deliberately chosen the year 1924 as the base, because (1) it has been adopted for so many other sets of statistics, such as the Board of Trade Index of Production, (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 I have taken out no time trends, 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; while correlation coefficients for such a short series are hardly appropriate even if one were courageous enough to be seen in their company until they have once again won their way into the society of economic proof.

APPENDIX A.

Summary of Quarterly Reports published in The Economist

Years contrasted.	Quarter.	No. of Cos.	Profits, £'000. First year.	Profits, £'000. Second year.	Percentage change on the Year.
1909/10	1	267	14,892	15,751	5·7
	2	221	11,618	12,984	11·7
	3	133	7,105	8,649	21·7
	4	154	8,930	10,139	13·5
	Total	775	42,545	47,523	11·7
1910/11	1	270	16,265	17,887	10
	2	223	13,858	15,564	12·3
	3	119	8,329	8,921	7·1
	4	162	10,218	10·505	2·8
	Total	774	48,670	52,878	8·6
1911/12	1	279	17,825	18,767	5·3
	2	262	18,674	18,956	1·5
	3	129	8,599	8,458	— 1·6
	4	197	13,118	14,026	7
	Total	867	58,216	60,207	3·4
1912/13	1	300	18,876	21,042	11·5
	2	292	20,585	24,259	17·8
	3	128	8,475	10,748	25·8
	4	213	13,134	14,462	10·1
	Total	933	61,071	70,510	15·4
1913/14	1	301	20,451	22,136	8·4
	2	263	22,649	23,596	4·2
	3	131	10,616	9,490	— 9·5
	4	214	15,320	14,462	— 5·6
	Total	909	69,037	69,685	0·9

Years contrasted.	Quarter.	No. of Cos.	Profits, £'000. First year.	Profits, £'000. Second year.	Percentage change on the Year.
1914/15	1	293	20,790	19,799	— 4·8
	2	285	23,667	22,375	— 5·4
	3	142	10,649	10,707	0·5
	4	208	14,209	14,046	1·3
	Total	928	69,315	66,927	— 3·2
1915/16	1	286	20,048	23,537	17·4
	2	311	23,792	33,924	42·6
	3	139	10,439	13,359	27·9
	4	196	12,951	15,768	21·8
	Total	932	67,230	86,588	28·6
1916/17	1	253	21,074	23,617	12·0
	2	330	26,310	29,323	11·4
	3	337	17,477	18,261	4·5
	4	380	17,677	19,561	10·7
	Total	1,300	82,537	90,761	10·0
1917/18	1	347	27,589	27,319	— 1·0
	2	409	28,071	26,431	— 5·8
	3	321	19,392	21,770	12·3
	4	305	21,072	22,092	4·7
	Total	1,382	96,124	97,612	1·6
1918/19	1	436	31,588	35,289	10·4
	2	430	31,472	29,874	— 5·1
	3	259	17,439	16·843	— 3·4
	4	292	20·503	22,661	10·5
	Total	1,417	101,003	104,668	3·7
1919/20	1	440	34,591	43,926	26·9
	2	355	25,975	35,779	37·8
	3	252	19,045	27,032	41·9
	4	334	21,727	27,664	27·1
	Total	1,381	101,337	134,401	32·6
1920/21	1	412	41,916	43,388	3·5
	2	355	44,173	40,467	— 8·4
	3	232	24,158	13,913	— 42·4
	4	311	30,272	14,268	— 52·9
	Total	1,310	140,519	112,036	— 20·1
1921/22	1	442	47,369	26,786	— 43·4
	2	401	38,045	25,196	— 33·7
	3	209	15,854	12,120	— 23·5
	4	319	23,310	24,229	3·9
	Total	1,371	124,578	88,331	— 29·0
1922/23	1	405	28,490	40,277	41·4
	2	425	31,875	38,946	22·1
	3	209	10,469	17,317	65·2
	4	312	23,383	26,044	11·4
	Total	1,351	94,217	122,584	30·6

