

branches, viz.—(a) the inquiry into what should be the list of commodities and the number of units used on the average; and (b) the technique followed in the computation of results. The latter being of high importance, but somewhat technical, has been dealt with in an Appendix, and will not further be referred to except therein. (See Appendix VIII.) It will suffice here to say that the method of basing deductions directly on aggregate expenditure has been preferred to that of basing them on price-ratios for the reasons already referred to, and which are more fully set forth in Appendixes VIII. and IX.

II. RETAIL PRICES, HOUSE RENT AND COST OF LIVING.

1. **General.**—Cost of living is affected by two things, viz.—(i) *Variation in the units and items of the regimen, i.e., change in the standard of living, which strictly includes also changes in quality or class of commodity consumed;* and (ii.) *Variation in the exchange value of gold, since this affects the cost of any regimen whatsoever.* With the former question, viz., standard of living, this investigation is not immediately concerned. That is a matter for determination by the analysis of household budgets or in some other appropriate manner; the latter remains to be considered.

Assuming, then, for the present that the regimen is exactly defined, then cost of living may be measured by the amount of money necessary to purchase it, that is to obtain definite amounts of food, clothing, housing accommodation and other necessaries, as well as comforts and luxuries. It will therefore be seen that in order to measure variations in the cost of living it is essential to obtain accurate and representative record of three things, viz. :—

(a) The nature of the commodities, requirements, and services ordinarily bought or paid for by the mass of the community.

(b) The relative quantity or extent to which each item is on the average consumed.

(c) The prices at which these items are bought or paid for by the consumers.

Before discussing these three questions in detail it is desirable to refer briefly to certain general considerations concerning the value and utility of index-numbers based on Retail Prices.

It has been alleged by various economists and statisticians that the formation of reliable and useful index-numbers based upon retail prices is precluded by the following considerations, viz. :—

(a) The absence of standardisation of grades and of standard retail quotations for the same article over a series of years.

(b) The rapid variations in the quality and the general nature of retail articles, which are powerfully influenced by changes of fashion and the varieties of production; and

(c) The local and non-typical character of retail prices.

To meet the last of these objections first, it may at once be stated that the matter of obtaining typical or representative prices is merely one of statistical organisation, and, as will appear hereinafter, steps have been taken to ensure that the quotations which have been, and are being,

collected in Australia are such as will afford a satisfactory basis for the computation of prices of a representative character. It will be seen later that the prices actually collected refer to those classes, qualities, or grades of commodities most frequently sold. While it is true that the grades are not in all cases well standardised, by obtaining the "predominant" or "most frequent" prices, an average price applicable to the purchases of the masses of the community may readily be computed. Furthermore, the objection raised to the absence of standardisation and the rapidity of variations in the quality of commodities, due to changes in fashion and other matters, must equally apply to wholesale prices, since practically all commodities, and all classes and grades thereof, which are sold retail are also sold wholesale.*

The regimen may be changed either in respect of quantity or quality. Change in quantity ordinarily takes place slowly, and it is not of importance in an investigation extending over only a small number of years; it must be met by a periodic revision of the "mass-units" or the "weights." Change in quality is continually taking place in regard to all commodities, and nearly every two samples of a commodity would be found, on strict analysis, to differ (*e.g.*, in chemico-physical analysis). The question is really only one of degree, and each case must be decided on its merits. If the objection that strictly applies, *viz.*, that change of quality must invariably be taken into account, were allowed to have weight, we should be landed in an absurd position, *viz.*, that no deductions could strictly be made. It is of importance, therefore, to notice that, by the device of obtaining the "predominant" or "most frequent" price, the class, quality or grade of commodities comprised in the regimen always refer to that class, quality or grade which is most frequently sold. The method, though not theoretically perfect, has distinct advantages.

