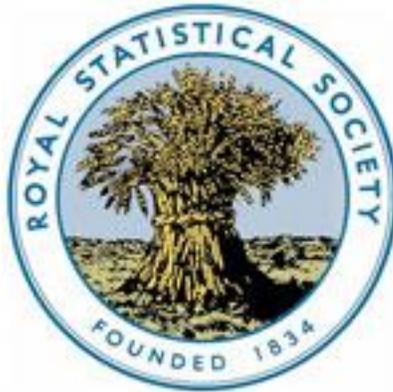


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The COURSE of REAL WAGES in LONDON, 1900-12.

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[Read before the Royal Statistical Society, November 18, 1913,
the President, Professor F. Y. EDGEWORTH, M.A., F.B.A., in the Chair.]

Introduction.—The period of severe industrial unrest through which we are at present passing is generally stated in the Press and elsewhere to be due to the fact that while of recent years the cost of living has increased considerably, wages have remained practically stationary. The object of this paper is to ascertain, as far as possible, the extent of the resulting decrease in the general prosperity of the working classes.

The figures generally quoted to show that the cost of living has increased very rapidly of late years are certain index numbers, published by the Board of Trade in their *Annual Abstract of Labour Statistics*, showing for London the change from year to year in the retail price of the principal articles of food. Since, however, these index numbers have been subject to a certain amount of criticism,¹ and since they are based upon a single record of prices, namely, "the only available continuous series of prices reaching as far back as the year 1892,"² it is doubtful whether they can be accepted, even for London, without further confirmation. Accordingly, an attempt has been made to obtain an independent series of figures for London, and with this aim in view records have been obtained of the prices charged by a number of London firms for the principal articles of food for the period 1900-12.³

¹ See *Daily News*, October 9, 1911.

² See *Report of the Cost of Living Enquiry for 1912*. [Cd.-6955], p. xliii.

³ It was not possible to obtain returns for years earlier than 1900.

During March, 1913, Mr. G. Stapylton Barnes, C.B., when giving evidence before the Royal Commission on the Civil Services, handed in a memorandum dealing with the change in the cost of living since 1900. This memorandum presumably contained the index numbers showing the change in the retail price of food published by the Board of Trade in their *Annual Abstract of Labour Statistics*, but, as a matter of fact, for nearly every commodity the figures differed slightly, and in some cases considerably, from those already published in the *Abstracts*. These revised figures were published again in the *Report of the Cost of Living Enquiry for 1912*, but in neither case were any reasons given for the various alterations. The revised figures have been quoted throughout this paper.

This is, I believe, the first time that a series of retail food index numbers has been prepared as the result of a private investigation. In 1902 Mr. G. H. Wood urged the desirability of undertaking such an investigation,⁴ and in 1909 the same author published a series of index numbers showing the general level of retail food prices for each year of the period 1850 to 1900,⁵ but the data upon which these figures were based were obtained, for the most part, from Board of Trade publications.

Last year Dr. Bowley also published a similar series of index numbers,⁶ based upon his own general impressions and experience, but not upon actual statistical data.

Recently the Co-operative Wholesale Society has issued a return showing the cost to the Society, at wholesale prices, of what is called an "average family grocery order," for certain years from 1898 onwards.⁷ These figures cannot, however, be regarded as giving the general level of retail prices for the years in question, since they represent changes in wholesale and not retail prices, and since they do not include changes in the price of meat and bread, upon which more than one-third of the working man's wages are spent.

To determine the change in the cost of living for the working man, we must know not only the change in retail prices, but also the extent of any change that may have taken place in working-class rents. An attempt, therefore, has been made to calculate this change.

The figures usually quoted to show general changes in wages from year to year are the wage index numbers, also published

⁴ "The investigation of retail prices," by G. H. Wood. *Journal*, 1902.

⁵ "Real wages and the standard of comfort since 1850," by G. H. Wood. *Journal*, 1909.

⁶ See *Daily News*, October 9, 1911.

⁷ Given in the Preface to *Gold and Prices*, by Professor W. J. Ashley.

by the Board of Trade in their *Annual Abstract of Labour Statistics*. These figures apply to the United Kingdom as a whole, and cannot, therefore, strictly speaking be compared with food index numbers for London. A fresh series of wage index numbers for London has accordingly been prepared, based upon changes in wages in nine trades in all. These trades, it is estimated, include about one-half of all the manual workers in London. The wage index numbers published at various times by Dr. Bowley and Mr. G. H. Wood⁸ cannot unfortunately be used, as in no case do they extend beyond the year 1904.⁹

The subject-matter of the paper will now be dealt with in detail under appropriate headings, and the final results will then be summarised.

I. *Change in the cost of living in London, 1900-12.*

(a) *Retail prices.*—In order to obtain a series of index numbers for food, an attempt was made to procure from a number of London firms a complete record of the average yearly retail price of the principal articles of food since the year 1900. The firms approached were exceedingly kind in giving all the information possible, but as it does not appear to be the custom for business houses to keep records of retail prices for past years, the only available information was, in many cases, contained in certain yearly catalogues which had fortunately escaped destruction. For this reason some of the returns are very incomplete. From two firms, however, a complete record of average yearly prices was obtained for many commodities.

With the two exceptions noted, the majority of the food index numbers are based upon prices obtained from yearly catalogues, and not, as one would have preferred, upon an average of the prices quoted in a series of weekly or monthly price lists published during the year. This does not introduce any very serious error in the case of commodities the price of which is not subject to frequent fluctuations, but it may lead to misleading results in the case of commodities such as meat and bacon of which the price, especially in recent years, has changed often. Until about 1904 the price

⁸ "Statistics of wages in the United Kingdom during the last hundred years." *Journal*, 1898-1906.

⁹ The wage index numbers quoted by Mr. Rowntree in an article on "Industrial Unrest," in the *Contemporary Review*, for October 1911, were prepared by Dr. Bowley. These figures reached as far as the year 1910, but they could not be used for the present paper as they refer to the whole of the United Kingdom and not simply to London.

of these commodities remained constant over long periods, so that the prices quoted in the yearly catalogues are fairly representative for the year; but after 1904 prices changed so frequently that certain firms ceased quoting at all for these commodities in their yearly catalogues, as it was impossible to fix upon one price which would apply to any but a very short period. For this reason gaps will be found in the tables for such commodities from the year 1904 onward.

As it is the custom for each firm to publish its yearly catalogue at about the same time each year, the prices obtained apply, for any given firm, to the same season throughout the period and are, therefore, comparable from year to year.

A separate yearly index number has been worked out for every commodity from the returns made by each of the firms. These figures are given in Table I (see Appendix); gaps have been left where no returns were obtained, and those index numbers which are based upon an average price for the year have been marked with an asterisk.

The year 1911 has been taken as a base, since for that year the figures are certainly the most accurate, and a return was obtained for each commodity from every one of the firms.

Generally speaking it is not desirable to use a single year as a base, especially when different series of index numbers are to be compared, as any error in the figures for the base year will affect all the other index numbers.¹⁰ For this reason, the average of a number of years is to be preferred as being less subject to error. In calculating the index numbers of individual commodities for the separate firms the average of a number of years could not be used; the returns were so very incomplete that it would have been impossible to choose even three years for which returns were obtained in every case. The objection to having a single year as a base largely disappears if the actual year chosen is a normal year and the index numbers for that year are calculated from accurate returns. In the present case the year chosen, namely, 1911, was probably quite normal, and certainly the returns for this year were as accurate as any obtained.¹¹

The firms giving information have been divided into two

¹⁰ See "Modes of constructing index numbers," by A. W. Flux, M.A. *Quarterly Journal of Economics*, 1906-07; also *Elements of Statistics*, by A. L. Bowley, M.A. P. S. King and Son.

¹¹ For a general discussion of method see "The construction of index numbers to show changes in the cost of the principal articles of food for the working classes," by the present writer. *Economic Journal*, December, 1913.

groups:—Group 1: Firms dealing principally with working-class customers. Group 2: Firms dealing principally with middle-class customers.

Group 1.—This group contains Firms A, B and C. A and C are very important firms, doing an enormous working-class trade, with branches in every district in London and in most of the large towns throughout the country.¹² Firm B is confined to one district of London, where it does a large working-class trade. It consists of a central store, with many branches in the neighbourhood. Although the index numbers for this firm are not, as in the case of Firms A and C, based upon yearly averages, they are probably fairly representative, as the prices charged by this firm are changed as seldom as possible. From the year 1902 onward (the first year with returns for meat) the results obtained from the firms in this group should give a very fair measure of the change in the price of food for the working classes in London during the period studied.

Group 2.—This group contains Firms D, E and F. These are all very large firms, dealing principally with middle-class customers living in London and its suburbs. Only yearly catalogue prices could be obtained as a rule from these firms.

Firm Z was not included in either group as it seemed probable that its returns were not very reliable. They are based upon the October price for each year, and as all the prices charged by this firm fluctuate considerably from month to month, it is doubtful whether the prices charged during one month are representative of the whole year.

The following particulars apply to the five additional firms who made returns for bread:—Firms K and L do a very big middle-class trade from a large number of branches scattered over London. Firms G and H have large bread factories and sell bread to working-class and middle-class customers in and around London. Firm L is confined to one district of London, where it does a big working-class trade.

For milk it is comparatively easy to obtain reliable figures, since most of the big London dairies agree to charge the general public the same price; the index numbers for this commodity are accordingly based on the change that has taken place in the price charged by this combination of firms.

On examining Table I and comparing the index numbers of the different firms for the same commodity, we find that although the direction of the change is the same for the whole period, there is considerable disagreement as to the extent of the change from year to year. This may be due to the fact that many of the numbers

¹² Firm A only sells meat at its chief branches.

are not based upon yearly averages, or it may be that the variation in the price of any article is not the same even for firms who cater for approximately the same class of customer. The index numbers for bread are almost all based upon average yearly prices, yet we still find the same disagreement between one firm and another, although, *a priori*, one would not have expected this to be the case with a commodity such as bread. Further, the index numbers for Firms A and C are all based upon yearly averages, and we again find this divergence, in spite of the fact that both firms deal with the same class of customer. It seems probable, therefore, that these differences are not due in any great measure to faulty data, but that they actually represent the real state of affairs; in fact, considering the widely varying methods by which different firms conduct their businesses, such differences as these seem bound to occur.

From the index numbers for the various commodities given in the first table, series of average index numbers were calculated for the firms in Groups 1 and 2 respectively. It was hoped in this way to obtain index numbers for the different articles representative of firms dealing both with working-class and middle-class customers. These average index numbers are given in Table II (see Appendix), and for comparison the Board's index numbers of retail food prices in London are also quoted.

On examining this table we again see a general agreement in the trend of the various series of figures, with marked differences for individual years. For many commodities the two new series of index numbers agree with one another better on the whole than they do with the Board of Trade figures, and in the cases where this is not so, *e.g.*, cheese, sugar and tea, the Board's figures agree better with those of Group II, *i.e.*, firms dealing with middle-class customers.

The best agreement between the index numbers for the two groups of firms is shown in the case of English beef, English mutton, bacon, butter, rice and bread, although the agreement is not very close.

With the exception of bread, which is dealt with later, it did not seem profitable to make a detailed comparison in the case of individual commodities, since the figures obtained during the present investigation are admittedly subject to a certain amount of error. A comparison will, however, be made between the various general index numbers, representing the level of prices as a whole for each year.

To obtain these figures a general index number was worked out for each of the two groups of firms, the index numbers of the separate

TABLE III.—LONDON. *Index numbers of the general level of retail food prices** 1900-12. (1911 = 100.)

Year.	Working-class firms, Group I.	Corresponding Board of Trade figures.	Commodities for which no return was obtained, and so omitted when calculating the Board of Trade figures.	Middle-class firms, Group II.	Corresponding Board of Trade figures.	Commodities for which no return was obtained, and so omitted when calculating the Board of Trade figures.
1900.....	93	90	Beef, mutton, pork, flour, rice.	94	91	Butter, bacon.
'01.....	93	91	Beef, mutton, pork, flour, rice.	95	91	Pork, butter, bacon.
'02.....	97	94	Flour, rice.	93	93	Butter.
'03.....	94	94	Flour, rice.	95	94	Butter
'04.....	94	93	Flour, rice.	99	95	Pork, butter, bacon.
'05.....	96	95	Flour, rice.	97	95	Pork.
'06.....	96	94	Flour, rice.	96	94	Pork.
'07.....	96.5	96		94	97	Beef, mutton, pork, butter.
'08.....	98	98.5		98	99	Pork.
'09.....	99	100		100	100.5	Pork, butter.
'10.....	98	101.5		101	102	Pork.
'11.....	100	100		100	100	
'12.....	101	105		103	105	

*Based upon the index numbers for individual commodities given in Table II.

commodities being weighted according to the extent to which they enter into the consumption of the ordinary working-class family; the results are given in Table III. The weights, which are those used by the Board of Trade in constructing their index numbers, were very kindly supplied by the Labour Department. For some years in each group no return was obtained from any firm for certain commodities. In that case the sum of the weighted index numbers for that year was compared with the sum obtained for 1911 after omitting the article or articles in question. For both groups of firms a corresponding index number, calculated from the Board of Trade figures, is also given, using for any particular year the same articles as those upon which the general index number for the particular group is based.

The new index numbers agree fairly well with the Board's figures for the earlier years, although the latter show a considerably larger increase over the whole period than either of the series obtained during the present inquiry. The figures for the two groups cannot be compared, as they are not, in all cases, based upon the same articles. In order to make this comparison possible, a fresh series of index numbers was worked out, using in all three cases the same articles for any given years; these results are given in the following table:—

TABLE IV.—LONDON. *Index numbers of the general level of retail food prices for working-class and middle-class firms with corresponding Board of Trade figures, 1900-12.* (1911 = 100.)*

Year.	General index numbers for working-class firms. (Group I).	General index numbers for middle-class firms. (Group II).	Corresponding Board of Trade index numbers (revised).	Commodities for which no return was obtained either for Group I or Group II and so omitted when calculating the other index numbers.
1900....	93	94	90	Beef, mutton, pork, butter, flour, rice, bacon.
'01....	93	95	89	Beef, mutton, pork, butter, flour, rice, bacon.
'02....	97·5	93	93·5	Butter, flour, rice.
'03....	95	95	95	Butter, flour, rice.
'04....	98	99	95	Pork, bacon, butter, flour, rice.
'05....	96	96	95	Pork, flour, rice.
'06....	95·5	96	94	Pork.
'07....	96	94	96	Beef, mutton, pork, butter.
'08....	98	98	98·5	Pork.
'09....	100	100	100	Pork, butter.
'10....	98	101	101·5	Pork.
'11....	100	100	100	
'12....	101	103	105	

* Based upon the index numbers for individual commodities given in Table IIa.

On examining this table we see that, except for the years 1902 and 1910, the two new series of general index numbers agree with one another fairly well, and distinctly better than does either with the Board's figures. For the whole period, *i.e.*, 1900-12, the working-class firms show an increase of about 9 per cent., the middle-class firms an increase of about 10 per cent., and the Board of Trade an increase of over 16 per cent. It is a little doubtful whether any reliable conclusions can be drawn from a comparison between these three series of figures, because they are based, especially for the earlier years, upon few commodities. To obtain, therefore, a continuous series of index numbers for each commodity, the returns from all firms (working-class and middle-class) have been combined. The figures given in Table IV show that there is no marked difference between the general index numbers for the two types of firms, and suggest that probably one is justified in combining the returns, although if sufficient data were available one would prefer to keep them separate. In order to compare these figures (obtained by combining the returns of all firms) with the Board of Trade index numbers without the possibly disturbing influence of a single year as base, they have been recalculated taking the average of the years 1900-11¹³ as equal to 100, and the corresponding Board of Trade figures for wholesale and retail prices have been recalculated, using the same base. The actual figures are given in Table IIB (see Appendix).

On the whole, the two series of retail index numbers do not agree very closely in the extent or even in the direction of the change from year to year, although they show the same general trend over the whole period. The same remark also applies to a comparison between the retail and wholesale figures.

Average index numbers for bread for both groups of firms were calculated on the new basis, as it is the only individual commodity for which sufficiently accurate and numerous returns were obtained to make a profitable comparison of the relative merits of the different series of index numbers. Of the nine firms making returns, seven were able to give the date and extent of every change during the period. Further, the trade of seven of these firms reaches into practically every district of London, so that the average index numbers should give an accurate measure of the variations which have taken place in the price of bread in London since 1900. The

¹³ Originally index numbers were obtained for the period 1900-11, and the average of the whole period was taken as a base. Since then index numbers for 1912 have been added without changing the base. This is also the case with the index numbers of wages, &c.

Board of Trade index numbers for bread are also based upon the continuous returns of a large number of London firms, and in the circumstances it is surprising that the three series of index numbers should not agree more closely. Here again Groups I and II agree with one another better than does either with the Board of Trade (see Diagram 1).

DIAGRAM 1.—*Index numbers of the retail price of bread in London, 1900-12.*

(Average 1900-11 = 100.)