Years contrasted.	Quarter.	No. of Cos.	Profits, £'000. First year.	Profits, £'000. Second year.	Percentage change on the Year.
1923/24	1	419	37,155	40,383	8·7
	2	466	49,794	51,293	3·0
	3	214	17,667	18,070	2·3
	4	312	26,143	29,617	13·3
	Total	1,411	130,759	139,362	6·6
1924/25	1	425	41,543	45,306	9·1
	2	492	51,284	56,986	11·1
	3	233	17,773	18,627	4·8
	4	340	32,012	34,074	6·4
	Total	1,490	142,611	154,993	8·7
1925/26	1	460	48,027	51,691	7·6
	2	442	55,835	60,489	8·3
	3	256	23,409	24,060	2·8
	4	414	37,273	38,693	3·8
	Total	1,572	164,543	174,933	6·3
1926/27	1	520	54,477	52,288	— 4·0
	2	509	67,739	64,102	— 5·7
	3	237	19,077	19,528	2·4
	4	403	33,432	33,525	0·3
	Total	1,669	174,724	169,444	— 3·0
1927/28	1	504	53,645	61,823	15·2
	2	556	57,730	58,478	1·3
	3	237	21,171	23,222	9·7
	4	412	35,036	36,121	3·1
	Total	1,709	167,582	179,643	7·2
1928/29	1	454	58,966	59,870	1·5
	2	639	78,663	78,079	— 0·7
	3	257	24,039	23,328	— 3·0
	4	420	32,949	33,405	1·4
	Total	1,770	194,617	194,681	0·0
1929/30	1	516	60,888	62,021	1·9
	2	578	73,424	79,717	8·6
	3	329	25,232	23,627	— 6·4
	4	509	39,272	32,175	— 18·1
	Total	1,932	198,818	197,540	— 0·6
1930/31	1	596	75,816	67,736	— 10·6
	2	619	79,491	64,051	— 19·4
	3	320	24,794	15,997	— 35·5
	4	474	26,460	12,293	— 53·9
	Total	2,009	206,561	160,077	— 22·5
1931/32 (part) ...	1	548	63,404	54,315	— 14·3
	2 (part)	675	72,998	56,834	— 22·1
	Total	1223	136,402	111,149	— 18·6

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 part year	4,205 part year	1,422 part 1,644 est. whole

APPENDIX C.

Year.	Third Grouping.		Assessment Series.		Combined Index.
	First Index.	New Index.	As Given.	New Index.	
1920	200·7	107·7	208·3	106·4	107
1	122·2	65·6	140·5	71·8	68·7
2	160·3	86·1	185·4	94·7	90·4
3	169	90·7	191	97·6	94·1
4	186·2	100	195·7	100	100
5	201·1	108	196·3	100·3	104·1
6	191·7	103	183·2	93·6	98·3
7	207	111	199·6	102	106·5
8	207·6	111·5	197·7	101	106·2
9	219	117·6	200	102·2	109·9
1930	185·5	99·6			
1	152·7 (part)	82			

APPENDIX D.

Year.	Third Grouping Index.	Percentage paid on Preference Dividend.	Deduction from Col. 1 for Col. 2.	Third Grouping, Net Series.	New Index.
	(1)	(2)	(3)	(4)	(5)
1920	107·7	17·2	18·5	89·2	112
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	19·4	21·0	87·0	109·3
6	103	20·4	21·0	82·0	103
7	111	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	82	21·5	17·6	64·4	80·9

APPENDIX E.

From Inland Revenue Reports.

(In millions, £.)

Years.	Manufacturing, 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

PROCEEDINGS OF THE MEETING

MR. FLUX: In accordance with the custom of at any rate recent times, it is the privilege of the immediate predecessor in office of the President delivering an address before the Society, to move a Vote of Thanks for the address. I should have regretted very much if I had, for any reason whatever, not been able to claim this privilege, for I feel it personally to be an honour to hold this relation to Sir Josiah Stamp in work done in association with our Society.

In the gradual building up of a mass of material which helps us to judge of where we are going, how fast we are moving, and, generally, in placing us in a position to venture on judgment as to what is the best thing to do for the immediate future, Sir Josiah has taken a very large share, and the address given us to-night is one further link in a chain which has been gradually built up over a long series of years.