This may be explained in the following manner:—Suppose that in an investigation into prices, either wholesale or retail, certain grades or qualities of commodities have been selected as representative of the grades or qualities most commonly used, and as furnishing typical price movements for the several commodities included in the regimen, and suppose that owing to a change in quality or in the habits of the people these selected grades cease to be representative either of the quality consumed or of the price movements, then the successive index-numbers, being based on a regimen which no longer prevails, cease to be of value. If, however, the data collected referred to the "predominant" or "most frequent" prices, then the prices obtained continually relate to the grade or quality most frequently used, whatever that grade or quality may be. Of course, in the case of certain commodities in regard to which all the varieties of production and all the changes of fashion have their full influence, it may be impossible either to select any grade, which is representative in quality and which truly reflects changes in prices, or to determine any quality which is most frequently sold. It is for this reason that certain commodities, such as clothes, boots, furniture, etc., have been excluded from the present investigation. It appears, therefore, that the objections which have been raised to the formation of an index-number based on retail prices are not valid, and that, in any case, they apply equally to one based on wholesale prices.

* This is generally true with the exception of a few commodities such as clothes made to order and a few other special commodities, in the making of which skill or personal service plays an important part.

The matter is one of such importance that it may again be pointed out that the scope of this part of the Report is limited to the consideration of variations in *expenditure on a definite regimen or schedule of living*. The questions of variations in the constituent parts of that regimen or schedule and of variations in the extent of the means of defraying the expenditure must be left for future consideration. And it may here be remarked that as regards the latter matter, viz., the extent of the means of defraying the expenditure, it is intended to issue, in the course of a few months, a further Report which will embody *inter alia* the results of investigations which have been made into the course of wages during past years; for future years reliable and comprehensive returns will be collected, and index-numbers will be published, for wages paid in various industries and localities, as well as for the whole Commonwealth.

In regard to the former of these two matters, viz., variations in the composition of the regimen, it is proposed to collect from time to time household budgets, the analysis of which will furnish reliable information as to *distribution of actual expenditure*. In all investigations care must be taken to discriminate between a change in the *standard of living* and a change in the *cost of living*, in so far as this is possible without descending to minutiae which are insignificant for the end in view.

2. Commodities and Requirements included.—The first step in the inquiry proper was to decide what commodities, requirements and services should be included. An investigation carried out by the Bureau in 1910-11 into the "Cost of Living," comprising the expenditure of 999 persons, disclosed the fact that the distribution of family expenditures is as follows, viz.:—

(a) *Rent*, 16.3 per cent. (13s. 3½d.) on the total expenditure (£4 1s. 10½d.).

(b) *Food*, 28.4 per cent. (£1 3s. 3¼d.);

(c) *Clothing*, 12.3 per cent. (10s. 1¼d.);

(d) *Fuel and Light*, 3.4 per cent. (2s. 9d.); and

(e) *Other Items*, 39.6 per cent. (£1 12s. 5d.).

Though the standard of living, or regimen at any particular date, varies for different classes of people in the same country, and though differences occur in the modes of living of people even of the same class, and in the same locality, yet the fact that the figures just given are representative of the mass of the people is borne out by collateral investigations that have been made in this Bureau. Thus the average rent in 30 chief towns of Australia as determined from agents' returns is 12s. 4d., as compared with 13s. 3½d. obtained from the Cost of Living inquiry referred to.* Again from import, export and production statistics it is found that the average weekly expenditure per head of population is—On Meat, 1s. 2½d. per head; on Bread, 5½d.; Milk, 5¼d.; and on Tea, Coffee and Cocoa, 2¼d.; while the corresponding amounts computed from the "Cost of Living" investigation were as follow:—1s. 1d. per head on Meat, 6d. on Bread, 6½d. on Milk, and 2¼d. on Tea, Coffee and Cocoa. It is clear, therefore, that the above distribution of expenditure may be taken as representative, with a close degree of precision, of the whole community.

*The difference is probably due largely to the fact that nearly one-half of the families included in the "Cost of Living" inquiry had incomes of over £200.

Now the object of the present investigation being to obtain results representative of variations in the cost of living, due to price fluctuations, in the community as a whole, the plan (subject to the limitations referred to below) was to include as many commodities, etc., as possible, such as were suggested by reference to the character of the more universal needs of the mass of the people. In making the selection, however, it was considered desirable to have due regard to the following limitations:—

(a) In the first place, it was not intended for the purpose of this inquiry to include in the term "cost of living" the cost of satisfying all of the more universal needs of the people, but only that of ordinary necessities and conventional comforts.