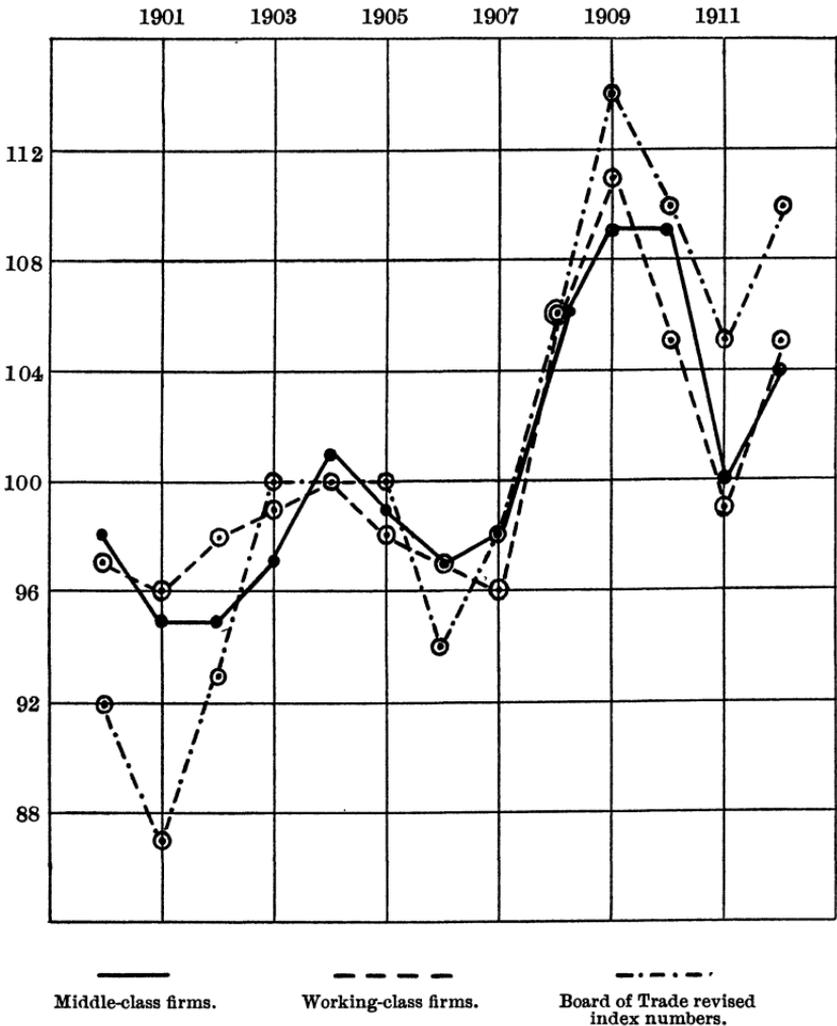


DIAGRAM 2.—*Index numbers of the retail price of bread and flour in London for middle-class firms, and the Board of Trade wholesale index numbers for wheat, 1900-12.*

(Average 1910-11 = 100.)

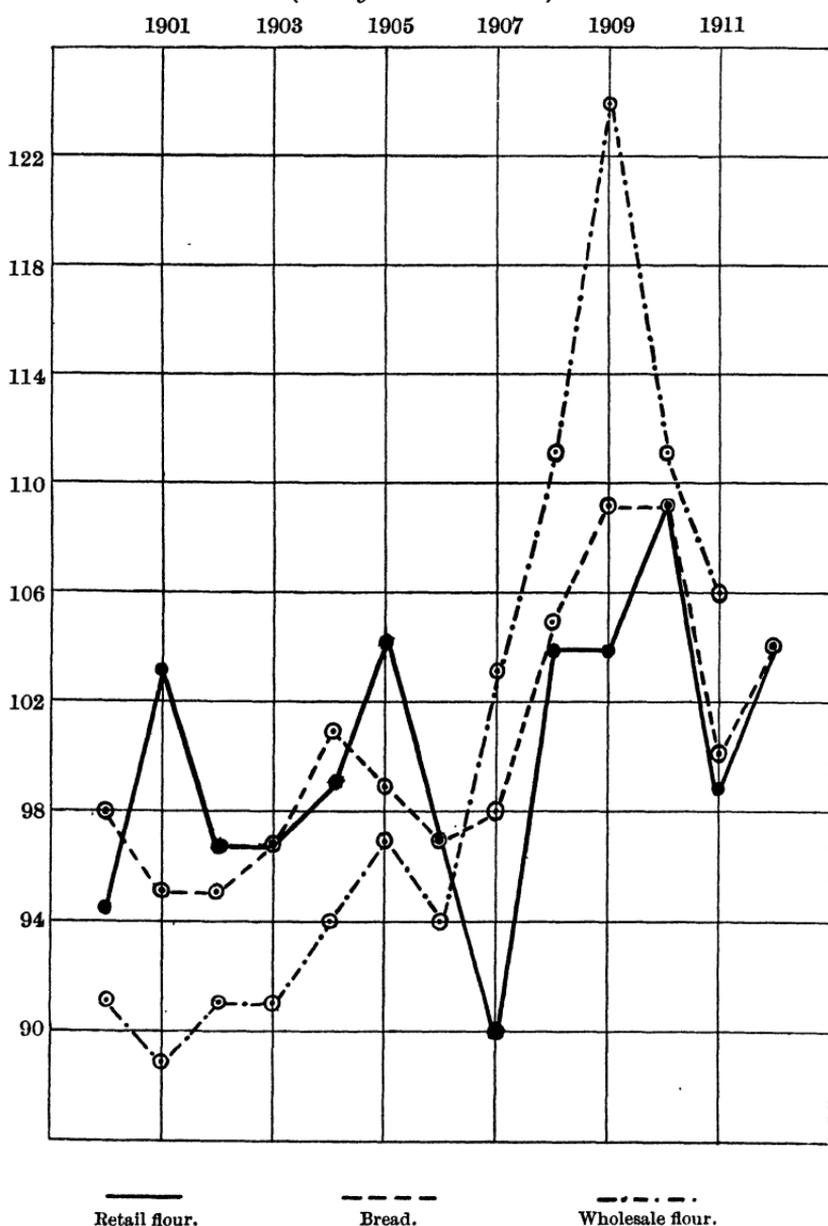
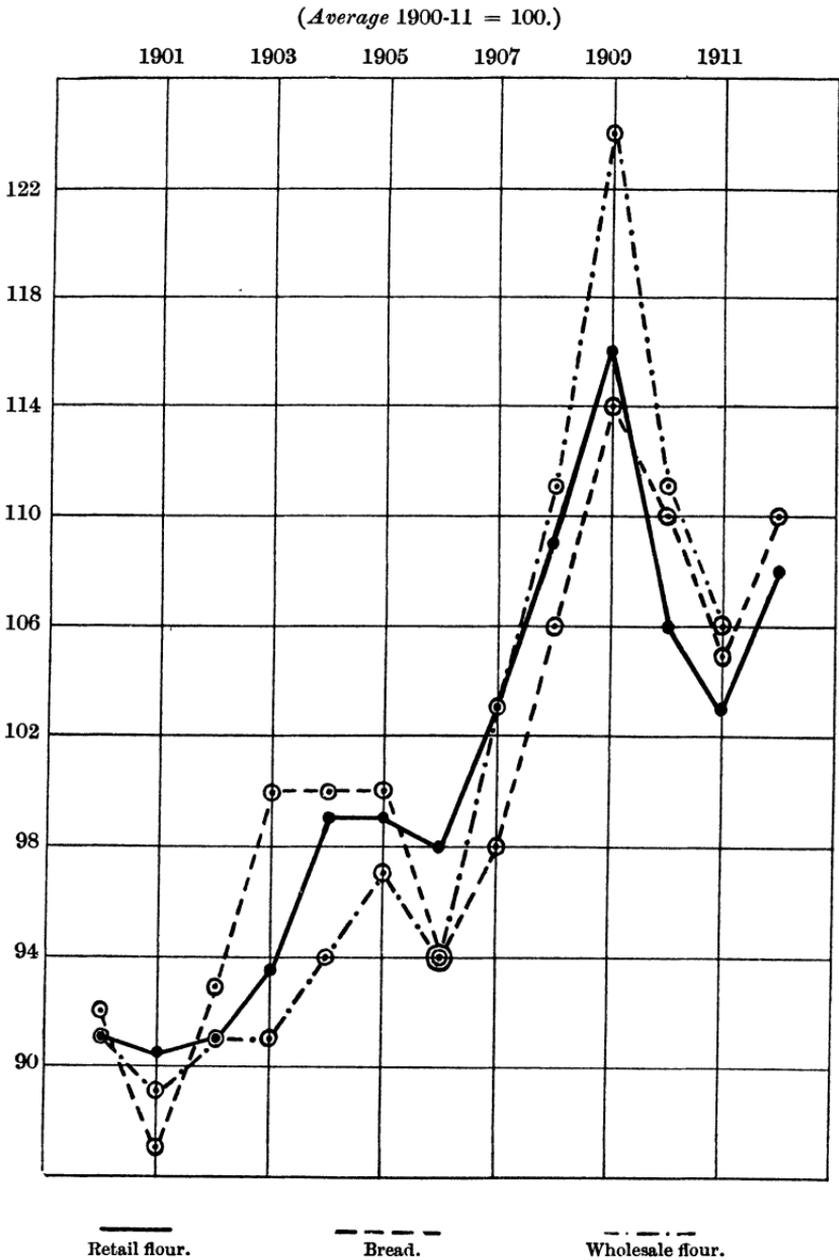


DIAGRAM 3.—*Revised Board of Trade index numbers of the retail price of bread and flour in London and of the wholesale price of wheat, 1900-12.**



* Given in *Report of the Cost of Living Enquiry for 1912.* [Cd.-6955.]

TABLE V.—*General index numbers of retail and wholesale food prices, 1900-12. (Average 1900-11 = 100.)*

Year.	Suggested general index numbers of retail food prices based upon the returns of all firms.*	Corresponding Board of Trade general index numbers (London).		General index numbers for firm ZS (London).	General index numbers for institution A (Cheshire).	General index numbers for institution B† (London).	Board of Trade's general index numbers of wholesale food prices (United Kingdom).	Sauerbeck's general index numbers of wholesale food prices‡ (United Kingdom).
		Original figures.†	Revised figures.‡					
1900.....	97.2	94.8	95.1	—	93.4	—	96.2	98.5
'01.....	97.1	96.3	96.2	97.9	101.5	98.4	96.6	95.6
'02.....	98.1	97.5	97.4	99.1	95.5	97.3	97.9	95.6
'03.....	98.1	98.1	98.2	95.7	95.3	96.9	96.9	94.2
'04.....	99.1	98.8	97.7	98.9	99.0	97.6	97.6	97.1
'05.....	100.2	99.6	99.4	99.2	101.6	99.7	97.4	98.5
'06.....	99.6	98.3	98.0	99.0	99.2	96.6	96.7	98.5
'07.....	99.3	100.0	100.1	100.1	99.7	97.4	101.1	102.7
'08.....	101.6	103.0	102.9	101.1	104.1	102.9	102.6	102.7
'09.....	102.5	104.1	104.2	102.0	103.0	104.4	104.6	104.1
'10.....	103.1	106.3	106.1	103.8	103.3	105.9	105.0	105.6
'11.....	103.8	103.2	104.5	103.2	104.3	102.8	107.4	107.0
'12.....	105.4	—	109.4	—	—	—	—	—

* Based upon the index numbers for the separate commodities given in Table IIb.

† Taken from *Fifteenth Annual Abstract of Labour Statistics.*

‡ Taken from *Report of the Cost of Living Enquiry for 1912.* [Cd.-6955.]

§ In calculating these index numbers the figures for bread for Firm D have been used. In this case the base used was the average of 1901-11.

|| Average 1901-11 taken as base.

¶ *Journal*, 1912, p. 412.

Theoretically the price of bread should follow that of flour, and both should, one would imagine, follow the general trend of the wholesale figures for wheat, with less marked fluctuations from year to year. To discover whether any of the series illustrate these theoretical views, the "retail prices" index numbers for bread and flour for Group II and for the Board of Trade were plotted on Diagrams 2 and 3 respectively,¹⁴ and on both diagrams the Board's wholesale figures for wheat were also plotted. The figures for bread follow fairly closely those for flour in the case of Group II, and show the same general trend as the wholesale figures with less marked fluctuations. According to the Board of Trade, on the other hand, the retail price of both flour and bread follows very closely the wholesale price of wheat, showing nearly as marked fluctuations.

Finally, general index numbers based upon the returns of all firms are given in Table V, with corresponding Board of Trade figures based upon the same commodities. It should be noted that by taking all the firms together it is possible to obtain a series of general index numbers based upon changes in the price of practically all the articles commonly consumed by the working classes.

The new index numbers and the Board of Trade figures both point to a substantial increase in retail prices for the whole period, 1900-12; the former show an increase of about 8 per cent. and the latter of about 15 per cent. The new index number for 1900 is 2 per cent. higher than the Board's figure, for 1910 it is 3 per cent. lower, while for 1912 it is 4 per cent. lower. For every year the Board's figures point to a bigger increase since 1900 than the index numbers obtained during this investigation.

In this connection it is interesting to note that, in a letter to the *Daily News*, of October 9, 1911, Dr. Bowley made a similar criticism of the Board's retail index numbers for 1908 and 1910, and suggested a new series of figures based upon his own general impressions and experience. These figures are given in the following table, with the Board of Trade index numbers and those obtained during the present investigation calculated on a similar basis:—

¹⁴ Owing to the very incomplete returns obtained for flour it is not possible to do this for Group I.

TABLE VI.—*General index numbers of retail food prices in London, 1900-12.*
(Average 1900-10=100.)

Year.	Suggested general index number.*	Dr. Bowley's general index number.†	Board of Trade general index number.‡	
			Original figures.	Revised figures.
1900.....	97·5	97	96	96
'01.....	97	98	97·5	97
'02.....	98	98	97	97
'03.....	98	99	99	99
'04.....	99·5	99	100	99
'05.....	100	99	99	99
'06.....	100	99	99	98
'07.....	100	100	101	101
'08.....	102	102	104	104
'09.....	103	102	103	104
'10.....	103	103	105	105·5
'11.....	104	—	104·5	105·5
'12.....	105	—	—	110

* Based upon the index numbers for the separate commodities given in Table IIb.

† Professor Bowley does not give a list of the commodities upon which his index numbers are based.

‡ Including eggs, potatoes, currants, raisins, tapioca, oatmeal, coffee, cocoa, jam and marmalade in addition to the commodities included in the "suggested" index number. These commodities have a weight of 64 out of a total weight of 360.

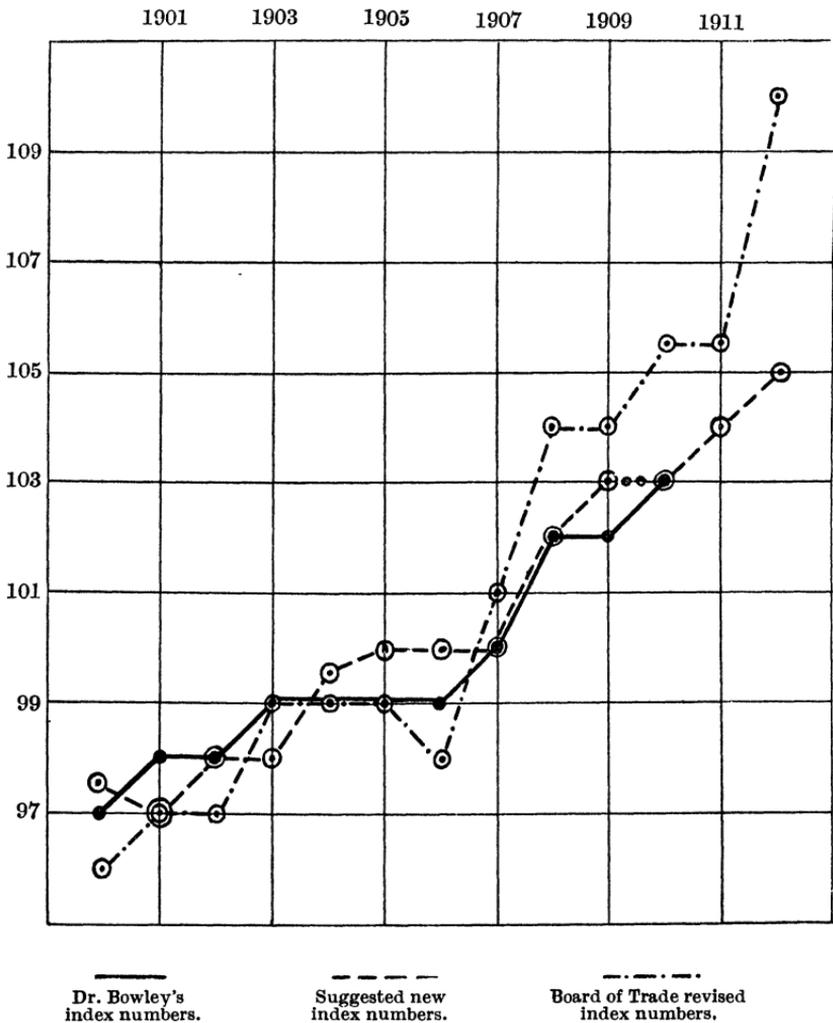
The agreement shown between Dr. Bowley's figures and those now obtained is very striking, for in no case do the figures differ by more than one unit. Both series point to an increase of about 6 per cent. between 1900 and 1910, while the Board's figures show an increase of about 10 per cent. for the same period. It seems possible, therefore, that the increase shown by the Board's figures is too large, since two perfectly independent calculations agree in fixing it at a lower figure (see Diagram 4).

Returning to Table V, general index numbers for Firm Z are given, which certainly do not differ as markedly from the other figures as one would have been led to expect from the striking differences shown for individual commodities.

Through the kindness of a friend it was possible to obtain index numbers showing the change in the "cost of living" for two small institutions. These numbers are also given in Table V, and although they do not agree very closely either with one another or with the other index numbers in regard to particular years, they show the same general features.

DIAGRAM 4.—*Index numbers of the general level of retail food prices in London, 1900-12.*

(Average 1900-10 = 100.)



The two series of general index numbers of wholesale food prices prepared by the Board of Trade and Mr. Sauerbeck respectively are given in the last two columns of the table. The numbers exhibit the same general trend as the retail figures, but they do not agree very closely with the retail figures, either in the direction or in the extent of change that they show from year to year.

Now that the Board of Trade have published the report of their inquiry into the cost of living in 1912¹⁵ it is possible to make a further comparison, as they give in the report the "predominant price" both in 1905 and in 1912 of the principal articles of food in the chief industrial towns of the United Kingdom. The changes that have taken place in the retail price of the different commodities in London as shown by the "cost of living" figures have been calculated and compared with the changes shown by the Board of Trade's ordinary retail index numbers, and with those found as a result of the present investigation.

TABLE.—LONDON. *Change in the retail price of certain articles of food between 1905 and 1912.*

Commodity.	Change according to the "cost of living" inquiries.	Change according to the Board of Trade retail prices index numbers.	Change according to the index numbers prepared during present investigation (all firms).
	Per cent.	Per cent.	Per cent.
English beef	+ 10	+ 11	+ 9.5
Foreign beef	+ 10	+ 29	+ 7.5
English mutton.....	+ 6	No change.	+ 2
Foreign mutton	+ 8	No change.	+ 2
Pork	+ 12	+ 5	+ 7
Bacon	+ 19	+ 22	+ 16
Butter	+ 10	+ 15	+ 7
Cheese	+ 19	+ 25	+ 15
Sugar	No change.	+ 3	- 6
Tea	- 1	- 5	No change.
Bread	+ 16	+ 10	+ 6
Flour	+ 14	+ 9	- 1
Milk.....	No change.	+ 2	+ 3
All the above commodities combined* }	+ 9.8	+ 10.2	+ 5.3

* Each commodity is weighted according to the extent to which it enters into the ordinary working-class consumption.