We are accustomed to hear that the characteristic Civil servant is a person who is very cautious and very hesitant to venture on doubtful ground. I think it would be impossible for anyone to imagine that those characteristics could have been the most outstanding characteristics of our President either when he was a Civil servant or since. To-night he has boldly ventured on new ground and, in making these bold ventures into territory unexplored, and very difficult to survey, the very boldness of his attack has enabled him to achieve results which, as the characteristic Civil servant, the ordinary critics would have declared it was impossible that he could reach. The field is a very difficult field, and the material, as is pointed out in our President's address, is very difficult material to handle. The success with which the difficulties have been outflanked is a matter on which you will all wish to congratulate the President.

With several of the opinions expressed in the address, particularly towards its close, I have the most unbounded sympathy; in the expression of the opinion that many of the indices regarding economic matters with which we are concerned cannot in their very nature be continuous over several decades, or even over centuries, he has voiced a doctrine in which I have a profound belief, and I welcome very much this expression of the belief of one whose opinion will go much further than my own. The fact that we are dealing with a living and changing organism has long convinced me that we cannot use an unchanged measuring rod to measure its fluctuations, but that we must constantly readjust our measuring rod and content ourselves with reviewing matters over a series of relatively short periods. We may thus gradually build up a history of a long-period movement which will, however, not provide one uniform continuous index framed from an unchanging formula over a half-century or century or longer period still. I welcome very much the support which that view has gained from the President's emphatic opinion expressed towards the end of his address. He has reminded us, too, that

those who have been concerned in the formation of such indices as the Board of Trade Index of Productive Activity are shortly to be called up for judgment, when the police have had time to complete their case, and I should hope, with regard both to the indices to which we have been introduced to-night, and that other index which I have just mentioned, that the prisoners, when they appear at the bar, need have no fear of the judgment of the Court.

There are one or two points to which reference has been made and on which I should like—without over-stepping the bounds of what is customary on these occasions—to make one or two passing remarks. Perhaps the first point I am going to mention is of less importance than it might appear to be; it is that while the *Economist* collects a very large amount of material, there is not only the private trader that is outside the *Economist's* scope, but a large number of private Companies not issuing accounts available for the purpose of inclusion in the *Economist* table. Some of these are organizations of no small importance. Further than that, the merger of private into public Companies in the course of twenty years adds to the difficulty. Companies at one time outside the field have been brought inside the field, and vice versa. You will agree that the results set out in the address entirely warrant the venturing into a field where there were so many red flags of warning that the going was dangerous.

Another matter that interested me—a point of very serious difficulty, and I am sure you will appreciate the ingenuity with which our President has dealt with the difficulty—was the series of figures showing the different periods of time from the conclusion of the period in which profits were made to the date when they were brought into the published accounts. I think it probable that in the near future there will become available a piece of information which will have added interest in this connection, viz. the distribution of the years of account of manufacturing firms in the country. If the need for economy had not compelled a limitation of work on the material relating to the 1924 Census of Production, we might have had some data from that survey. I have seen summaries relating to the reports for the 1930 Census so far published, which show the distribution of the years of account covered by those returns. In these summaries I was struck by the way in which the emphasis in the series of figures gathered varies from the emphasis as it would lie if the period between the conclusion of the year of account and the entry into the records was always the same. The last quarter of the year, so far as the trades that have been covered for the 1930 Census up to the present are concerned, covers something like 65 per cent. of the firms reported on, and a little less than that percentage of the persons employed. The first quarter of the year is the next most important, not in that case the following June quarter, indicating what a confusing element has here to be dealt with. It leads me personally to look with even greater admiration on the skill with which our President has dealt with these essential and necessary complications of the material

that he has had to handle. It is but one more illustration of the mastery in the field of statistics to which we have been accustomed from him, which was one of the reasons why the whole of the Society welcomed two years ago his acceptance of the offer of the Presidency then made to him. The two years of his Presidency have been years of notable work. I think if we examine the list of topics dealt with we shall find that they have added quite a good deal to the statistical material available for dealing with the problems of the time. It has struck me recently how much our Society has been free from the challenge that it deals with abstruse problems with which the business world of to-day is not much concerned. It has maintained its reputation in that regard, and if there were no more to bring to account in these years than the two addresses of our President, the reputation of our Society has been enhanced as being well abreast with the time.