(b) Secondly, it was desired to avoid unnecessary duplication, *e.g.*, it was not considered necessary to include prices of both ordinary flour and self-raising flour.

(c) Thirdly, it was not desired to include commodities in which the grades or qualities vary to such an extent that definite "predominant" or most frequently sold qualities or grades could not be determined with precision by the persons furnishing the data.

(d) Lastly, since (as has already been pointed out, see pp. 11, 12) the technique followed requires that the extent to which each commodity included is used should be known, it was not desired to include those commodities for which no information as to relative usage or consumption was available.

On reference to the results, given on page 17 hereinbefore, of the "Cost of Living" inquiry it will be seen that, excluding expenditure on "other items," by far the most important branch of expenditure is that on "Food," followed, in the order named, by rent, clothing, and fuel and light. Commodities comprised under the head of "Clothing" have been entirely omitted from this investigation, owing to the impracticability of obtaining periodic prices for predominant grades and qualities and of satisfactorily determining the relative importance of the various items (see paragraphs (c) and (d) above). For the same reasons commodities comprised under the heading "Fuel and Light" have also for the present, at any rate, been excluded. In country districts wood is extensively used, while gas, coal and electricity are practically not used at all; again, in urban districts the consumption of wood as fuel is comparatively small, while gas is used both as an illuminant and as fuel.

The expenditure on "other items" comprises amounts spent on other groceries not food, beverages, tobacco, fares, insurance, contributions to benefit societies, education and school materials, medical expenses, rates and taxes, sports and amusements, furniture, and all other expenditure. It is, of course, obvious that in regard to many of these items, prices cannot be collected; the expenditure upon them is moreover largely a matter of individual taste or caprice. Prices of "other groceries not food," including kerosene, are included in this investigation; the expenditure on these items amounts to nearly 3 per cent. on the total expenditure. All other items in this group have been advisedly excluded from the present investigation, *viz.*, for one or more of the reasons specified above.

It may now be seen that the scope of this inquiry includes expenditure on (a) Food, (b) House Rent, and (c) Other Groceries not Food, comprising approximately 48 per cent., or nearly one-half, of the total expenditure of a normal family. The only important branch of expenditure which is entirely excluded is "Clothing," *necessary* expenditure on clothing does not, however, vary greatly from year to year, and expenditure on clothing other than what is necessary in accordance with an individual's station in life may well be looked upon as expenditure on a luxury. Variation in expenditure on clothing due to price fluctuations is, in fact, indeterminate owing to the influences of individual taste, fashion, and immense variety in production. Finally, in respect to this item, it may be pointed out that the question of "change of standard," so largely enters into the result, that the appropriate method for determining change in the cost of clothing is the householder's budget only.

Investigations have proved that the percentage of expenditure on food is far greater in families having small incomes than in those having larger incomes, thus indicating that economies in expenditure are primarily effected in regard to matters other than food. The same is true, but to a less extent, in the case of house rent, while, on the other hand, the relative expenditure on amusements, luxuries, and miscellaneous matters is far greater in the case of families having large incomes. Expenditure on clothing remains at a fairly constant percentage in all families grouped according to income. Now these facts shew that, in so far as expenditure on living is affected merely by changes in prices, the proper branches of expenditure to be primarily investigated are those relating to food and house rent, since it is shewn that these needs are the first to be satisfied, the surplus, after their satisfaction, being expended in other ways; in other words, the regimen in regard to food and house rent is substantially constant, while the regimen in regard to other items of expenditure is, to some extent, dependent upon variations in price of those commodities and services (in regard to which the regimen is constant) which have first of all to be paid for. The effect of change in prices on cost of living should obviously, therefore, be primarily investigated from the standpoint of those commodities, for which the need is first satisfied, and in regard to which changes in price thus have their full influence on the totality of purchases which can be made with a fixed income. The result is that those items of expenditure which have been excluded from this investigation do not adversely affect the validity and utility of the index-numbers computed to shew the variation in cost of living due to price-fluctuations. The truth of the matter is that if all branches had been included a fictitious result would have been obtained, since total aggregate expenditure is fixed and does not, in the majority of cases, vary with prices, and, therefore, the distribution of expenditure on luxuries, amusements, etc., does not contribute a substantially constant regimen, but one which has to be restricted to the surplus available after payment for food, housing accommodation, other necessities, and conventional comforts. In other words, the regimen in regard to such comforts and luxuries varies inversely as the prices paid for the needs that are first satisfied, and it is the price of these needs which has the predominating influence on the distribution of aggregate expenditure and on the cost of living. Moreover, as has been pointed out elsewhere