Except for three commodities, *i.e.*, bread, flour and sugar, the new index numbers do not differ markedly from the "cost of living" figures, although in every case, with the exception of milk, they show a smaller increase. On the other hand, for certain commodities the Board's retail index numbers differ very markedly from the "cost of living" figures, *i.e.*, foreign beef, English and foreign mutton, &c., but in some cases the change is too big and in other cases it is too small, so that when the different commodities

¹⁵ *Cost of Living of the Working Classes.* [Cd.-6955.]

are combined to give a general figure, the increase of 10·2 per cent. shown by these index numbers agrees very well with that of 9·8 per cent. shown by the “cost of living” figures. On the other hand, the proposed new index numbers give a change of only 5·3 per cent. This marked discrepancy is largely due to the relatively small increase for bread and flour shown by the new index numbers. It is quite possible that the new figure for flour is incorrect, because the returns obtained for 1905 were not all that could be desired, but it is hard to believe that this is the case with bread, since the figures are based upon reliable returns from firms which, for the most part, serve customers living in all parts of London. It should, however, be noted that the “cost of living” figures are based upon returns for October, 1905, and October, 1912, and that the other figures are based upon average prices for the two years in question. There was no significant movement of prices during 1905, so that the October figures for that year are probably very similar to the average figures; but 1912 was a year of rapidly rising prices, and consequently the prices obtained for the month of October were undoubtedly considerably higher than the average prices for the year. For this reason we should expect that the “cost of living” figures would show a bigger increase than either of the other two series of figures. As a matter of fact the Board’s retail index numbers point to a slightly bigger increase.

From the somewhat incomplete data obtained during this investigation, it does not seem possible to answer definitely the following questions which have been raised:—

(1) Is there a marked difference in the variation in the retail prices charged by different firms dealing with the same class of customer: (a) for any particular article; (b) for commodities as a whole? It does not necessarily follow that if (b) is true (a) must also be true. The returns for Firm Z in fact show that, whilst the change in the price of individual articles does not follow the general change, the change in the level of the prices as a whole does follow more or less closely the general change observed for the other firms.

(2) Is there a marked difference in the case of firms not dealing with the same class of customer?

(3) What is the connection between changes in retail and changes in wholesale prices?

In order to answer these questions at some future time weekly and monthly records of retail prices from a number of firms are at present being collected.

(b) *Working-class rents in London.*—The most satisfactory method of discovering the change that has taken place in working-

class rents over a given period is that used by the Board of Trade in their cost of living inquiries. For these inquiries records were obtained from a number of house agents of the change in the rent charged for the same house in a large number of cases. As it seemed improbable that a sufficient number of house agents would be willing to give this information to a private individual, another method was used for the present investigation. It is certainly a less exact method, but when it was used by the Board of Trade in an earlier investigation it gave results that agreed very well with those obtained by the first method.¹⁶ In this case the change in the average rateable value of houses rated at less than 50*l.* per annum was used, allowance being made for changes in rates. This method takes no account of changes in the accommodation, &c., provided, or of the substitution of one type of house for another, but it does give a rough indication of the way in which working-class rents are moving.

There has been no analysis of rateable values for London since 1901, but since the assessments for Inhabited House Duty are based upon the same assessments, and represent the rent at which any property might reasonably be expected to let, the landlord doing all repairs, the necessary information can be obtained from the reports of the Inland Revenue Commissioners. These reports give for each year the number and total value of all assessments of private dwelling-houses assessed up to 10*l.*, from 10*l.* to 20*l.*, from 20*l.* to 40*l.* per annum, and so on. For this paper the change in the average assessment of London houses assessed at less than 40*l.* per annum has been used. This may be rather too low a limit if we wish to be quite sure that we have included all working-class houses. On the other hand, if we extend the limit at all it will have to be up to houses of the rateable value of 60*l.* per annum, which will certainly include many houses that are not inhabited by the working classes.¹⁷

The following table gives the average assessed value of all dwelling-houses in London assessed at less than 40*l.* per annum (whether they are exempt from the payment of Inhabited House Duty or not),¹⁸ the average rates for London (excluding the City of London); and, finally, index numbers of the change in rents—(a) irrespective of changes in rates, and (b) when changes in rates are allowed for.

¹⁶ Second Fiscal Blue Book. [Cd.-2337], 1904.

¹⁷ The final result is practically the same if 60*l.* is taken as the limit.

¹⁸ Houses assessed at less than 20*l.* per annum are exempted from the payment of Inhabited House Duty. Rates have to be paid in all cases.

TABLE VII.—*Working-class rents in London, 1901-12.*

Year ending March 31.	Average assessment of dwelling houses assessed at less than 4 <i>ol.</i> per annum.	Average rates for London (in the £).*	Index numbers of changes in rents not including changes in rates.†	Index numbers of changes in rents including changes in rates.†
	£	<i>s.</i> <i>d.</i>		
1901.....	23	6 6·63	99	96
'02.....	23·2	6 9·28	100	98
'03.....	23·1	7 2·80	99	99
'04.....	23·2	7 2·93	100	100
'05.....	23	7 3·77	99	99
'06.....	23	7 6·00	99	100
'07.....	23·2	7 6·47	100	101
'08.....	23·3	7 4·47	100	100
'09.....	23·5	7 5·24	101	102
'10.....	} 23·3	{ 7 6·19	100	101
'11.....			100	101
'12.....	23·3	7 7·93	100	102

* Given for each year in *London Statistics*, published by the London County Council.

† Average 1901-11 = 100.

Owing to the delay in passing the Finance Act for 1909-10 the figures for 1909-10 are too small, and those for 1910-11 are correspondingly too big. Accordingly all assessments, &c., for the two years have been taken together and the mean used for both years.

No important changes in the law regarding assessments for Inhabited House Duty have been made, so that the figures are comparable from year to year, but the possibly disturbing effect of the following change must be considered. Up to the year 1907-08 an assessment might be made any time within one year of the year for which duty was due, but after 1907-08 this time was extended to "within three years." It had previously been the custom of the Commissioners to publish for any particular year the value of the assessments for that year, irrespective of the year in which the actual assessment was made. If this practice had been continued under the new regulations nearly four years would have had to elapse before their report for any year could have been published. In consequence of this after the year 1907-08 the amounts of all the assessments made in the year are given in the Annual Report, irrespective of the year to which the various assessments might relate.

The figures originally published for 1907-08 only represented

the assessments made in and for that year. They did not include the assessments made in 1907-08 for the year 1906-07 (which had appeared in the previous Report), nor did they include assessments made in 1908-09 for 1907-08 (which appeared in the next Report). In consequence of this the original figures for 1907-08 were too small, and in order that they might be compared with other years they were increased in subsequent Reports by the estimated amount which would have been included had they been compiled according to the old system. For years after 1907-08 the Commissioners give in their Annual Reports, as already stated, the assessments made within the year, irrespective of the year to which they applied. This alteration has a disturbing effect upon the year immediately following it, but otherwise the numbers obtained by the old method are probably comparable with those obtained by the new. Even if this is not the case when comparing one year with another the change cannot have had any effect upon the general trend of the figures, which is really what we are concerned with rather than the value for any particular year.

The almost steady increase in rents which appears to have taken place in London during the last ten years, as shown by the index number in the last column of Table VII, is surprising, as one hears on all sides of falling rents, due it is said to the large increase in the number of small houses situated in the surrounding suburbs.

It was possible in the case of St. Marylebone and St. Pancras to compare the rents paid in 1900 and in 1911 for the same houses in about 120 cases. It was found that if the index number for 1911 was taken equal to 100, that for 1900 was 101·8. The house agent who kindly allowed this comparison to be made stated that in 1911 the houses were in better repair and had additional conveniences.

It is doubtful, therefore, whether, in calculating the change that has taken place in rents, the increase in rates should have been taken into consideration. It is quite possible that, with a falling demand for houses, landlords have had to bear the increase in rates themselves without making any corresponding increase in rents, and that those index numbers in which no allowance has been made for changes in rates represent more correctly the true state of affairs. At the best the figures only afford a rough indication of the direction in which rents are moving, and do not necessarily show the exact extent of the change from year to year.

(c) *The cost of living.*—Finally, to obtain figures representing the change in the cost of living for the working classes, index numbers must be calculated which combine changes in retail prices with

changes in working-class rents.¹⁹ This has been done, and the results are given in the following table :—

TABLE VIII.—*Index numbers of the change in the cost of living in London for the working classes, 1900-12. (Average 1900-11 = 100.)*

Year.	Index numbers of retail food prices.	Index numbers of rent.*	Index numbers of the cost of living.†
1900.....	97·2	99	97·5
'01.....	97·1	100	97·8
'02.....	98·1	99	98·4
'03.....	98·1	100	98·6
'04.....	99·1	99	99·2
'05.....	100·2	99	100·0
'06.....	99·6	100	99·7
'07.....	99·3	100	99·5
'08.....	101·6	101	101·5
'09.....	102·5	100	102·1
'10.....	103·1	100	102·5
'11.....	103·8	100	103·1
'12.....	105·4	(100)‡	104·3

* Not including changes in rates.

† In obtaining these figures food has been given a weight of 4 and rent a weight of 1.

‡ Returns not yet available for this year. It has been assumed that no change has taken place since 1911.

II. *Changes in wages.*

The Labour Department of the Board of Trade publish each year two reports dealing with changes in wages : (1) *Standard Time Rates of Wages in the United Kingdom*, which gives the standard time rate of wages in force for certain occupations in the chief industrial towns of this country. (2) *Changes in Rates of Wages and Hours of Labour in the United Kingdom*, which gives any changes in standard rates that have taken place during the year, as well as any change in wages in trades for which there are no standard rates. In both cases the approximate number of workers affected by the change is given.

As Dr. Bowley and Mr. G. H. Wood have pointed out, these two Reports do not give sufficient information for the calculation of

¹⁹ The question of the change in the price of clothing and household utensils has not been dealt with owing to the great difficulty experienced in obtaining any data on this point, other than the personal impression of various retailers. Since, however, only a very small proportion of the working man's wages are spent in this way, the assumption that the price of these commodities has increased to the same extent as the price of food can only introduce a very small error.

accurate wage index numbers.²⁰ They show that for this purpose we ought to know : (1) The wages per hour, week, or piece of the ordinary wage earner and the number of hours, &c., worked during a unit of time ; (2) the change in the standard rates of wages and the number of hours, &c., worked during the period studied, and the relation between changes in standard rates and changes in actual earnings ; (3) whether there has been any movement from poorer to better paid trades or from poorer to better work inside any given trade or *vice versa* ; (4) whether for men paid by the hour a reduction in the number of hours means a corresponding reduction in earnings. We ought also to know whether changes in the wages in the special grades selected by the Board of Trade for the calculation of their wage index numbers are really representative of changes in wages of the trade as a whole. Many of these points can only be settled by a comparison between periodic wage censuses, and the first part of this section will deal with a comparison between the wage censuses for 1886 and 1906, published by the Board of Trade, in order to obtain, if possible, an answer to some of these questions.²¹ Unfortunately the building and engineering trades are the only two dealt with in sufficient detail in the earlier census to make this comparison possible.

(a) *A comparison between the wage censuses for 1886 and 1906.*²²

1. *The building trade.*—The 1886 wage census contains details of the “full time” earnings, &c., for one summer week of 4,388 employees, and the 1906 Report contains similar details of 50,836 employees. Owing to the great difference in the number of workers represented in the two inquiries, the Board state in the 1906 Report that the two results cannot be compared. The 1886 census was presumably based upon a small sample of the building trade, and with caution one should be able to compare it with the 1906 census, which was based upon a larger sample, and draw at least some deductions from such a comparison.

The 1886 census was not published until 1893, and contained for the building trade details of the “full time” earnings, &c., of 7,768 employees for one summer week in 1891, in addition to the information for 1886.

²⁰ “The statistics of wages in the United Kingdom during the nineteenth century (Part 14)”. *Journal*, 1906, p. 148.

²¹ When Dr. Bowley and Mr. G. H. Wood published the paper already referred to the wage census for 1906 was not published.

²² *Rates of Wages Paid in the United Kingdom in 1886.* [Cd.-6889.] *Report of an Enquiry by the Board of Trade into Earnings and Hours of Labour of Workpeople of the United Kingdom in 1906.* [Cd.-5086.] [Cd.-5804.]

The Board of Trade wage index numbers for the building trade, published in the *Annual Abstract of Labour Statistics*, are based upon the change in the unweighted average of the standard time rate of wages of bricklayers, masons, and carpenters and joiners in the chief industrial towns in the United Kingdom, and accordingly are a measure of the change in the standard rates of these grades in the country as a whole. For comparison with this, the corresponding change in average "full time" earnings for these grades was calculated from the three wage censuses. The results obtained both for the United Kingdom and for London are as follows:—

TABLE IX.—*Changes in standard rates of wages and in actual earnings for bricklayers, masons and carpenters and joiners. (Full time for one summer week.)*

	1886.	1891.	1906.
United Kingdom—			
(a) Change in standard rates per hour	84.5	88	100
(b) Change in average earnings	93	97	100
London—			
(a) Change in standard rates per hour*	86	86	100
(b) Change in average earnings	93	89	100
(c) Change in standard weekly rate*....	90	90	100

* Taken from *Standard Time Rates of Wages in the United Kingdom.*

From this we see that in both cases standard rates per hour increased at a faster rate than average "full time" weekly earnings. This can be accounted for, to a certain extent, by the fact that between 1891 and 1906 a reduction was made in the number of hours that constituted a "full week." This caused a corresponding reduction in the "full time" earnings for 1906, making the change in average earnings appear to be smaller than the change in standard rates. It is probable that had we been comparing changes in average earnings of all workers, and not of "full time" workers only, we should have found a better agreement, as one is generally lead to suppose that a reduction in the hours of labour makes little difference in the long run in average weekly earnings; the reduction in the earnings of some workers being compensated for by the fact that for other workers overtime—for which they are paid at a higher rate—becomes more common. It was possible to obtain index numbers for London based upon the change in standard *weekly* wages, and the figures are given in the last line of Table IX. It will be seen that they agree fairly well with the index numbers based upon changes in average earnings, although they still show a somewhat larger increase.

It should be noted that the Board, in basing their yearly wage index numbers upon changes in standard rates of wages, tacitly assume that all the workers receive the increased rate, which, as an inspection of Tables A and B (see Appendix) will show, is certainly not the case. To take a single example, during 1900, the standard rate of carpenters and joiners in London was increased by $\frac{1}{2}d.$ per hour, and according to the Board of Trade only 20,000 workers received this increased rate, although there are approximately 30,000 carpenters and joiners over 20 years of age working in London. This may be an additional reason for the discrepancy between the two series of figures.

To discover whether the Board of Trade are justified in regarding changes in the wages of bricklayers, masons and carpenters and joiners as representative of changes in wages in the whole trade, we must discover whether, for the period 1886-1906, the average earnings of bricklayers, &c., changed, according to the three wage censuses, to the same extent as the average earnings of the whole trade for a constant distribution of workers in the trade. It is necessary to take a constant distribution of workers in order that any change in average earnings due to movement inside the trade from poorer to better paid work, or *vice versa*, may be eliminated. It is immaterial which distribution of workers is chosen as a standard, and in calculating the figures given in the following table the distribution of workers, given in the 1906 census for London and the United Kingdom respectively, has been used.

TABLE X.—*Change in average earnings for the whole building trade.*
(Full time for one summer week.)

	1886.	1891.	1906.
United Kingdom—			
(a) Change in actual earnings as shown by the three wage censuses	90	92	100
(b) Change in earnings for a constant distribution of workers (1906 distribution).....	91	96	100
London—			
(a) Change in actual earnings as shown by the three wage censuses	91.5	89	100
(b) Change in earnings for a constant distribution of workers (1906 distribution).....	90.5	90.5	100

The figures given in the table show that, for a constant distribution of workers, the change in average earnings for the whole of the building trade was very similar to that found already for

bricklayers, &c., only²³ (see Table IX). This is a little unexpected. The bricklayers, &c., are certainly better organised than the bulk of the workers in the trade, and it is therefore surprising that their wages should not have increased at a faster rate. *A priori*, one would have been inclined to criticise the selection of these three grades by the Board of Trade as representative of the building trade on these very grounds, but certainly the evidence afforded by these figures appears to justify such a selection.

As "full time" earnings have been used throughout, it is impossible to determine the change, if any, in the amount of "time lost" in the three years. Changes in earnings due to changes in the amount of employment will be dealt with separately.

The wage census figures for London for the two earlier years are based upon so few returns that one would not be inclined to place any reliance upon them were it not for the fact that they show the same general tendencies as those for the United Kingdom.²⁴

The result of the comparison between the three censuses may be summarised as follows :—

(1) The change in average earnings of bricklayers, masons and carpenters and joiners may be taken as representative of changes in average earnings of the building trade as a whole. When calculating the change in wages in this trade from 1900 to 1912, therefore, the changes in wages in these three grades will be taken as representative of the whole trade.

(2) The actual earnings per week of "full time" workers in these three grades have not increased as fast as have their standard rates of *wages per hour*, owing largely to the fact that during the period a substantial reduction in the number of hours constituting a "full week" took place. In the case of London it was found that there was not a very significant difference between changes in *weekly* earnings and changes in *weekly* standard rates.

(3) For the engineering trade a method is described for calculating the change in average earnings due to movement inside the trade the validity of which depends upon the assumption that the different wage censuses are based upon representative samples of the trade under consideration. In view of the warning of the Labour Department that for the building trade the results of the

²³ The change in average earnings of bricklayers, &c., for a constant distribution of these grades of workers is the same as the change shown in Table IX, owing to the fact that in this case the earnings of the different workers are practically identical.

²⁴ The actual numbers are : 1886 262 employees ; 1891, 1,042 employees ; 1906, 7,012 employees.

three censuses cannot be compared, one is certainly not justified in making this assumption, and consequently in this case movement inside the trade cannot be dealt with.

2. *The engineering trade.*—The 1886 wage census gives details of full time earnings, &c., of about 54,000 employees, and the 1906 census gives similar details of about 113,000 employees. The Labour Department say nothing in this case of the two reports not being comparable.