I therefore move that our best thanks be tendered to our President both for the address he has delivered to us this evening and, apart altogether from the general vote of thanks passed earlier in the proceedings to the outgoing Executive officers and Council, for the work he has done for our Society in the last two years in particular and during the whole of his connection with our body.

SIR BERNARD MALLET: I had the honour of seconding the motion proposed by Mr. Flux to the President on the occasion of his first presidential address; it is pleasant that the same duty should fall on the same team on the occasion of his second and last presidential address.

Besides the qualification, or rather, perhaps, disqualification, of being senior ex-President, I had that of some acquaintance with the subject discussed on that occasion; to-night I am afraid I have no technical knowledge of this subject. You have heard expert criticism from Mr. Flux, and I dare say you will hear more from Mr. Yule, and therefore on this occasion I shall take refuge behind the rule of the Society which discourages criticism and discussion of Presidential Addresses!

What I can do is to express the great gratitude of the Society to Sir Josiah Stamp for all he has done for the Society. I understand that during the two years he has hardly missed a single meeting of the Executive or Council, which seems to me nothing short of a marvel for the busiest man in England. His diligence in our interests and the prestige of his name will, I am sure, have the effect of enabling the Royal Statistical Society to go forward to its Centenary celebrations with much enhanced reputation and authority.

I have very great pleasure in seconding the Vote of Thanks.

MR. UDNY YULE: It would obviously be most improper to throw on the President the duty of putting to the meeting the Vote of Thanks moved by Mr. Flux and seconded by Sir Bernard Mallet; I therefore consented to undertake that honour. I need not add much to what has been said; I do not wish to add to the discussion

of technical points, and am in most full agreement with Mr. Flux in what he has said on the ability with which the technical difficulties have been mastered, and the skill with which those difficulties have been explained so that anyone can follow step by step the problems to be surmounted.

Mr. Flux reminded us that at one time the President was a member of the Civil Service, and it passed through my mind how much the Civil servant must have improved since the days of the Queen of Sheba. The Queen of Sheba, when she received a letter from Solomon the King, summoned all her wise men—the dim forefathers of our Civil servants—and requested them to read the letter; but they all fell on their faces and exclaimed with one voice, "O Queen, our intelligence is limited and our incompetence is a great incompetence; we cannot read the letter from Solomon the King." I cannot picture our President, even in his Civil Service days, taking that attitude towards a problem presented to him.

There is only one unpleasant feeling associated in our minds this evening with the reading of this address,—the memory that it is our President's valedictory address. It is true that it is his valedictory address, but let us hope that it is by no means his last contribution to our proceedings.

I beg to put to the meeting the Vote of Thanks to the President not only for this address, but for all the work he has done for the Society in his long association with it, and in particular during the last two years.

The Motion was put to the meeting and carried unanimously.

Sir Josiah Stamp, in reply, said: I thank you very much for that cordial Vote of Thanks and I thank the movers for their speeches. I do not intend to add to my general address a sub-address on the paper; I will only make one or two remarks upon two features mentioned by Mr. Flux.

I started on my work on the *Economist* sample with considerable distrust as to its having any particular value, for this purpose but the more I examined it, the more I found the particular points I had in mind were really insignificant. I think it is true to say that as a financial newspaper, taking what records come to it, the best use is made of all the results of public Companies received. One would not accuse them of going to the highways and hedges to drag things in, and it is possible there may be Companies of particular importance which do not want to draw attention to the character of their results, either because they are too good or too bad. I think it will be found that there is a slight difference between the weekly summaries and actual reports of the summaries in the total numbers.

On the general subject, I hope you will endorse what I have done as at any rate being worth attempting. Only time will prove whether it will bear any weight. One must be patient, and I shall not be in the least disappointed if it is pointed out to me that it

is invalid. The great thing is to make a start, and that is what I attempted. I shall be greatly obliged to any who will give me any reflections as to anything obscure or that is not included and very glad of help in any work upon the table and for any suggestions.

I thank you very sincerely for your vote of thanks and for the kind things that have been said.

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