pp. 11-12, the method of comparison by index-numbers is valid only if the regimen be constant or *pro tanto* for that part of a regimen which is constant. The inclusion of expenditure on clothes, luxuries, amusements, and other matters is, however, of course essential in any inquiry into distribution of expenditure, that is, regimen or change in *standard* of living, a matter with which, as has already been stated, (see para. 1) this Report is not concerned.

The various items comprised in this investigation may be conveniently grouped under the following four heads:—

Retail Prices—Commodities, etc., included in each Group.

I. GROCERIES. (18 Commodities).	II. DAIRY PRODUCE. (7 Commodities).	III. MEAT. (21 Commodities, Joints, etc.).	IV. HOUSE RENT. (Weighted Averages).
1. Bread. 2. Flour. 3. Tea. 4. Coffee. 5. Sugar. 6. Rice. 7. Sago. 8. Jam. 9. Oatmeal. 10. Raisins. 11. Currants. 12. Starch. 13. Blue. 14. Candles. 15. Soap. 16. Potatoes. 17. Onions. 18. Kerosene.	1. Milk. 2. Butter. 3. Cheese. 4. Eggs. 5. Bacon (Mid. Cut). 6. " (Shoulder) 7. Ham.	1. Beef (Fresh) Sirloin. 2. " " Rib. 3. " " Flank. 4. " " Shin. 5. Steak " Rump. 6. " " Shoulder. 7. " " Buttock. 8. Beef (Corned) Round. 9. " " Brisket " " with bone. 10. " " Brisket " " without " " bone. 11. Mutton, Leg. 12. " " Shoulder. 13. " " Loin. 14. " " Neck. 15. Chops, Loin. 16. " " Leg. 17. " " Neck. 18. Pork (Fresh) Leg. 19. " " Loin. 20. " " Belly. 21. " " Chops.	(The rents used in the computation of the index-numbers given in this Report represent, except where otherwise stated, the weighted average rent for all houses, obtained by weighting the predominant rents for houses of each different size by the number of houses of that size in each particular town. Index-numbers based on rents of houses of any particular size can, of course, be specially computed from the data furnished in this Report and the Appendixes thereto.)

3. Relative Expenditure and Mass-Units.—In order to obtain the aggregate expenditure at any period, that is the sum of the relative expenditures on the items included, it is, of course, necessary to multiply the price of each commodity by a number, called the mass-unit, which represents the relative extent* to which that commodity, and the particular unit thereof, is used. The general method followed in computing these relative numbers, or "mass-units," is the same as in the case of Wholesale Prices, that is to say, the extent of usage or consumption has in general been obtained by taking the production of each commodity in Australia and adding or subtracting the excess of imports over exports, or *vice-versa*, as the case may be. The figures have, in general, been based on the average production, and the average export and import returns, for the five years 1906 to 1910, inclusive.

* The relative extent is alone essential, in other words the mass units must represent the quantities used in some period of time common for all commodities.

(i.) *Commodities Included and Mass-Units.*—In the subjoined table particulars are given shewing the numbers thus obtained. In the third column is shewn the extent (in thousands) to which each commodity, in the unit specified, is used or consumed. The fourth column shews the relative numbers which have been adopted (in the computation of the index-numbers) as representing the extent of usage or consumption. The effect of thus "rounding-off" the mass-units to be used was specially investigated; it was found that for a regimen comprising 73 commodities taking the prices for 1871 and 1911, the index-number referred to the latter year as base obtained by using the actual figures (as shewn in column 3) was 1194, whereas the index-number obtained by using the rounded-off mass units (as in column 4) was 1193. This shews that the error caused through using the latter figures, and thus considerably shortening the arithmetical labour, is negligible.