The Board's wage index numbers for this trade, published in *Annual Abstract of Labour Statistics*, are based upon the unweighted mean of the standard time rates of wages in the chief industrial towns of the United Kingdom of the following grades—fitters, turners, ironfounders and patternmakers, and accordingly give a measure of the change in standard time rates of these grades for the United Kingdom as a whole. For comparison corresponding figures showing the change in average earnings for time and piecework for the same grades were obtained from the two wage censuses. Since a large number of these men are employed at piecework (for which higher wages are paid than for timework), and since there has been a movement during the period from time to piecework, average earnings have increased from this cause alone. To eliminate this the change in average earnings has been calculated for a constant distribution of workers. The change in average earnings for timework only has also been calculated from the two wage censuses. The results obtained are given in the following table:—

TABLE XI.—*Changes in standard rates of wages and in average earnings of fitters,* turners, ironfounders and patternmakers. ("Full time" for a selected week.)*

	1886.	1906.
United Kingdom—		
(a) Change in standard weekly time rates	89	100
(b) Change in average earnings (time and piece-work†) for a constant distribution of workers	84	100
(c) Change in average earnings (time work only)	84·5	100
London—		
(a) Change in standard weekly time rates	97	100
(b) Change in average earnings (time and piece-work†) for a constant distribution of workers	94	100
(c) Change in average earnings (time work only)	93	100

* Erectors were grouped with fitters in the 1906 census, and have accordingly been included with them in 1886. Their number is very small compared with that of the fitters.

† Since there were no "bonus" workers in 1886 they have been omitted for 1906 also. They form less than 4 per cent. of all workers.

The standard rates for London were obtained from *Standard Time Rates of Wages in the United Kingdom*, the rates for the different grades being weighted according to the relative numbers employed, as shown for London in the wage census for 1906.

On examining the figures given in the above table we see that average earnings have increased faster than standard rates, both for London and the United Kingdom, even when the increase due to movement from "time" to "piecework" is deducted. This is very unexpected, although a possible explanation may lie in the fact that the membership of the various trade unions concerned has increased enormously during the period, so that year by year an increasing proportion of the workers receive the standard rate instead of a lower rate of wages, thus producing an increase in average earnings quite apart from any increase in standard rates. We also see that average earnings for "time" and "piece" work have increased at practically the same rate as average earnings for "time" work only.

The change in average earnings for the whole of the engineering trade, for a constant distribution of workers, was calculated from the two wage censuses. The figures obtained, both for London and for the United Kingdom, were very similar to those already obtained when fitters, &c., only were considered. It was difficult to determine the change in average earnings for a constant distribution of workers, because for this trade the classification of occupations was very different in the two censuses. This difficulty was overcome to a certain extent with the help of an engineer with a very large experience of the trade, who very kindly condensed the 1886 report to correspond with the report for 1906. The actual results obtained are as follows:—

TABLE XII.—*Change in average "full time" earnings for the whole of the engineering trade. ("Full time" for a selected week.)*

	1886.	1906.
United Kingdom—		
(a) Change in average earnings	79	100
(b) Change in average earnings for a constant distribution of workers (1906 distribution).....	83	100
London—		
(a) Change in average earnings	86.5	100
(b) Change in average earnings for a constant distribution of workers (1906 distribution).....	91	100

To obtain the change in average earnings due to a movement having taken place from poorer to better paid work inside the trade, as shown by the two wage censuses, the average earnings of all those

working at the trade for the two years was determined, using the percentage of workers employed at the different occupations actually given in the two reports, but keeping the wage for any given occupation the same in the two cases. In these circumstances any change found in the two averages must be due to a movement having taken place from occupation to occupation inside the trade. In working out the results given in the following table the "full time" wages for 1906 were used :—

TABLE XIII.—*Change in average earnings in the engineering trade due to movement from occupation to occupation inside the trade. ("Full time" for a selected week.)*

	1886.	1906.
United Kingdom	95	100
London.....	95·5	100

If we could assume that the wage censuses for the two years were based upon thoroughly representative samples of the engineering trade, we could use these results to correct for movement inside the trade index numbers originally calculated on the assumption that the distribution of workers had remained unchanged. Although the samples used for the engineering trade were undoubtedly more representative than those used for the building trade, one is probably not justified in regarding them as truly representative, so that the index numbers which have been calculated both for the building and engineering trades for the period 1900-12 have not been corrected for movement inside the trade, and are, therefore, to this extent incorrect.

The results of the comparison between the two wage censuses may be summarised as follows :—

(1) The change in average earnings of fitters, turners, iron-founders and patternmakers for timework is representative not only of changes in the earnings of all the workers in these grades, but also of changes in earnings of all the workers in the engineering trades. When calculating the change in wages in this trade from 1900 to 1912, therefore, the index numbers will be based upon changes in wages in these four grades.

(2) Actual earnings have increased at a somewhat faster rate than standard rates of wages, both for the United Kingdom and for London.

It is not possible to obtain information of the relation between changes in standard rates and actual earnings, &c., for any other trades. In all other cases, therefore, we shall have to rely upon the

information as to changes in standard rates, &c., given in the various annual publications of the Board of Trade.

No conclusion has been reached as to the probable effect of a reduction in the hours of labour upon workers paid by the hour. It is generally stated that such a reduction has very little effect when the wages of all workers are considered. For the purpose of this paper it will be assumed that this is so, and no allowance will be made for any reduction in the hours of labour that may have taken place.

Change in average earnings due to movement from trade to trade.—No information can be obtained of any change in average earnings owing to a movement from trade to trade for the period under discussion, since the report of the population Census for 1911 containing details of occupations is not yet published. If, however, we take the relative numbers employed at the nine trades used in the present paper, as given in the population Censuses for 1891 and 1901 respectively, and treat movement from trade to trade in the manner already described for movement from occupation to occupation inside a trade (*i.e.*, the engineering trade), we find that during this period practically no change took place in the average wage of these workers due to this cause. We shall, therefore, assume that the same is true for the period 1900 to 1912. The details upon which this calculation is based are given in the following table :—

TABLE XIV.—*Change in average wage in the Administrative County of London due to movement from trade to trade, 1891-1901.*

Occupation.	Number employed, 1891.	Number employed, 1901.	Average wage for London, 1906.
Building trade	115,600	149,960	36·25*
Engineering trade	20,690	53,710	36·75*
Carters and carriers	43,680	60,510	26·00†
Railwaymen	18,530	28,870	25·96‡
Tailors.....	24,470	31,390	34·83§
Cabinet makers, French polishers and upholsterers }	27,810	28,140	35·50*
Boot and shoe makers	31,460	24,590	28·25*
Dock and wharf labourers	14,560	19,710	27·08
Compositors	16,850	17,480	39·00†
Average wage of all workers	33·0s.	33·1s.	

* Average earnings of "all workers" in London (1906 wage census).

† See p. 51.

‡ Average wage of "all workers" in England and Wales.

§ Average earnings of "all workers" in the United Kingdom (1906 wage census).

|| 50 hours per week at 6½d. per hour.

(b) *Changes in the wages of male manual workers in London, 1900-12.*—Any change in wages reported to the Labour Department of the Board of Trade is published yearly in *Changes in Wages and in the Hours of Labour in the United Kingdom*. In Tables A and B (see Appendix) will be found for certain trades all the changes that have taken place in London during the period under discussion, together with the number of workers stated to have been affected by the change; and where possible for comparison the corresponding change in standard rates of wages, which have been taken partly from *Standard Time Rates of Wages in the United Kingdom* and partly from *Annual Abstract of Labour Statistics*. There is also given in each case the number of workers who should have received the increased wage had it been universal. In many cases the standard rate has been increased by the whole amount of the change, although only a proportion of the workers received the new rate. The Board base their wage index numbers upon changes in standard rates, and in view of this fact it seems possible that they may show too large an increase from year to year.

Since changes in wages tend to concentrate to a large extent in definite years, unless care is taken to include these years in any period that may be selected very misleading results may be obtained. In the present case, important changes took place in 1900, 1911 and 1912, so that the period under discussion includes the latter changes. Index numbers for 1899 have, however, been prepared to indicate the change that took place between 1899 and 1900.

Information of changes in wages sufficiently reliable and detailed to allow of the calculation of a wage index number is only available for nine groups of workers. Strictly speaking, therefore, the final wage index numbers obtained only apply to these particular workers. In the case of the Administrative County of London the information with regard to occupations given in the population Census for 1901 is sufficiently detailed to enable us to calculate what proportion of all the manual workers in the area are employed in the nine selected trades. There are, speaking very roughly, about 921,000 employed male manual workers in the county of London,²⁵ and of these about 450,000 are engaged in the nine trades in question, that is to say, the wage index numbers obtained apply directly to about one-half of all the manual workers in London.

Two series of index numbers have been calculated, based upon the data given in Tables A and B.

Series A.—Based on the assumption that all the workers eligible

²⁵ This is only a very rough approximation. In many cases it is not possible to say with any certainty whether persons included under certain headings are manual workers or not.

received any increase in standard rates that may have taken place in the course of a few years after the change; that is to say, the index numbers are based upon changes in standard rates. These index numbers will, on the whole, show too large a change from year to year. As there are no generally recognised standard rates in certain of the selected trades, index numbers for this series could not be calculated in these cases.

Series B.—Based upon the assumption that any increase in wages was only received by the number of workers stated by the Board to have been affected by the change. These index numbers are obtained by comparing year by year the total wage bills for London for the different industries. The increase in the total wage bill from year to year is obtained by multiplying any increase in wages that may have taken place by the number of workers stated to have been affected by the change. These index numbers will, on the whole, show too small an increase.

To obtain the total wage bill for any occupation or trade it is necessary to know not only the average wage for the trade but also the approximate number of workers. In some cases the former can be obtained from the 1906 wage census, which gives not only the average wage of those working full time, but also of all workers whether working full time or more or less than full time. As we wish to deal with the whole trade it is the latter figure which will be used. For trades not dealt with in the wage census, details of the average wage have been obtained from various sources, which will be referred to in the short notes about the individual trades after Table XV.

The changes in wages stated by the Board as having taken place in "London," include changes that have taken place not only in the Administrative County but also in the area known as "Extra London," which areas together make up "Greater London." It is, however, not easy to obtain the approximate number of workers in the different trades since "Greater London" is not treated as a single area in the census. Full details of the number of persons engaged in the different occupations living in the Administrative County, and almost as full details for the county of Middlesex (the whole of which is included in Greater London), can be obtained from the population Census for 1901, but it is only possible to obtain very scanty data for the metropolitan areas of Essex, Surrey, Kent and Herts, which are included in the returns for their respective counties. For these areas it is possible to obtain the number of persons living in the urban and rural districts, but details of occupations could only be obtained for persons living in urban districts of more than 5,000

inhabitants. Fortunately the number of persons in Greater London living in rural districts is relatively very small. Even for the urban districts, however, we do not know the number of persons following any particular occupation, as the returns are only classified under main headings; we know, for example, the number engaged in the "Conveyance of men, goods and messages," but we do not know what proportion of these are "carters or carriers" or "railwaymen." In these circumstances it is assumed that in every case the proportion for the metropolitan area is the same as for the county as a whole, for which detailed information is available. Any error this assumption may introduce will not have any marked effect upon the final figures since a large proportion of the workers in Greater London live either in the Administrative County or in Middlesex.

For our present purpose we are only concerned with the number of male adult employees in any given trade or occupation; we do not wish to include: (1) employers and men who are working on their own account; or (2) workers under 20 years of age, who are mostly apprentices or learners, since these classes of workers are not eligible for any increase in wages that may take place. For the Administrative County of London the number of adult employees in the different trades can be obtained from the population Census for 1901. For the other metropolitan areas, however, this information is not available. For these areas the required figures were obtained by making the following assumptions:—(1) That for trades dealt with in the 1906 wage census the proportion of adult workers is the same as that given for London in the Census report. (2) That for trades not dealt with in the wage census the proportion is the same as for the Administrative County. (3) That for all trades the proportion of the adults who were employed persons is the same as for the Administrative County. An example will perhaps make this clearer:—

Number of employed persons in the building trade in Greater London in 1901.

Number of workers in the Administrative County of London.....	149,960
Number of adult workers in the Administrative County of London	136,700
Number of employed adults in the Administrative County of London.....	123,970
Proportion of all adults in the building trade who were employees in the Administrative County of London	90·7 per cent.
Number of workers in Extra London.....	87,220
Proportion of all workers who are adults (1906 wage census)	94 per cent.
Therefore—	
Number of adults in Extra London	81,950
Number of employed adults in Extra London.....	74,320
Number of employed adults in Greater London	198,290

Having obtained the number of adult workers in any given trade, it now remains to discover how many of these workers are engaged at a particular occupation. Although we have to use the population Census for determining the number of persons engaged at a given trade, it was found to be so inaccurate in assigning these workers to their respective occupations, that for this purpose the 1906 wage census was used instead. According to the population Census, for example, 20 per cent. of all workers in the engineering trade are either blacksmiths or blacksmith's strikers, while according to the wage census the proportion is only 6.6 per cent. I have consulted several engineers, who all say that 20 per cent. is an impossible figure and that they would estimate the proportion to be about 6 per cent. To find, therefore, the number of workers engaged in any particular occupation, *i.e.*, the number of bricklayers in the building trade, it was assumed that the proportion was the same as that found for London from the wage census for 1906.

The index numbers obtained are given in Table XV (see Appendix), and the details of the source of the data, method employed in working out the figures, &c., are given for each trade after the table. In all cases the index numbers are based upon the changes in wages given in Tables A and B.

General index numbers for Series A and B respectively have been prepared, and taking the mean of these two series as the final figures, we see that between 1900 and 1910 wages remained almost stationary, although during the same period the cost of living increased by 5 per cent. Wages certainly advanced during 1911 and 1912, but not sufficiently to compensate for the increase in prices, for, taking the whole period 1900 to 1912, while the cost of living increased by 7 per cent., wages only increased by a little over half that amount.

The index numbers given in the last line of Table XV make no allowance for any change that may have taken place in the number of workers who were unable to find employment from year to year, and it now remains for us to make the necessary alterations. Index numbers showing the level of employment from year to year for five of the nine trades used in calculating the wage index numbers have been taken from a recent paper by Dr. Bowley, and a general index number has been calculated by weighting the different index numbers according to the number of workers engaged in the particular trades in Greater London (see Table XVI in Appendix) It should be noted that Dr. Bowley's index numbers apply to the whole of the United Kingdom and not only to London.

The wage index numbers given in Table XV represent the

relative wage received year by year by the workers, and the index numbers for employment the change in the relative number of workers who received these wages, so that by multiplying together the corresponding figures for the different years we shall obtain a series of figures representing the change in the wages of manual workers, allowing each year for the number of workers who received no wage at all on account of unemployment. The results of these calculations are given in the last column of Table XVI.

III. Changes in "real wages."

The "cost of living" index numbers given in Table VIII represent the change that has taken place in the purchasing power of money during the period under consideration, and the wage index numbers given in the last column of Table XVI, the change in the amount of money received by the workers. To obtain, therefore, figures to show the change in "real wages," the wage index number for each year must be multiplied by the reciprocal of the corresponding index number of the "cost of living." In this way the following figures were obtained:—

TABLE XVII.—LONDON. *Index numbers showing the change in real wages, 1900-12. (Average 1900-11 = 100.)*

Year.	"Real wages."	Year.	"Real wages."	Year.	"Real wages."
1900	106·4	1905.....	98·4	1909.....	92·8
'01	106·4	'06.....	100·4	'10.....	96·2
'02	104·2	'07.....	100·4	'11.....	100·4
'03	102·5	'08.....	93·2	'12.....	100·4
'04	99·3				

The figures given in the table show that over the whole period there has been a marked diminution in "real wages," for although from 1909 to 1912 they increased by about 8 per cent., the decrease from 1900 to 1909 amounted to about 13 per cent.

Consumption per head.

An index number showing the change in "consumption per head" of the various articles of food by the working classes should give a very good measure of the change in working-class prosperity, since "consumption per head" is affected not only by the condition of retail prices, but also by the amount of average weekly wages.

The Board of Trade, in their *Annual Abstract of Labour Statistics*, give for each year the "consumption per head" of certain of the

principal articles of food by the population of the United Kingdom as a whole. These figures are given in the form of index numbers in Table XVIII (see Appendix). The original figures were obtained by dividing the total amount of the various commodities consumed in this country by the population. The index numbers, therefore, appear to give the change in "consumption per head" of the whole population, whereas, since the consumption of the more important articles of food is practically constant in the case of persons with incomes over a certain limit, there is actually in this table, spread over the whole population, a change which is almost entirely confined to the working classes. Although these figures, therefore, inevitably show the direction of any change that has taken place, the actual change in consumption of the staple articles of food by the working classes is always greater than is indicated.

The two series of general index numbers of consumption per head given in Table XVIII were obtained by using two systems of weights—the first based upon the relative amounts spent on the different commodities by the whole population, and the second upon the relative amounts spent by the working classes, *i.e.*, the same system of weighting as that used for the calculation of the general index numbers of retail prices. The two series of figures do not differ from one another very markedly. The differences that do occur are mainly due to the fact that, in the first system of weighting, meat is given a larger weight and flour a smaller weight than in the second case. Since the figures for consumption per head are concerned with the whole population, the first system of weighting seems to be the more appropriate, and accordingly the first series of general index numbers given in the table will be used for comparison with those for "real wages." On the whole these figures show that since 1900 there has been a decrease in the amount of certain of the principal articles of food consumed per head of the population, and this fact is in agreement with the result already obtained with regard to the change in "real wages."

Beer and tobacco were not included in calculating the general figures, since in the former case the decrease in consumption may well be due to a spread of temperance principles, while in the latter case the wealthier classes may be largely responsible for the increase in consumption that has taken place.

Commodities such as wool and cotton were also not used for the purpose of this calculation, since only a very small proportion of the working man's wages are spent on them. Moreover, the change in "home consumption" in this case is probably largely due to the change in the spending power of the wealthier classes,

for although the amount consumed never drops below a certain limit, it undoubtedly increases with increasing wealth.

The "consumption per head" figures refer to the whole of the United Kingdom, and so, strictly speaking, should not be compared with figures for "real wages" for London only. Unfortunately this is inevitable, as it is impossible to obtain figures for "consumption per head" for London only.

Conclusions.

The results obtained under the various sections have been summarised in the following table, which gives—(1) the change in retail food prices; (2) the change in the cost of living; (3) the change in wages; (4) the change in "real wages," and, finally, the change in "consumption per head" of certain of the principal articles of food.

TABLE XIX.—*Table of final index numbers, 1900-12.*
(Average 1900-12 = 100.)

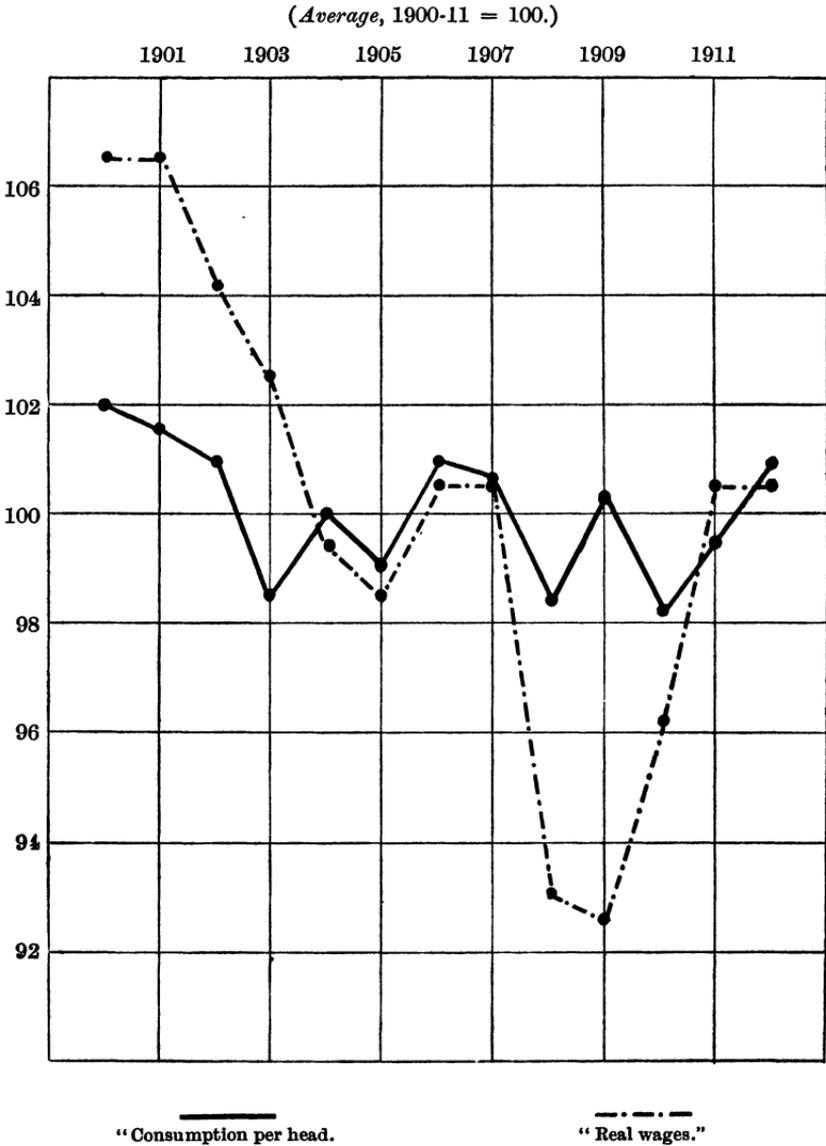
Year.	Retail food prices (London).	Cost of living (London).	Wages* (London).	"Real wages" (London).	Consumption per head (United Kingdom).
1900	97·2	97·5	103·7	106·4	102·0
'01	97·1	97·8	104·1	106·4	101·7
'02	98·1	98·4	102·5	104·2	100·9
'03	98·1	98·6	101·1	102·5	98·5
'04	99·1	99·2	98·5	99·3	100·0
'05	100·2	100·0	98·4	98·4	99·0
'06	99·6	99·7	100·1	100·4	100·8
'07	99·3	99·5	99·9	100·4	100·5
'08	101·6	101·5	94·6	93·2	98·3
'09	102·5	102·1	94·7	92·8	100·3
'10	103·1	102·5	98·6	96·2	98·2
'11	103·8	103·1	103·5	100·4	99·6
'12	105·4	104·3	104·7	100·4	100·8

* Including change in the amount of employment.

According to the present investigation between 1900 and 1912 retail prices in London increased by about 8 per cent. The Board of Trade, on the other hand, estimate the increase at about 15 per cent. The index numbers by Dr. Bowley for the years 1900-10 agree with the figures obtained as a result of the present investigation. Both these series of figures show a distinctly smaller increase in prices than the Board's figures for the same period.

During this period wages have not kept pace with prices, even when the increase which took place in 1912 is included. While the

DIAGRAM 5.—*Index numbers of "real wages" of the working classes in London and of "consumption per head" for the whole of the United Kingdom, 1900-12.*



cost of living increased by 7 per cent., wages, when changes in the amount of employment are taken into consideration, only increased by about 1 per cent. In other words, taking the period as a whole, "real wages" in London show a marked decrease. Between 1900 and 1909 they dropped by about 13 per cent., and between 1909 and 1912 rose by about 8 per cent, with the net result that for the whole period they actually dropped by about 6 per cent.

The index numbers for "consumption per head" confirm these results. The two series of figures are plotted on Diagram 5, and we see that, with the exception of the years 1903 and 1909, the two series agree in the direction of the change from year to year, although in all cases the "consumption per head" figures show much smaller fluctuations. It will be remembered that earlier in this paper it was pointed out that "consumption per head" figures only show the direction and not the full extent of the change in the spending power of the working classes.

The purpose of this inquiry was to discover to what extent the prosperity of the working classes in London had changed during recent years. The results obtained show that there has been a substantial increase in the cost of living, which has not been accompanied by a correspondingly large increase in wages. If the Board's figures for the change in retail prices are taken in preference to those obtained during the present investigation, the discrepancy between increase in the cost of living and the increase in wages is still more marked.

Before concluding this paper I wish to express my thanks to the numerous firms and private individuals who have kindly supplied me with information, and especially to Dr. M. Greenwood for the very valuable advice he has given me during its preparation.

APPENDIX.
TABLE I.—LONDON. Index numbers showing the change in the retail price of various articles of food
for individual firms, 1900-1912. (1911 = 100.)

Commodity.	Firm.	Data upon which the index numbers are based.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	
Meat— English beef	Group I—Firm A	Average price per lb. of following: rump, loins, fore ribs, top ribs, top sides	—	—	102 ^a	94*	94*	95*	92·5*	92·5*	92·5*	92·5*	96*	100*	102*	
	Group II—Firm B	Average price per lb. of all joints quoted in yearly catalogues or weekly price lists ^b	87	89	—	94	94	95	99	99	98·5	98·5	100	100	100	
	Group II—Firm D	Average price per lb. of following: ribs for rolling, silverside, beef steak, rump steak, thick flank, thin flank, shin with bone	90	—	91	98	—	—	—	—	—	—	—	100*	100*	104*
	Group II—Firm E	The same as in the case of English beef	—	—	—	91	—	—	—	—	—	—	—	100*	100*	103*
	Group II—Firm F	The same as in the case of English beef	87	—	91	91	—	—	—	—	—	—	—	100*	100*	104*
	Group I—Firm A	Average price per lb. of following: leg, loin, shoulder	—	104	111	97	97	97	97	96	96	99	99	109	100	106*
	Group II—Firm B	Average price per lb. of all joints quoted in yearly catalogues or weekly price lists ^b	98	—	102	105*	102*	102*	100*	107*	107*	107*	105*	105*	100*	104*
	Group II—Firm D	Average price per lb. of following: leg, shoulder, best end of neck, scrag end of neck, chops, breast	—	112	126	109	106·5	106·5	106·5	109	109	95	101	102	100	109
	Group II—Firm E	The same as in the case of English mutton	—	—	—	100*	100*	100*	100*	100*	100*	100*	100*	100*	100	97*
	Group II—Firm F	The same as in the case of English mutton	95	100	—	99·5	102	102	102	102	102	101	99	100	100	102
Foreign mutton	Group I—Firm A	Average price per lb. of following: leg, shoulder, best end of neck, scrag end of neck, chops, breast	97	—	99	99	—	99	—	—	—	—	—	100*	103*	
	Group II—Firm B	The same as in the case of English mutton	—	103	106	102·5	105	105	104	104	104	100	102	100	106*	
	Group II—Firm D	The same as in the case of English mutton	82	—	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	100*	101
	Group II—Firm E	The same as in the case of English mutton	87	93	—	96	97	97	97	95	95	94	94*	100*	100*	100*
	Group II—Firm F	The same as in the case of English mutton	—	—	94	94	—	—	—	—	—	—	—	100*	100*	101*
	Group I—Firm A	Average price per lb. of following: leg, shoulder, best end of neck, scrag end of neck, chops, breast	—	93	95	100	102	102	98	—	100	102	98	102	100	101*
	Group II—Firm B	The same as in the case of English mutton	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Group II—Firm D	The same as in the case of English mutton	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Group II—Firm E	The same as in the case of English mutton	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Group II—Firm F	The same as in the case of English mutton	—	—	—	—	—	—	—	—	—	—	—	—	—	—

^a Index numbers marked with an asterisk are based upon an average price for the year.

^b Keeping the joints the same throughout the period.

^c In September of 1911 the quality of the foreign beef sold by this firm was changed; a poorer quality than that sold in the earlier years of the period being substituted. A similar change took place in the case of the other firms about the middle of the period.

TABLE I.—LONDON. *Contd.*—Index numbers showing the change in the retail price of various articles of food.

Commodity.	Firm.	Data upon which the index numbers are based.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	
Pork.....	Group I—Firm A	Average price per lb. of following: loin, leg, shoulder Average price per lb. of all joints quoted in yearly catalogues or weekly price lists Average price per lb. of following: leg, fore loin, belly chops.....	—	—	96*	96*	96*	96*	98*	98*	98*	102*	106*	100*	106*	
	Firm B		—	—	—	—	—	100	100	100	98	97	100	100	100	100
	Group II—Firm E		99	107	—	—	—	—	—	—	—	—	—	—	100*	104*
	Firm Z		—	—	—	—	—	—	—	—	—	—	—	—	—	—
Bacon	Group I—Firm A	Average price per lb. of following: collar, back, streaky.....	—	96	100	95	93·5	92	97	93·5	95	96	104	100	97*	
	Firm B		—	85*	85*	75*	71*	88*	85*	80*	80*	88*	100*	105*	100*	102*
	Firm C		—	—	—	—	—	—	—	89	92	90	100	105	100	102
Butter	Group II—Firm D	Average price per lb. of following: collar, back, streaky.....	87·5*	90*	87·5*	87·5*	83*	85*	90*	85*	83*	86*	99*	100*	93·5*	
	Firm F		—	—	—	—	—	—	99	—	98	101*	97*	100*	108*	
	Firm Z		—	—	83	82	82	82	82	82	83	85·5	88	107	100*	103*
	Group I—Firm A		—	97	97	97	97	97	97	95	88	100	102	122	100	106*
Canadian cheese	Firm B	Average price per lb. of following: Danish and "selected".....	89*	89*	86*	86*	79*	86*	86*	90	88	88	86	86	100	96*
	Firm C		100*	100*	100*	96*	96*	100*	100*	100*	100*	100*	100*	100*	100*	100*
	Group II—Firm D		—	—	86	80	89	89	89	86	86	94	89	89	100*	100*
	Firm Z		75*	75*	75*	81*	69*	87·5*	87·5*	87·5*	94*	94*	87·5*	87·5*	100*	100*
Canadian cheese	Group I—Firm A	Price per lb. of Canadian cheese	93·5	93·5	—	93·5	87·5	93·5	93·5	97	93·5	100*	100*	100*	100*	
	Firm B		91	91	86	91	80	91	80	94	97	97	97	100*	100*	
	Group II—Firm D		88	88	88	94	82	88	100	100	100	100	100	100	100*	104*
	Firm Z		—	82	82	82	76·5	88	94	94	94	94	94	88	100	109*

TABLE I.—LONDON. *Contd.*—Index numbers showing the change in the retail price of various articles of food.

Commodity.	Firm.	Data upon which the index-numbers are based.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	
Sugar	Group I ^a —Firm A	Average price per lb. of following: loaf, granulated, Demerara.....	68*	71*	73·5*	73·5*	76·5*	85*	73·5*	76·5*	68*	73·5*	76·5*	100*	82*	
	Firm B	Average price per lb. of all qualities quoted in yearly catalogues.....	—	—	—	—	—	—	81	83	78	78	78	100	84	
	Firm C	Average price per lb. of following: loaf, white granulated, Demerara, and yellow crystals.....	64*	64*	75*	68*	68*	104·5*	—	77*	75*	75*	68*	100*	100*	80*
	Group II—Firm D ^e	Average price per lb. of following: loaf, granulated, Demerara.....	93	100	—	89	96	111	100	100	—	100	96	100	100	119*
	Firm E	Average price per lb. of all qualities quoted in yearly catalogues or weekly price lists.....	75·5	—	80	76	88	88	88	88	88	84	85	93	100*	97*
	Firm F	Average price per lb. of all qualities quoted in yearly catalogues or weekly price lists.....	—	—	84·5	89	—	—	120	96	96	97	90	103	100*	111·5*
	Firm Z	Average price per lb. of following: loaf, white granulated, Demerara.....	—	73	62	70	78	76	76	76	78	68	68	86·5	100	85·1
	Group I—Firm B	Average price per lb. of all qualities quoted in yearly catalogues.....	—	—	—	—	—	—	—	100	100	100	100	100	100	100
	Group II—Firm D	Price per lb. of Rangoon rice	—	—	—	—	—	—	—	100	100	100	100	100	100	100
	Firm E	Average price per lb. of all qualities quoted in yearly catalogues or weekly price lists.....	100	100	—	—	—	—	—	100	—	100	100	100	100	100*
Tea	Group I—Firm A	Average price per lb. of all qualities sold.....	98	98	98	98	—	98	98	98	100	100	100	100*	104*	
	Firm B	Average price per lb. of all qualities sold.....	113*	113*	113*	107*	120*	100*	100*	100*	100*	100*	100*	100*	100*	100*
	Group II—Firm D	Average price per lb. of the two cheapest qualities sold.....	97	97	97	97	116	100	100	100	100	100	100	100*	100*	
	Firm Z	Average price per lb. of all qualities quoted in yearly catalogues or weekly price lists.....	100*	100*	100*	100*	103*	103*	108*	108*	97*	109*	112·5*	104*	100*	100*
	Group I—Firm B	Average price per lb. of all qualities sold.....	95·5*	94*	97*	—	102*	100*	100*	97*	98*	108*	111*	106*	100*	108*
Bread	Firm G	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm H	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm I	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm J	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm K	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm L	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm M	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm N	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm O	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	
	Firm P	Price of a 4-lb. loaf.....	—	—	—	—	—	—	—	—	—	—	—	—	—	

^d The variation shown between the different index numbers for sugar for 1912 is striking. It is interesting to note that three of the firms showing a big decrease since 1911 are working-class firms.

^e The index number for sugar for 1911 for this firm was based upon the yearly catalogue price and not upon the average price of the year. The yearly catalogue was issued before the big increase in the price of sugar which took place during the autumn of 1911.

TABLE I.—LONDON. *Contd.*—Index numbers showing the change in the retail price of various articles of food.

Commodity.	Firm.	Data upon which the index numbers are based.	1900.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.	
Flour	Group I—Firm B	Average price per 7 lbs. of following: "best households, selected self-raising"	—	—	—	—	—	102	117	117	117	107.5	100	100	105	
	Group II—Firm D	Average price per 7 lbs. of following: "households"	95.5	104.5	—	100	100	109	100	—	104.5	109	—	100	106*	
	Firm E	Average price per 7 lbs. of following: "households," "whites,"	96	—	101	99	101	104	94	92	92	103	103	112.5	100*	106.5*
	Firm F	Average price per 7 lbs. of following: "households," "whites,"	95.5	—	95.5	95.5	—	104.5	100	91	109	104.5	109	100*	100*	102*
Milk	All Firms.	Average price per 7 lbs. of finest: "American"	—	87.5	87.5	87.5	—	104	96	109	104	112.5	100	100	103*	
	Group I—Firm B	Price of a quart following: "Primrose," "mottled"	94	94	94	94	94	94	94	94	94	94	94	100	98	
	Group II—Firm D	Average price per 3-lb. bar of following: "yellow," "mottled"	—	—	—	—	—	—	86	100	86	86	100	100	100	
	Firm E	Average price per 3-lb. bar of following: "Primrose," "mottled," "scrubbing"	80	80	—	86	80	86	94	—	—	91	94*	98*	100*	100*
Cotton by the yard f	Firm F	Average price per 3-lb. bar of following: "Primrose," "scouring"	91	—	91	92	97	97	97	109	109	95	99	100*	100*	100*
	Firm Z	Average price per 3-lb. bar of following: "yellow," "scrubbing"	78	—	92	92	—	78	78	89	94	92	97	100*	100*	
	Firm Z	Price per ton of "bright nuts"	—	87.5	94	94	81	—	94	106	100	94	106	100	106	
	Firm D	—	88	88	97	92	93	93	96	—	99	96	93	100	111	

f Not included in the general index number.