Retail Prices.—Table shewing **Commodities, etc., included in Investigation, Units, Extent of Usage or Consumption and "Mass-Units" adopted.**

Commodity.	Unit.	Extent of Average Annual Usage or Consumption (000 omitted).	"Mass Unit."
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GROUP I.—GROCERIES (INCLUDING BREAD).

1. Bread	2. lb. loaf	468,000	468
2. Flour, ordinary	25 lb. bags	11,280	11
3. Tea	lb.	30,000	30
4. Coffee	"	2,100	2
5. Sugar	"	460,000	460
6. Rice	"	50,000	50
7. Sago	"	7,750	8
8. Jam	"	73,500	73
9. Oatmeal	"	35,000	35
10. Raisins	"	14,000	14
11. Currants	"	14,000	14
12. Starch	"	1,000	1
13. Blue	doz. sqs.	500	$\frac{1}{2}$
14. Candles	lb.	16,000	16
15. Soap	"	64,000	64
16. Potatoes	14 lbs.	64,000	64
17. Onions	lb.	68,000	68
18. Kerosene	gallon	17,500	17

GROUP II.—DAIRY PRODUCTS.

19. Milk	quart	300,000	300
20. Butter	lb.	95,000	95
21. Cheese	"	15,000	15
22. Eggs	dozen	18,000	18
23. Bacon, middles	lb.	16,000	16
24. Bacon, shoulder	"	16,000	16
25. Ham	"	8,000	8

Retail Prices.—Table shewing Commodities, etc., included in Investigation, Units, Extent of Usage or Consumption and "Mass-Units" adopted.—continued.

Commodity.	Unit.	Extent of Usage or Consumption (000 omitted).	"Mass Unit."
GROUP III.—MEAT.			
26. Beef, sirloin ..	lb.	67,000	67
27. " rib ..	"	82,000	82
28. " flank ..	"	12,000	12
29. " shun ..	"	14,000	14
30. Steak, rump ..	"	24,000	24
32. " shoulder ..	"	53,000	53
32. " buttock ..	"	53,000	53
33. " corned round ..	"	39,000	39
34. " brisket, with bone	"	11,000	11
35. " " without bone	"	32,000	32
36. Mutton, leg ..	"	92,000	92
37. " shoulder ..	"	62,000	62
38. " loin ..	"	30,000	30
39. " neck ..	"	40,000	40
40. Chops, loin ..	"	82,000	62
41. " leg ..	"	15,000	15
42. " neck ..	"	31,000	31
43. Pork, leg ..	"	9,500	9½
44. " loin ..	"	8,500	8½
45. " belly ..	"	10,500	10½
46. " chops ..	"	8,500	8½
GROUP IV.—HOUSE RENT.			
47. House Rent ..	per week	46,500	46½

(ii.) *Relative Importance of Groups.*—The relative importance of any group depends, of course, upon the expenditure on any one group in relation to the expenditure on any other group or on all groups. The relative expenditures on the groups are obtained by taking the sum of the products of the mass-units, multiplied by the corresponding prices. Since the mass-units (which represents the "regimen") are constant over the period under review, the relative importance of any group will vary to some extent according to the price fluctuations from year to year. In the following table the relative expenditures are shown on the basis of the weighted average prices and house-rents for the first nine months in 1912 in the thirty towns for which particulars are collected, the averages being obtained by weighting the figures for each town according to its population.

Retail Prices—Relative Importance of Groups according to Weighted Average Price for Thirty Towns, 1912.

Particulars.	I. Groceries.	II. Dairy Produce.	III. Meat.	IV. House Rent.	All Groups
Relative Expenditure	63,457	39,703	37,710	87,922	228,792
Percentage on Total Expenditure ..	27.7	17.4	16.5	38.4	100 0

These figures shew that expenditure on food and groceries amounts to 61.6 per cent. on the total expenditure, and on house-rent to 38.4 per cent. In other words, the expenditure on house-rent was (according to prices and rents in the first nine months of the year 1912) 62.3 per cent. on the expenditure on groceries and food. An independent investigation carried out by this Bureau (by means of household budgets) into the Cost of Living in 1910-11 shewed that on the average expenditure on house-rent was about 60 per cent. on the expenditure on food and groceries. The remarkable closeness of these results confirms the accuracy of the "mass-units" used in this investigation to compute the relative expenditure on the various items.