TABLE IIIA.—LONDON. *Average index numbers showing the change in the retail price of various articles of food for working-class and middle-class firms, 1900-12. (1911 = 100.)*

Year.	English beef (24).*			Foreign beef (24).			English mutton (12).		
	Working class firms.	Middle class firms.	Board of Trade.†	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.
1900....	—	88	96	—	98	86.5	—	97	106
'01....	—	89	96	—	—	88	—	100	106
'02....	102	91	101	112	98	94	100	97.5	106
'03....	94	94	98.5	105	101	92	100	100	106
'04....	94	94	96	102	—	88	100	102	105
'05....	95	93.5	94	98	92	85	100	100.5	106
'06....	96	95	94	100	—	85	101	102	106
'07....	96	—	95	107	—	89	101	—	106
'08....	95.5	96	99	107	—	96	100.5	102	105
'09....	95.5	97	98	105	—	97	99.5	101	101
'10....	98	97	103	105	—	101	100	100	102
'11....	100	100	100	100	100	100	100	100	100
'12....	101	104	105	104	100.5	110	99.5	104	106

Year.	Foreign mutton (12).			Pork (15).			Bacon (19).		
	Working class firms.	Middle class firms.	Board of Trade.†	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.
1900....	—	84.5	95	—	99	98	87.5	—	79
'01....	—	93	98.5	—	—	101.5	87.5	—	90
'02....	100	92.5	98	96	101	103	86	83	89
'03....	100	94	104	96	107	99	81	82	84
'04....	100	97	101	96	—	96	77	—	78
'05....	100	96.5	100	96	—	96	86.5	87.5	86
'06....	97.5	97	98	99	—	99.5	88	90.5	94
'07....	97.5	—	101	99	—	98	86	83	93
'08....	99.5	94	102	95.5	—	95	87	92	88
'09....	100	94	98.5	99.5	—	98	95	94.5	98
'10....	100	100	101	103	—	103	103	102	107.5
'11....	100	100	100	100	100	100	100	100	100
'12....	100.5	100	101	103	104	101	99	105.5	105

* The figures in brackets are the weights assigned to the various commodities.

† The Board's revised index numbers obtained from *Report of the Cost of Living Enquiry for 1912.* [Cd.-6955.]

TABLE IIA *Contd.*—Index numbers showing change in the retail price.

Year.	Butter (41).			Canadian cheese (10).			Sugar (19).		
	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.
1900....	94.5	—	92	75	91	93.5	66	84	80
'01....	94.5	—	93.5	75	92	86	67.5	100	87
'02....	93	—	92	75	87	87	74	82	80
'03....	91	—	89	81	93	92.5	71	85	85
'04....	87.5	—	88	69	84	87	72	92	90
'05....	93	94	91	87.5	89	87	95	106	107
'06....	95	94	94	91	92	93.5	77	95	90
'07....	91	—	93	91	98.5	98	78	92	96
'08....	92	94	97	91	97	95	74	94	94
'09....	91	—	94.5	88	99	96	73	90	89
'10....	93	94	97	88	99	95	76.5	98	102
'11....	100	100	100	100	100	100	100	100	100
'12....	98	102	104.5	100	104	109	82	109	110

Year.	Rice (3).			Tea (22).			Bread (50).		
	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.	Working class firms.	Middle class firms.	Board of Trade.
1900....	—	99	100	113	97	97	98	97	88
'01....	—	99	100	113	97	100	97	94	82.5
'02....	—	98	97	113	97	100	98.5	94	88.5
'03....	—	99	98	107	97	100	100	96	95
'04....	—	100	93	120	116	106	101.5	101	95
'05....	—	99	93	100	100	105	99	99	96
'06....	100	99	94.5	100	100	97.5	98	96	90
'07....	100	98	109	100	100	100	97	97	94
'08....	100	100	108	100	100	100	107	104	101
'09....	100	100	96	100	100	100	112	108	109
'10....	100	100	93	96.5	100	100	105	108	105
'11....	100	100	100	100	100	100	100	100	100
'12....	100	102	111	100	100	100	106	104	105

Year.	Flour (20).			Milk (25).	
	Working class firms.	Middle class firms.	Board of Trade.	All firms.	Board of Trade.
1900	—	96	89	94	97
'01	—	104.5	88	94	97
'02	—	98	89	94	97
'03	—	98	91	94	97
'04	—	100.5	96	94	97
'05	—	106	97	94	97
'06	102	98	96	94	97
'07	117	91.5	101	94	97
'08	117	105.5	107	94	97
'09	107.5	105.5	113	94	97
'10	100	111	103.5	94	97
'11	100	100	100	100	100
'12	105	105	106	98	99

TABLE IIE.—LONDON. *Index numbers showing the change in price of various articles of food, 1900-12. (Average 1900-11 = 100.)*

Year.	English beef.*			Foreign beef.		English mutton.*		
	Average index numbers for all firms.	Board of Trade retail figures.†	Board of Trade wholesale figures.‡	Average index numbers for all firms.	Board of Trade retail figures.	Average index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures.
1900.....	96	98·5	102	96	94	97	101·5	103
'01.....	94	98	96	—	96	100	101	97
'02.....	100	104	103	101	102	98	102	98
'03.....	99	101	98	100	100	100	101	100
'04.....	99	98	96	100	96	101	100	101
'05.....	99	96·5	96	93	92·5	100	102	101
'06.....	101	96	96	98	93	101	101	105·5
'07.....	101	98	98	105	96·5	101	101	105·5
'08.....	101	102	100	105	105	101	101	101
'09.....	101	100·5	103	103	105	100	96	91
'10.....	103	105·5	107	103	110·5	100	98	100
'11.....	105	102	102	98	109	100	95·5	97
'12.....	109	107	—	100	119	102	102	—

Year.	Foreign mutton.		Pork.		Bacon.		
	Average index numbers for all firms.	Board of Trade retail figures.	Average index numbers for all firms.	Board of Trade retail figures.	Average index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures.
1900.....	88	95	100	99	98·5	88	79
'01.....	97	99	—	103	98·5	99	89
'02.....	99	98	100	104	95	98	100
'03.....	99	104	103	100	92	93	100
'04.....	103	101	97	97	87	86	89
'05.....	102	101	97	97·5	98	95	88
'06.....	98	98	100	101	100	104	100
'07.....	102	102	100	99	96	103	104
'08.....	102	102	97	96	100	97	96
'09.....	102	99	101	99	107	108	113
'10.....	104	102	104	104	115·5	119	131
'11.....	104	100	101	101	112·5	110	112
'12.....	104	101	104	102	114	116	—

* For beef and mutton the Board only give wholesale index numbers for English and foreign meat combined. These figures are given in this table under English meat.

† Revised index numbers taken from *Report of the Cost of Living Enquiry for 1912.* [Cd.-6955.]

‡ Taken from *Fifteenth Annual Abstract of Labour Statistics.*

TABLE IIB *Contd.*—Index numbers showing the change in price.

Year.	Butter.		Canadian cheese.		Sugar.			Rice.	
	Average index numbers for all firms.	Board of Trade retail figures.	Average index numbers for all firms.	Board of Trade retail figures.	Average index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures.	Average index numbers for all firms.	Board of Trade retail figures.
1900....	102	98	96	101	89	87	100	100	102
'01....	102	100	96	92.5	93	95	95	100	102
'02....	100	98	92	94	93	87	82	99	98
'03....	98	95	99	100	93.5	93	83.5	100	99
'04....	94	94	87	94	97	98.5	95	101	94
'05....	100	97	98	94	120	117	115.5	100	94
'06....	102	101	101	101	101.5	98.5	90	100	96
'07....	98	99	105	106	99	104	93	100	111
'08....	99	104.5	105	103	99	103	101	101	109.5
'09....	98	101	105	103.5	97	97	104	101	97.5
'10....	100	104	104.5	103	101	111	121	101	95
'11....	108	107	110	108	118	109	119	101	102
'12....	107	112	113	118	113	120	—	102	113

Year.	Tea.			Bread.				
	Average index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures.	Average index numbers for working-class firms.	Average index numbers for middle-class firms.	Average index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures* for wheat.
1900.....	102	96	108	97	98	97	92	91
'01.....	102	99.5	97	96	95	95	87	89
'02.....	102	99.5	91	98	95	95	93	91
'03.....	99	99.5	98	99	97	97	100	91
'04.....	115	106	92	100	101	101	100	94
'05.....	97	104	92	98	99	99	100	97
'06.....	97	97	94	97	97	97	94	94
'07.....	97	99.5	92	96	98	97	98	103
'08.....	97	99.5	90	106	105	105	106	111
'09.....	97	99.5	93	111	109	109.5	114	123.5
'10.....	95	99.5	93.5	104	109	107	110	111
'11.....	97	99.5	114	99	100	100	105	106
'12.....	97	99.5	—	105	104	105	110	—

* Made up of foreign wheat with a weight of 4 and English wheat with a weight of 1.

TABLE IIB *Contd.*—*Index numbers showing the change in price.*

Year.	Flour.			Milk.		
	Average index numbers for middle-class firms.	Average index numbers for all firms.	Board of Trade retail figures.	Index numbers for all firms.	Board of Trade retail figures.	Board of Trade wholesale figures.
1900	94.5	94	91	99	100	96
'01	103	102	90.5	99	100	103
'02	97	96	91	99	100	105
'03	97	96	93.5	99	100	102
'04	99	98.5	99	99	100	98
'05	104.5	104	99	99	100	94
'06	97	97	98	99	100	93
'07	90	98	103	99	100	100
'08	104	106	109	99	100	99
'09	104	104	116	99	100	100.5
'10	109	105	106	99	100	101
'11	99	98	103	105	103	108
'12	104	103	108	103	102	—

TABLE XV.—LONDON. *Index numbers showing changes in wages in certain selected trades, 1899-1912. (1911 = 100.)*

Year.	Building trade.		Engineering trade.		Carters and carriers. Series B.	Dock and wharf labourers.		Furnishing trades.	
	Series A.*	Series B.†	Series A.	Series B.		Series A.	Series B.	Series A.	Series B.
1899.....	95	96.5	95	98	93	80	86	97	98
1900.....	98.5	99	95	98	93.5	87	88	98.5	100
'01.....	100	100	97	99	93.5	87	88	98.5	100
'02.....	100	100	97	99	93.5	87	88	98.5	100
'03.....	100	100	97	99	93.5	87	88	98.5	100
'04.....	100	100	97	99	93.5	87	88	98.5	100
'05.....	100	100	97	99	93.5	87	88	98.5	100
'06.....	100	100	100	100	93.5	87	88	98.5	100
'07.....	100	100	100	100	93.5	87	88	98.5	100
'08.....	100	100	100	100	93.5	87	88	98.5	100
'09.....	100	100	100	100	93.5	87	88	98.5	100
'10.....	100	100	100	100	93.5	87	88	100	100
'11.....	100	100	100	100	100	100	100	100	100
'12.....	103	102	100	100	100	100	100	103	101

* Based upon changes in standard time rates, assuming that all workers eligible received the increased rate (see Table A).

† Based upon changes in standard time rates and other changes reported to the Board of Trade, assuming that only the number of workers stated to have been affected by the change received the increased wage (see Tables A and B).

TABLE XV *Contd.*—Index numbers showing changes in wages.

Year.	Compositors.		Boot and shoe operatives. Series B.	Railway men. Average wage.	Tailors. Series B.	General index numbers.*		
	Series A.	Series B.				Series A.†	Series B.	Mean of Series A and B.
1899.....	97	98·5	99·5	98	100	95	96·3	95·7
1900.....	97	98·5	100	97	100	96·9	97·5	97·2
'01.....	100	100	100	97	100	97·8	98·1	98
'02.....	100	100	100	97	100	97·8	98·1	98
'03.....	100	100	100	96·5	100	97·7	98·1	97·9
'04.....	100	100	100	97	100	97·8	98·2	98
'05.....	100	100	100	98	100	97·9	98·3	98·1
'06.....	100	100	100	99	100	98·3	98·5	98·4
'07.....	100	100	100	100	100	98·5	98·6	98·6
'08.....	100	100	100	97	100	98·1	98·3	98·2
'09.....	100	100	100	98	100	98·3	98·4	98·4
'10.....	100	100	100	100	100	98·4	98·6	98·5
'11.....	100	100	100	102	100	100	100	100
'12.....	100	100	100	104	100	101·6	101·1	101·4

* Obtained by combining the index numbers for the different trades and weighting according to the number of workers in London employed at them (see short notes on different trades after this table).

† When no index numbers for Series A were available the figures for Series B were used in obtaining the general index numbers for Series A.

Details of the method of calculation, source of data, &c., for the different trades.

(a) *Building trade.*—There are about 198,290 adult workers in the building trade in Greater London. The index numbers were based upon the changes that have taken place in the wages of bricklayers, masons and carpenters and joiners, as it has already been shown that they are representative of changes in wages of the whole trade. Fairly accurate information of changes in wages of these three grades can be obtained.

The calculation for both series of index numbers is given in full for this trade only, the method of calculations for the other trades being the same.

Series A.—Index numbers based upon changes in standard rates for the three selected grades.

*Standard rates in the building trade (1900-12).**

Occupation.	Percentage of all workers in the trade.†	1899.	1900.	1901.	1911.	1912.
Bricklayers	8·6	Per hour. 10d.	Per hour. 10d.	Per hour. 10·5d.	Per hour. 10·5d.	Per hour. 10·5d.
Masons	3·1	10d.	10·5d.	10·5d.	10·5d.	11d.
Carpenters and joiners	15·3	10d.	10·5d.	10·5d.	10·5d.	11d.

* See Table A.

† According to the wage census for 1906.

Weighing the rates for the three different occupations according to the percentage the workers form of all engaged in the building trade, the following index numbers are obtained :—

1899	95·0	1911.....	100·0
1900	98·5	'12.....	103·0
'01	100·0		

As has already been pointed out, these index numbers should be corrected for any change in wages due to movement from occupation to occupation inside the trade. Since there are no reliable data available for the calculation of such changes no correction could be applied.

Series B.—Index numbers based upon the changes in wages that have taken place in the three selected grades, assuming that only those stated by the Board of Trade as having been affected by the change, actually received the increased rate.

Number of adult employees in Greater London (bricklayers, &c.)	53,540
Average weekly earnings of all workers (1906 wage census)	42·04s.
Total weekly wage bill for 1906	2,250,760s.
Total increase in weekly wage bill during 1901.....	31,200s.*
Total weekly wage bill for January, 1901	2,219,560s.
Total increase in weekly wage bill during 1900	47,840s.*
Total weekly wage bill for January, 1900	2,171,720s.
Total increase in weekly wage bill during 1912.....	48,880s.*
∴ Total weekly wage bill for January, 1913	2,299,640s.

Comparing the weekly wage bills for the various years we obtain the following index numbers :—

1899.....	96·5	1911.....	100·0
1900.....	99·0	'12.....	102·0
'01.....	100·0		

No change in wages took place between 1901 and 1906.

(b) *Engineering trade.*—Changes in wages of fitters, turners, ironfounders and patternmakers have been taken as representative of changes in wages of the whole trade. There are about 61,470 adult workers in the engineering trade as a whole.

With regard to the changes in wages that took place in 1901 and 1906 one is struck by the fact that such a small proportion of the workers eligible actually received the increased rate. An endeavour has been made to obtain some explanation of this fact, without success.

The index numbers for Series A were worked out from the data given in Table D in the manner already described for the building trade. The following additional information was used in working out the figures for Series B :—

Number of adult employees in the four grades in Greater London	18,380
Average earnings of all these workers (1906 census).....	42·38s.

The increase in wages in 1906 took place after the returns for the wage census had been made.

* See Table A.

(c) *Carters and carriers.*—There are about 58,540 employed adults in Greater London. This occupation was not included in the 1906 wage census. According to the *Cost of Living Enquiry* [Cd.-3864] for 1905 the following rates are those most usually paid in London:—Single-horse carman, 24s. a week; pair-horse carmen, 28s. a week. Accordingly 26s. a week has been taken as the average wage paid to carmen in 1905. As there is no recognised standard rate for these workers index numbers for Series A cannot be obtained.

(d) *Dock and wharf labourers.*—There are about 24,450 employed adults in Greater London. The standard rate of 6d. per hour has been taken as the average rate for 1900, since the wage census for 1906 does not deal with these workers. Both series of index numbers have been worked out.

(e) *Railwaymen.*—The details as to changes in earnings of railwaymen apply to about 45,700 workers. We only know for these workers the average wage for all workers ("boys" and adults) for England and Wales. These figures have been taken as applying to London, assuming that wages in London have varied in the same way as for the whole of England and Wales.

(f) *Tailors.*—There are about 25,510 employed adults in Greater London. The wages of these workers have remained unchanged during the period.

(g) *Boot and shoe operatives.*—There are about 19,830 employed adults in Greater London. As the only increase in wages that took place during the period is expressed as a percentage increase of the previous wage, there is no need to determine the average wage of these workers.

The standard rate for pressmen advanced 2s. per week during 1908, but the only change recorded in *Changes in Wages, &c.*, that could correspond was one that took place in 1907 and was placed among "small changes," *i.e.*, affecting very few workers; this does not seem sufficient to warrant the advancing of the standard rate of pressmen by 2s. per week when they number about 1,300. The change, therefore, has been ignored in calculating the index numbers for Series B.

No index numbers for Series A have been prepared. Information of the changes in standard rates for the whole period is only available for a small proportion of the workers, and we do not know whether the changes in wages of these workers are at all representative of changes in wages of the workers as a whole.

(h) *Cabinet-makers, french polishers and upholsterers.*—There are about 22,860 employed adults in Greater London. The average wage of all workers in these three occupations was, according to the 1906 wage census, 36·45s.

The standard rate of cabinet-makers of 10d. per hour advanced during 1900 by ½d. per hour, but as only about one-half of the workers eligible received the increased wage the standard rate for 1901 was given as 10d. and 10½d. per hour (see Table A). For 1911 the standard rate is given as 10½d. per hour only, but no corresponding change appears in *Changes in Wages, &c.* This probably means that between 1900 and 1911 an increasing number of workers received the higher rate, so that by 1911 practically all cabinet-makers were receiving 10½d. per hour. Index numbers for both series have been calculated.

Compositors.—There are about 34,480 printers in Greater London, and approximately one-half of these are compositors. As the report of the wage census for the printing trade was not ready the standard rate of 38s. per week was taken as the average wage for 1900 when calculating the index numbers for Series B. Index numbers for Series A were also calculated.

TABLE XVI.—LONDON. *Wage index numbers for London allowing for changes in the amount of employment, 1899-1912.* (1911=100).

Year.	Index numbers of employment.*						General index number of employment.	Wage index number (London).	Wage index number allowing for changes in amount of employment.
	Engineering trade (United Kingdom).	Printing trade (United Kingdom).	Building trade (United Kingdom).	Furnishing trade (United Kingdom).	Docks (London).				
1899.....	100.7	101.2	103.7	102.3	111.6	103.5	95.7	99.0	
1900.....	100.4	100.8	102.6	100.8	117.4	103.1	97.2	100.2	
'01.....	99.4	100.5	101.4	100.4	123.9	102.6	98.0	100.5	
'02.....	98.0	100.6	100.7	100.3	111.6	101.0	98.0	99.0	
'03.....	98.2	100.5	100.1	99.5	100.7	99.8	97.9	97.7	
'04.....	96.1	100.3	97.2	95.5	97.8	97.1	98.0	95.2	
'05.....	98.0	99.9	96.5	96.9	95.7	96.9	98.1	95.1	
'06.....	100.2	100.4	97.7	98.1	94.9	98.2	98.4	96.6	
'07.....	99.4	100.6	97.6	98.3	94.2	97.9	98.6	96.5	
'08.....	92.7	99.4	93.2	93.1	89.1	93.1	98.2	91.4	
'09.....	91.3	99.3	92.9	93.7	92.8	93.0	98.4	91.5	
'10.....	97.3	100.1	96.2	96.8	97.1	96.7	98.5	95.2	
'11.....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	
'12.....	—	—	—	—	—	99.8†	101.4	101.2	

* Taken from "The measurement of employment: an experiment." *Journal*, 1912.† Obtained by comparing the percentage of trade unionists unemployed in 1911 and in 1912, as given in the *Labour Gazette* for those years, and calculating the 1912 figure on this basis.

TABLE XVIII.—*Index numbers showing the change in the consumption per head of certain articles of food in the United Kingdom,* 1900-11. (Average 1900-11 = 100.)*

Year.	Meat.	Flour.	Sugar.	Tea.	Cocoa.	Currants and raisins.	Beer.†	Tobacco.†	General index numbers A.‡	General index numbers B.§
1900	105.5	98	101	98	85	81	111	96	102	100.8
'01	104	95	108	100	92	89	108	96	101.7	100.3
'02	102	101	97.5	98	100	105	106	96	100.9	100.8
'03	96	107	95	97	92	98	104.5	96	98.5	99.7
'04	100	102	98	97	100	98	101	101	100	100.1
'05	102	98	88	97	100	100	98	101	99	98.8
'06	101	102	99	100	92	107	99	101	100.8	101.0
'07	99	102.5	103	102	92	107	97.5	101	100.5	100.9
'08	99.5	95	98	100	100	100	94	101	98.3	97.9
'09	100	98	103	103	108	107	92	101	100.3	100.2
'10	95	102	99	103	102	100	92	101	98.2	99.1
'11	96	99	109	105	123	107	96	106	99.6	99.9
'12	99	103	97	105	131	103	94	106	100.8	100.6
First system of weights	54	24	12	7	2	1	—	—	—	—
Second system of weights	42	34	9	11	2	2	—	—	—	—

* Taken from *Fifteenth Abstract of Labour Statistics*. The figures for 1912 were taken from the *Statistical Abstract of the United Kingdom*.

† Not including when calculating the general index numbers.

‡ Obtained by using the first system of weights, i.e., weights based upon the relative amounts spent upon the different commodities by the whole population.

§ Obtained by using the second system of weights, i.e., weights based upon the relative amounts spent upon the different commodities by the working classes only.

TABLE A.—*Changes in wages in London for certain selected trades, 1900-1912.*
 (A) *Trades for which there is a recognised standard rate given in Standard time rates of wages, &c.*

Year during which change took place.	Workers to whom change refers.	Change as given in <i>Changes in wages, &c.</i> ^a	Number of workers affected by the change as given in <i>Changes in wages, &c.</i>	Approximate number of adult employees in Greater London, 1901.	Change in "standard rates" as given in <i>Standard time rate of wages, &c.</i> ^b	Weekly hours of labour.
Building trades^c—						
1900	Carpenters and joiners	+ 3d. per hour	20,000	188,290	From 10d. to 10½d. per hour	50 (summer)
	Masons	+ 3d. per hour	3,000	30,340	From 10d. to 10½d. per hour	50 (summer)
1901	Bricklayers	+ 3d. per hour	15,000	6,150	From 10d. to 10½d. per hour	50 (summer)
1912	Carpenters	+ 3d. per hour	20,000	30,340	From 10½d. to 11d. per hour	50 (summer)
	Masons	+ 3d. per hour	3,500	6,150	From 10½d. to 11d. per hour	
Engineering trades^d—						
1901	Patternmakers	+ 1s. per week	6,530	61,470	From 42s. to 43s. per week	
	Turners			4,918	From 38s. to 38s. per week	
	Fitters			11,741	From 38s. to 38s. per week	
	Smiths			1,721	From 38s. to 38s. per week	
1906	Patternmakers			610	From 43s. to 41s. per week	
	Ironfounders			1,106	From 40s. to 41s. per week	
	Turners			4,918	From 39s. to 40s. per week	
	Fitters			11,741	From 39s. to 40s. per week	
	Smiths			1,721	From 39s. to 40s. per week	
1908	Patternmakers			610	From 44s. to 44s. and 45s. per week	
1910	Patternmakers			610	From 44s. and 45s. to 45s. per week	
1912	Ironfounders			1,106	From 41s. to 42s. per week	
Cabinet makers, upholsterers and french polishers^e—						
1900	Cabinet makers	+ 1s. per hour and increased wage for overtime	8,000	22,060	From 10d. to 10d. and 10½d. per hour ...	52½
1910	Cabinet makers			13,000	From 10d. and 10½d. to 10½d. per hour ...	52½
1912	Cabinet makers	+ 3d. per hour	1,900	13,000	From 10½d. to 10¾d. and 11d. per hour	
	French polishers	+ 3d. per hour	1,600	6,677	From 9d. to 9½d. per hour	
Boot and shoe operatives^f—						
1900		+ 10 per cent. of previous wage.	1,000	19,830	From 25s. to 27s. per week (minimum rates)	
1907		+ 10 per cent. on piece rates* (hand sewn)	Not given	19,830		
1908	Pressmen			1,290		
Compositors^g—						
1901	Compositors	+ 1s. per week	9,900	17,240	From 38s. to 38s. per week	

^a *Changes in wages and in the hours of labour in the United Kingdom.*

^b *Standard time rates of wages in the United Kingdom.* This gives the standard rate on January 1 of each year, as well as the number of hours which constitute a "full week." The standard rates for 1912 are those given in *Changes in Wages, &c.*, as the "rate after the change had taken place."

^c Only changes in the wages of bricklayers, masons and carpenters and joiners are given.

^d Only changes in the wages of fitters, turners, ironfounders and patternmakers are given. In 1901 and 1906 smiths are included in the original returns, and it is not possible to discover how many of the workers affected by the change belong to this class. In any case the number would only be a small proportion of the whole.

^e Given among "smaller changes" as affecting few workers.

TABLE B.—*Changes in wages in London for certain selected trades, 1900-12.*(B) *Trades for which there is no recognised standard rate given in Standard time rates of wages, &c.*

Year during which change took place.	Workers to whom change refers.	Change as given in <i>Changes in rates of wages, &c.</i>	Number of workers affected by the change as given in <i>Changes in rates of wages, &c.</i>	Approximate number of adult employees in Greater London, 1901.
<i>Tailors—</i>				25,510
<i>Dock and wharf labourers—</i>		No change.		24,450
1900	Dock and wharf labourers	+ 1d. per hour from 6d. to 7d. per hour	4,500	24,450
1911	Dock and wharf labourers	+ 1d. per hour from 6d. and 7d. per hour to 7d. and 8d. per hour	20,000	24,450
<i>Carters and carriers—</i>				58,540
1900	Carters and carriers	{ + 6-9 per cent.* + 2s. 6d. per week..... (Increase to 27s. for one horse Increase to 31s. for two horses Increase to 34s. for three horses Increase to 38s. for four horses)	5,000 1,250	58,540
1911	Carters and carriers		35,000	

* Taken as an average increase of 7.5 per cent.

† Generally recognised rates previous to 1911 were 24s. for one horse, 28s. for two horses, &c.; the increase has been taken as equivalent to 3s. per week for all carters and carriers affected by the change.

Average weekly earnings of railwaymen for England and Wales, 1900-12.

Year.	Average earnings per head.						
1900....	s. 25.58	1904....	s. 25.58	1907....	s. 26.40	1910....	s. 26.30
'01....	25.52	'05....	25.87	'08....	25.52	'11....	26.69
'02....	25.44	'06....	25.96	'09....	25.87	'12....	27.37
'03....	25.37						

DISCUSSION *on* MRS. WOOD'S PAPER.

DR. GREENWOOD, in proposing a vote of thanks to the reader of the Paper, said, with regard to the statistical method adopted, he thought probably most people who had worked with index numbers would agree with the remarks made by Mrs. Wood as to the desirability of using as a base the mean of a series of years, owing to the fact that if an abnormal year were chosen, then, as the scale of movement depended on the base, incorrect or at least exaggerated ideas might be conveyed. The one disadvantage of using a mean as base—the fact that the indices did not give directly what most people wished to see in studying a Paper of that sort, viz., the actual changes from the earlier years of the series in terms of the most recent year—could be obviated by a moment's mental arithmetic, since evidently any other base could be substituted for the mean by simple division and multiplication. Another point to be remembered was that index numbers did not, as it appeared to him, furnish a final method of investigating changes. Another method of great value could be based upon graphical considerations—that is to say, if one plotted the absolute values for each commodity, each variable, and investigated the form of change, one often found that such simple graphs as straight lines fitted by the method of least squares gave one an extremely good idea of the general trend. For the purposes of the present investigation, however, the index method was unquestionably the appropriate one to employ. Turning to the results of the inquiry, there was only one section of which he anticipated a certain amount of criticism, that was the portion analyzing changes in rents. He confessed it did not seem to him, and, he gathered from Mrs. Wood's Paper, it did not appear to her, that one could form a very good idea of the change in the cost of living, so far as house rent was concerned, by indices based upon assessed values. In the first place, the distribution of the working-class population throughout London was very heterogeneous; and, in the second place, the difficulty which Mrs. Wood had pointed out, namely, the question as to whether increased rates were or were not borne by the tenants, seemed to vitiate to a considerable extent any conclusions based upon rateable values. He suggested that the other method, that of obtaining samples from house agents of the rents actually charged, was probably a better method, although it did not appear to him that sampling on a sufficiently large scale would ever be within the power of a private investigator. He thought one should remember that although the proportion of working-class income which was expended on rent might not be so large as that devoted to the other groups dealt with here, nevertheless it was a very important item, because it happened to be that portion of the expenditure which could not be temporarily diminished at will. It was an amount that had to be found. Finally, with regard to the actual interpretation of the general conclusion, he pointed out

that, as Mrs. Wood remarked, it did seem a confirmation of the general accuracy of her work that Dr. Bowley's results, obtained by a totally different process of investigation and reasoning, agreed very closely indeed with hers. That being so, accepting those results as sufficient to support definite conclusions, what was the inference to be drawn as to the condition of the working classes. For example, supposing they took persons in the middle class of life, people like themselves, a diminution, say, of 5 per cent. of their incomes, assuming prices remained stationary, would not, as pointed out to him before the lecture, necessarily be detected by all of them, unless they kept their accounts carefully; and he took it the question as to what difference in one's spending powers could be regarded, in the psychologist's phrase, as liminal, depended on how far one was living from the actual minimum of subsistence. That was to say, if they took population living very near indeed to the actual minimum, a change of much less than 5 per cent. might be of catastrophic importance; so that really one wanted to combine the results of that Paper with the reports they had received upon the condition of the working classes, such as those of Mr. Rowntree dealing with York, and of Dr. Bowley with respect to Reading, in order to grasp the exact significance of the change. It seemed rather important to realise that a change of so small dimensions as 5 per cent. might really be a change of extremely large dimensions from the point of view of the comfort of existence. That being the case, another aspect of the question evidently presented itself: ought they not only to consider the question as to whether wages were in a satisfactory condition, but as to whether the instruction placed at the disposal of the working classes with regard to the utilization of their wages was at all adequate? As Fellows of the Society knew, various physiologists, and perhaps most prominently Professor Leonard Hill, had recently been arguing that the working classes did not spend their wages so far as the purchase of food supplies was concerned at all satisfactorily, which, after all, was only a confirmation of the views expressed by Mr. Rowntree in his famous inquiry. The problem seemed to be one of so much importance that it was undesirable to leave it, as it seemed to be at the present moment, in the hands of individual workers, who, encountering a certain amount of opposition, probably became more firmly attached to their particular hypotheses and less capable of modifying them; in other words, it was a question whether those fundamental physiological problems as to the cheapest and most effective dietary ought not to be taken out of the realm of private scientific investigation and speculation and put upon a national basis, and whether the importance of so doing was not very much emphasised when they were faced (as they were at present) with a diminution in the spending capacity of the working classes.

Miss COLLET, in seconding the vote of thanks, said that the Paper was exceedingly valuable, above all to civil servants. It

was exceedingly good and stimulating to a civil servant to know that he would be followed up carefully by the outside world, and the Paper, which had involved so much trouble, deserved very detailed attention. With regard to the question of the changes in the cost of living, she thought the value of Mrs. Wood's Paper lay in this, that it brought out a new fact quite contradictory to the conclusions drawn by some people who had used the Board of Trade Report. If she understood the Board of Trade method rightly they gave their figures for the prices usually paid in working-class districts, and their comparison of 1912 and 1905 was a comparison of the prices usually paid by the majority in 1912 with the prices paid by the majority in 1905. If Mrs. Wood was right in her figures, then the Board of Trade figures pointed to a conclusion that the working classes had raised their standard of quality. It was also very interesting to notice the difference Mrs. Wood brought out between the change in the prices of the middle-class firms and those of the working-class firms. Mrs. Wood showed that, on the whole, the middle-class firms came nearer to the Board of Trade figures than the working-class firms. In conjunction with that, she thought they would notice that, with regard to the changes in wages, the increase was greatest amongst those that had the lowest earnings. For example, if they took the dock labourer and compared the change in the index number of the cost of food with the change in the dock labourer's wages, they would see that wages went up much more than the cost of food in that class. She felt with regard to the conclusions about wages that the foundations on which they were based were too weak for them to have any validity. Knowing what they did about the change of population of London, she thought it was not permissible to assume that the figures of 1911 would bear the same relation to the figures of 1901 that those of 1901 bore to 1891. They knew that for the first time there was a decline in the population of London, and that Greater London only showed an increase of 10 per cent. Supposing the cost of food had increased even as much as 15 per cent. and wages had only increased 3 or 4 per cent., she asked whether it necessarily followed in relation to the question put by Mrs. Wood, which was not the question put in the Board of Trade return, that the prosperity of the working classes in London had diminished. Were they only to measure the prosperity by the amount the workman could extract from the employer for the same article? She thought there were other things which came into consideration. She believed that the Board of Trade standard for the index number was an average man earning between 36*s.* and 37*s.* a week and having three or four children. In most of the nine trades given, that 36*s.* or 37*s.* a week would mean that the standard chosen was that of a man whose wife and children were not earning anything. That was not a typical standard; it was a right standard to take when they were fixing an irreducible minimum. At every decade there should be a larger proportion of unmarried men and women between the

ages of 15 and 25, and if they found that in the working-class districts of London there was an increased proportion of young unmarried men and women, they then had an indication of greater prosperity in the family. In such a case the cost of food might increase very greatly, and yet not overtake the increase in the family income. Both the Board of Trade and Mrs. Wood had ignored the female worker altogether. The Board of Trade volume had certain objects in view, not the one she thought they were considering there, in which the cost of living to the man supporting his family entirely himself was of importance. But Mrs. Wood was considering the changes in the prosperity of London working classes, and surely the question of the improvement or otherwise of the position of the women workers in London was of the very greatest importance. She thought London had attained certain material advantages which could be expressed in a money form, which must be taken into account before drawing conclusions about changes in prosperity. The rates and taxes paid were not entirely without anything on the other side, and during the last twelve years London, however defective its educational methods might still be, had nevertheless gone ahead as compared with previous times. It had spent far more money in making young persons efficient, and in recent years medical inspection, and a considerable amount of medical treatment, of school children had been provided. In the ordinary family also, after a certain period, the grandparents had to be considered. She did not think they could, when considering whether Londoners had lost or gained, afford to neglect the old-age pensions. Then there were such matters as the increased facilities for locomotion, which must count. During the last eight years the tramway facilities had been very greatly increased, and even such a minor detail as the fact that the trams had roofs must be of considerable effect on the health of those people who used to travel to their work backwards and forwards in the pouring rain. Another test which should be adopted was the test of the evils which have been prevented. She thought if they looked at the London records they would find a considerable decrease in infantile mortality, which pointed to very great improvements in many directions. Twenty-five years ago it was quite a common thing to come across a dock labourer's wife who had borne sixteen children and buried two-thirds of them, and who had become a grandmother before her youngest children were born. If the 1911 Census pointed to improvement in these respects, it could more than counterbalance any increase in the cost of food. There seemed to her to have been an increase in the self-respect of the London workman, and also London in the last twelve years had become a much brighter place. Arrangements in the parks had greatly improved; good music she believed could be heard on most Sundays. She thought the amenities of London counted very much in the matter of prosperity. She did not in the least desire to make out a case for improvement from a material point of view,

but certainly her impression was that the unrest that had been referred to was largely due to the increased hopefulness of the working classes.

Mr. YERBURY said the last speaker seemed to think Mrs. Wood's investigations had been for the purpose of showing whether Londoners were better off than they were a few years ago. No one could deny that the London working man was better off than formerly, but the question was whether he was relatively better paid. They felt they were worse off, because they knew they had not been getting what they considered to be a fair share of the growing profits in every industry. The most sanguine of them saw that sooner or later the end of the period of boom must go. For the moment most people, he supposed, would agree that they were at the top of the boom, and the workman saw that if he could not at present get a rise of wages sufficient to bring him up to the position he ought to be in, his position would be worse when the slump came. There was an increase in the cost of living, and profits had been made during the last five years or ten years which were very much larger than the profits manufacturers had seen in the past, and if the workmen could not get their share of those profits by a rise now they would have to go through a good deal of suffering by striking at a time when they could not well afford to strike, and probably at a time when the masters could not so well afford to give a rise in wage except out of the profits they had made at the time of the boom. The fact that one-third of the wages of the working classes was taken up by expenditure on meat and bread had struck him very much. He thought it might be accepted that another third would be taken up by rent. Therefore on those three things two-thirds of the working man's wages were taken up. There could be little doubt if they took the rents of the working classes in London generally the working man had to pay the rise in rates and not the landlord. It might be in some places the landlord had to pay the rise in rates, because owing to the easier transit the working classes had been able to move out of London. But in places like East Ham, and as far out as Penge and other districts, the rents had not only not fallen, but the increased rates had been put on the rent, and the properties were still well let. Within an easily accessible distance he thought the working man had had to pay any rise there had been in rates, although in the central districts, such as Marylebone, it was perfectly true that the landlords had had to pay it. With regard to catalogue figures, he did not know how far it might be true that the figures in the catalogue might not be the proper figures to take, because most people could publish catalogues, and in order to save the expense of printing catalogues very often they would put a higher price than the real retail price, and vary the discount allowed off list price. As regards putting the middle-class and the working-class customers together, from his personal experience

of the middle, and a very great deal of experience of the working classes, he thought it would be very unwise to do that, because with regard to almost every item of consumption the difference in prices paid by the middle classes was very much greater than the price paid by the working classes. With regard to bacon, for instance, no one of the middle classes would say it was cheap. It was one of the dearest commodities bought by the middle classes, although in the East End of London they could get very cheap bacon. On page 17 of the Paper certain figures were given with regard to the change in retail prices—sugar, for instance, in column 1. Inquiries answer to “no change,” while in the other two tables there was a difference of 3 per cent. and 6 per cent. It seemed to him very strange that all the tables should not agree as to whether or not there was a change. He would have thought it quite easy where there was no change for all the tables to agree, and especially in items such as tea and sugar.

Mr. A. D. WEBB thought that the author was to be heartily congratulated on the work she had produced. The effect of the Paper seemed to be to produce a feeling of distrust towards the Board of Trade figures, which they had hitherto trusted. He would be very interested to hear any member present justify the figures of the Board of Trade if he could. In the table on page 35 the author had summarised her investigations by giving index numbers of real wages, and that was the table towards which her previous work had been leading. He had himself been interested a short time ago in the series of index numbers relating to real wages, covering the whole of the United Kingdom and not London only, which Mr. George H. Wood had published in the *Journal*. This series ended with 1902, and he had continued it by means of the Board of Trade figures of prices, wages and unemployment. Mrs. Wood's Paper implied that those figures were not to be trusted. Perhaps taken by themselves that might be so. But when he combined the three sets of figures on the lines Mr. G. Wood had laid down he got a result not very different from the result Mrs. Wood had arrived at in Table XVII. In that table the difference in the real wages or the real cost of living, so far as rents, prices and wages were concerned, between 1900 and 1912 was shown to be about 6 per cent., which was almost the difference he got when using the Board of Trade figures. So that even if the Board of Trade's index numbers were not to be relied upon separately, yet when they were combined in order to get some indication of real wages they received a very striking confirmation from the independent sets of figures Mrs. Wood had put before them. He wished Mrs. Wood had endeavoured to construct an index number of real wages based on the Board of Trade figures, to put in comparison with her own index numbers. In the section dealing with the consumption of certain articles the author had said she had omitted to include beer and tobacco in her results, because she supposed,

in the case of beer, that the decreasing consumption might well be due to a spirit of temperance, and in the case of tobacco any variation might be due to the consumption of the wealthier classes of the community. He had contributed a paper to the *Journal* a few months before in which he had shown that the consumption of beer did vary very intimately with the real wages of the working classes, using up to 1902 Mr. George Wood's figures, and thereafter the figures he had just referred to. He had also had occasion to examine variations in the consumption of tobacco in relation to the variations in real wages, and he had found that in this case, too, there was a very intimate connection between the variations of the two sets of phenomena.

Mr. A. W. FLUX said the Society had reason to congratulate itself on the piece of work Mrs. Wood had put before them, not only because of the interest of the work itself, but also because of a very pleasant breach of the custom that generally brought male authors only before the Society. Reference had been made by various speakers to an impression they had gathered from Mrs. Wood's figures that she challenged important sections of Board of Trade statistics as to their accuracy. He thought that at any rate certain parts of Mrs. Wood's paper did the exact opposite. She had started out by suggesting that certain modes of procedure adopted by the Board of Trade in calculating changes in wages could hardly be expected to lead to a satisfactory result. He thought that Mrs. Wood, examining the material from another point of view, came quite clearly and emphatically to the conclusion that, in each of two cases tested, in spite of her *a priori* case against their methods, the results of the Board of Trade were entirely confirmed by results obtained by her methods; that, in fact, while they might not have expected that certain special trades within the building trades would have given them results which were a fair specimen of the movement in the building trade as a whole, when they came to look at matters they found they had done so: and the same was true of the engineering trade. It seemed to him that this was rather a striking point when some speakers expressed themselves as being under the impression that the Paper on the whole amounted to a challenge of Board of Trade statistics. In another direction Miss Collet had referred to a possible interpretation of the differences between certain sets of figures that were brought forward in the Paper which had been overlooked by a later speaker. The fact that the investigation conducted by the Board of Trade into the prices most commonly paid by the working classes in various districts showed that, after an interval of seven years, there had in certain cases been no change, while index numbers applied to the average prices of articles of the same quality showed a change—a comparison of those two things, Miss Collet had suggested, might be taken to mean perhaps that the average quality of things of those kinds that the

working classes were consuming had changed in the interval. It was, perhaps, as fair an inference from the figures as any other. The material that had been put before them in the Paper had rather tended to confirm one of the conclusions that was always battling for victory in his mind in regard to retail index numbers, namely, that it was impossible to give one universal interpretation to the idea of the "general level" of retail prices. Retail index numbers were among the most elusive things they could possibly get hold of. The Paper supported the view that different retail index numbers, each of which was perfectly valid, might apply to different sections of the community. It would appear that prices did not, in all probability, vary in the same way at shops serving different sections of the community. In spite of the consequent ambiguity of retail index numbers, it might nevertheless be necessary and desirable to compile them; but when they were compiled students ought not to forget what kind of figures they were handling and what kind of facts they were endeavouring to submit to measure. If they attributed to the measure a precision and a scope which did not belong to it, it was certain that they risked being led into endless confusion, and the inferences they drew would almost certainly be challenged by somebody who spoke from another point of view. These numbers must, in fact, not be treated as universal measures of one uniform movement, but as subject to those limitations of locality, &c., which were in general clearly stated by their compilers, whether officials or private investigators. Mrs. Wood had shown that the various firms that had contributed to her aggregate did not agree in the extent and sometimes even in the direction of the movement of prices which they showed. She had suggested that the retail index numbers published by the Board of Trade, being based upon one series—a series selected because it was the only available one that went back over material of the same kind for a sufficiently lengthy period—had only the support of that one series of quotations. In the Report from which she had quoted, it was stated that the evidence as to price movement furnished by that series was supported by evidence derived from other sources covering different portions of the period. The series did not stand by itself. He would not be inclined to attribute very much importance to the differences which appeared between the indices as calculated by Mrs. Wood and as calculated in the Board of Trade reports. It was, however, very interesting to them, and he thought the Society was to be congratulated on having a considerable amount of material, gathered privately, brought together in this way and reduced to order and system, if it were only for the sake of reconvincing themselves that there was more than one valid answer to the question now before them. Dr. Greenwood had referred to a point made in the Paper as to the essential nature of the difficulty that arose in selecting a single year as the base period for index numbers of the character they

were dealing with. Dr. Greenwood had expressed himself quite accurately on the subject, he thought; but one or two of the expressions in the Paper did not seem to give the most important of the reasons against the single year as the basis. It was suggested that the year for which the most accurate data was obtained was one admirably suited as the basis. That was perfectly true; the more accurate the data for all years the better, and the year that they were going to select as their basis naturally ought to be that which had the least inaccuracy, because inaccuracy anywhere else would only affect the single year which was inaccurate; whereas the inaccuracy of the basis year would affect all comparison with other years. Another suggestion was that the year 1911 was a quite normal one, and therefore was a satisfactory year for a base year. He had tried to submit the impressionistic survey of the situation, that 1911 was a perfectly normal year, to the test of Mrs. Wood's own figures, which, it seemed to him, was a fair test to apply. In going through the tables on pp. 44—48 one found, taking the firms doing a working-class trade, and measuring from the year 1911 as the standard, that the average of the last ten years was 20 per cent. below that standard in the case of sugar, 10 per cent. below the standard in the case of bacon, and ran up to about 4 or 5 per cent. above the standard in one or two cases. It was exactly that which seemed to bear on the question of whether 1911 was a normal year. Viewed by the average conditions of the ten years in the several commodities, they found that the prices of some of them in 1911 were much above the normal level, and the prices of others were at or below the normal level. It might be that the commodities that were considerably above the normal level were the less important ones; but it did not appear to him to be quite clear enough to dispose of in a single sentence that 1911, judged by that test which was the real one of the question of normality, was a normal year for the purpose. Some of the individual prices that were going to affect the average index numbers were set too high, and others were set too low, because a single year was taken rather than a period of ten years. In bringing into the foreground the accuracy of the figures, the other criterion of suitability had been somewhat overlooked. It was perfectly true that the main reason why Mrs. Wood did not proceed on the basis of a long series of years at that part of her investigation was, that it was impossible to get any lengthy series. They might have to put up with the second best when they could not get the best, and that was one of the examples where Mrs. Wood had had to do it, being pressed by the circumstances of the case. Other people were pressed in the same way sometimes, and even Government departments were not omnipotent with regard to the material they could get, and they had to put up with something less than the ideal very often. That was a point which might perhaps be remembered when viewing matters from the ideal standpoint of what an absolutely omnipotent ruler might be able to obtain, if he could exact absolute truth from everybody

of whom he inquired, as he could compel everybody to give him the information asked for. The difference between Mrs. Wood's indices and Dr. Bowley's index number obtained by the impressionistic method, on the one hand, and the Board of Trade index number applying to somewhat different facts obtained by strict arithmetical processes, on the other hand, had been dwelt on in the Paper. The difference did not impress him, and did not convince him that the two were right and the one was wrong. It would not matter if the two and the one were differently arranged, his opinion would still be the same. He thought the amount of evidence was not sufficient to entitle them to say that one result was right or that one was wrong; but they had two or three presentations of what were different facts, all of them bearing upon the general problem, the general solution of which was, he was afraid, beyond their powers at the present time. They had, therefore, to be thankful for every contribution they got towards that general solution which would help them not to be too much misled by any of the partial solutions with which for the present they were condemned to rest content.

Mr. PERCY WALLIS said, in examining the results obtained by means of index numbers, it might be interesting to refer to some other data collected by the Board of Trade which gave direct wages. Each month the wages of ten different trades, and the number of people who received them, was published in the *Labour Gazette*. If the average wage for each person was calculated they found that in 1905 it was 42*l.* per person, and in 1911 45*l.*, or an increase of about 6 per cent. He had not the data for 1912, but the figure could be obtained, and he had no doubt they would find it would be between 46*l.* and 47*l.* It seemed to him that wages were the most important price they had to deal with, and as the figures quoted represented the variation in the price of labour they ought to be considered in the formation of any index. He thought the Paper and the remarks of the speakers proved that the whole system of index numbers in use at the present time were very faulty, and if a longer period was examined than the one at present under consideration (from 1909 to 1912) they would find a much larger error. If they went as far back as 1880 the index number published by the Board of Trade was 129 as against 108 for 1910. If they could take the real, definite wages paid per year from the same years they would find an increase instead of a decrease in the price of labour. Therefore the index number must show a very distinct error in the actual purchasing power of money, which was the idea that was intended to be shown. Index numbers showed a variation in price, but did not show the variation in cost; that was the difficulty which was always vitiating the index figures. If they took the United States, where the variation had been very much bigger, they would find that in 1880 the wages were \$347, and in 1910 \$518. If it were the case that the price of labour had risen by that amount and yet they found the index number in England for the same period was

21 per cent. less; there must be some error somewhere, and there was a very decided necessity for a more careful investigation of the index number in use. There were also some very interesting figures collected by the French Government with regard to the coal miners of France, which gave the annual production of wealth by the coal miners and the wages that had been paid to them. An analysis of these figures showed the percentage they obtained was always round about the same amount, always increasing as the total production decreased, and always decreasing as the total production increased, varying within a range of 5 per cent. This variation in the percentage obtained in wages was shown in the period they were considering. From 1905 there was a rise in prices, and therefore there would be a decrease of the actual wages in proportion to those prices. From now forward if they had falling prices the wages would be tending to get nearer the higher percentage or equalising what appeared to be a lowering of the actual wages at the present moment. The same interesting fact of the actual rise of wages was also shown by some figures of the Co-operative Wholesale Society. In 1900 their wages were 5*l.*, in 1904 they fell to 48*l.*, in 1907 they rose again to 56*l.*, and in 1909 they were 55*l.* The figures quoted in the Paper showed a regular advance of prices from 1900, instead of the considerable fluctuations shown by these wages, and a still larger fluctuation if the wages for 1912 were obtained.

The PRESIDENT said that Mrs. Wood's Paper appeared to him to form an important contribution to the art of measuring changes in the value of money. Methods of this kind must, of course, be used in the spirit shown by Mr. Flux, with a due sense of "probable error." Exact arithmetical agreement between index numbers constructed on different plans was not to be expected. He (the President) had been more surprised by the similarities than by the differences between Mrs. Wood's and the Board of Trade's results. As to the inferences that were to be drawn from those results when compared with changes in nominal wages, he thought that Miss Collet's observations were very valuable. He would suggest an additional consideration showing that change in "real wages" as defined in the Paper was not an exact measure of the increase in the prosperity of the working classes. Account should be had of the shortening of hours which had taken place. He would add another suggestion which was rather dialectical than statistical. If the bimetallists had been right in lamenting the drag on industry due to the fall of prices some thirty years ago, we ought now to set against the evils of rising prices the stimulus thereby given to industry.

Mrs. WOOD, in reply, referred first to the remarks of Dr. Greenwood about the index numbers for rent. She agreed with him that they were not wholly satisfactory and that the method was only a rough one. The method used by the Board of Trade in their customary inquiries was undoubtedly the more correct, but it was doubtful whether a private individual could collect the necessary

information. Later in the discussion it had been suggested that rents in London had actually gone up since 1900. The result of the Board's Cost of Living Inquiries had shown that between 1905 and 1912 rents in London, taken as a whole, had actually gone down by 4 per cent. Miss Collet had pointed out that the Board of Trade, in their Cost of Living Inquiries, were not measuring quite the same thing as she was measuring in her investigation, and that the discrepancy between the two results might be due to the fact that the working classes had raised their standard of quality. She thought that this was very probably the case, since the price at which most working-class people buy, which was what the Board considered in their inquiries, depended not only upon the level of retail prices but also upon wages. Between 1905 and 1912 wages in London increased by about 6 per cent., and this would undoubtedly affect the quality of the food purchased by the working classes, although it was doubtful whether this fact alone was sufficient to explain the difference between the two results. On the other hand, both the Board's retail index numbers for food and her own index numbers measured the change in the price of the same quality, as far as possible, from year to year, and yet the two series of figures did not agree at all closely. In fact, in contrast to what had been already said, the Board's retail index numbers showed, if anything, a slightly bigger increase than the Cost of Living figures. Miss Collet had also suggested that the wage index numbers were based upon a weak foundation, but with certain modifications they were based upon essentially the same foundation as the Board's wage index numbers for the United Kingdom. Miss Collet seemed to think that the assumption that the change in the distribution of workers in the nine selected trades between 1901 and 1911 had been the same as that found for 1891-1901 had invalidated the results. The assumption had been made in connection with an endeavour to determine the change in wages due to movement from trade to trade, and as no change took place between 1891-1901 due to this cause it had been assumed that the same was true for 1901-11, and the wage index numbers had not been modified on this account. When the required volume of the 1911 Census was published it would only be the work of an hour to calculate the actual change, and in any case it was very unlikely that it would amount to more than 1 or 2 per cent. Mr. Yerbury had suggested that the working class and middle class firms should not have been combined, as the prices charged by these two kinds of firms for the same articles was very different. This was quite true, but it did not follow that the change in price was also different. It might quite well be very much the same. She did not know about catalogue prices being particularly high. She knew if they were buying from those firms they would be charged the catalogue price, except for the commodities she had mentioned, such as meat, &c., where the price changed frequently. Mr. Webb had suggested that a series of "real wages" index numbers might

have been prepared from the Board of Trade figures. This had not been done, because the Board only published a wage index number for the United Kingdom and a retail index prices number for London. With regard to the remarks made by Mr. Flux, she was glad that he had pointed out that in many respects she was in complete agreement with the Board of Trade. It was only in connection with retail prices that she had disagreed with them. She thought that Mr. Flux was gloomy about the prospect of obtaining a reliable series of retail index numbers. Surely, if for any town one obtained a sufficient number of returns of the change in the prices charged by the different retailers, one must get a series of figures showing the change in retail prices for that town. It was very important that any series of retail index numbers should be based upon a number of returns, and it was for this reason that she deplored the fact that the Board of Trade had published each year index numbers of retail food prices without stating the number of returns upon which the figures were based. Mr. Flux had pointed out that these figures were supported by other series of figures, which had not, up to that time, been published by the Board. If, however, they compared the Board's Cost of Living figures with these index numbers they would find that for individual commodities the two series of figures in some cases were far from supporting one another. To take the worst case—foreign beef—between 1905 and 1912 the retail index numbers show an increase of 29 per cent. and the cost of living figures an increase of only 10 per cent. Again, with bread there was an increase of 10 per cent. against an increase of 16 per cent., and so on. She thought that it was essential for compilers of retail index numbers to be quite sure of what it was they wanted to measure and to give a full account of the methods they used. It was not possible to discover from the Board's publications whether, to take a single instance, in compiling their retail index numbers for meat and bacon they studied the change in price of all joints or only selected joints, and, if so, what joints. For almost every commodity similar difficulties arose, and it was probable that some of the differences between the two series of figures were due to different methods having been used. Once they had settled exactly what they wanted to measure and the best way to measure it, she thought that two workers ought to arrive at results that would agree more closely than did her own with those of the Board of Trade.

The following Candidates were elected Fellows of the Society :—

P. D. Bhargava.
A. R. Burnett-Hurst, B.Sc.
F. W. A. Eveleigh.
C. R. Fay.
W. R. Hamilton.
W. Hazell.
E. Hoogewerf, A.M.S.T.
M. R. Sundaram Iyer.

F. W. Kolthammer, M.A.
John Koren.
J. H. Lewinski, D.Sc. (Econ.).
F. C. Ruddle, F.S.I.
J. Strong, F.S.A.A., A.C.I.S.
V. R. Thyagaraja Aiyar.
E. H. Young.