4. Predominant or Most Frequent Prices.—The first step to be taken towards the actual collection of the necessary data was an examination of records of retail prices already available. These were contained mainly either in

(a) Statistical registers and other official publications issued by the State Governments; or

(b) Newspaper reports of market prices.

In making this examination, the important question of variation in grades and qualities had to be borne in mind, as also had the fact that one of the essential requirements of the present investigation was to furnish prices and index-numbers on a comparable basis, not only for each State, but also in different localities within a State.

It was found that the records of prices available in official publications of the States were not generally suitable as a basis for a comprehensive inquiry on the lines indicated, inasmuch as the information published by the respective States was not on a comparable basis, either as to the scope of the commodities included or as to the nature of the prices quoted. Moreover, for some of the States practically no information was available, while in others the particulars were meagre or indeterminate owing to the prices being published as a range, without any indication of what constituted an average.

The information available from newspaper and trade reports was equally unsatisfactory, mainly for the reason that the prices quoted refer to definite grades or qualities, which were not uniform for different States or localities. In many cases wide ranges of prices were given, and in other cases, no information at all was available; the latter objection especially applies to places and districts other than the metropolitan towns in each State.

In view of the preceding facts, it was decided to initiate an independent investigation and to obtain monthly statements of prices from a number of retail dealers throughout the Commonwealth. In doing so, it was also decided to obtain records of the *predominant* prices, that is to say, the prices of that grade or quality most frequently sold. In this way the difficulty of having, when obtaining prices, to select any particular grade or quality as representative of the purchases or requirements of the mass of the community, is obviated. Moreover, by adopting this method, the fact that the grades or qualities most frequently sold differ either in different localities or even at different periods, practically does not adversely affect the validity of the results obtained. This view of the matter has already been referred to (see p. 16).

5. Sources of Information as to Retail Prices.—Having decided upon the nature and scope of the data to be collected, the next step was to obtain the names and addresses of a number of representative retail dealers in each locality for which the particulars were required. This information was obtained, by the courtesy of the Secretary to the Postmaster-General's Department, through the postmaster in each locality. These officers were requested to furnish the names and addresses of a specified number of representative persons in each of the following classes, viz., (a) Grocers, (b) Butchers, and (c) Milk Vendors, and, it was pointed out, in selecting representative persons it was desired to obtain returns of prices only from firms or persons whose shops were patronised to a considerable extent by families of wage-earners; that the shops should not be such as cater chiefly for trade with a special class; and, lastly, that the more substantial establishments should be selected rather than small shops with their trade confined to a restricted locality.

(i.) *Returns for Current Years.*—As a result of the above inquiry satisfactory lists of representative dealers were secured for each town shewn in the following statement. The numbers in the last column but one indicate the number of returns which are collected for each town in the respective horizontal line and for each of the three classes of dealers (grocers, butchers, and milk-vendors). The numbers in the last column shew the total number of monthly returns collected for the six towns specified in each line respectively; the total number of monthly returns may accordingly be seen to be 612, that is, 204 in each class, or 102 in each State.

Cost of Living, Towns for which Returns Collected, and Number of Returns.

N.S.W.	Victoria.	Q'land.	S. Aust.	W. Aust.	Tasmania.	Number of Returns in each Class for each Town	Total Number of monthly Returns.
Sydney ..	Melbourne	Brisbane	Adelaide	Perth†	Hobart	10	180
Newcastle	Ballarat	Toowoomba	Kadina*	Kalgoorlie†	Launceston	7	126
Broken Hill	Bendigo	Rock-hampton	Port Pirie	Midland Junction§	Zeehan	7	126
Goulburn	Geelong	Charters Towers	Mount Gambier	Bunbury	Beaconsfield	5	90
Bathurst	Warrnambool	Warwick	Petersburg	Geraldton	Queens-town	5	90

* Including Moonta and Wallaroo. † Including Fremantle. ‡ Including Boulder City. § Including Guildford.

The forms necessary for the collection of the requisite data were prescribed by Regulation* under the provisions of the Census and Statistics Act, 1905, and were distributed to the various dealers in book form. Each book contained (a) Instructions for filling in the forms, (b) A form for each month of the year 1912, (c) A butt in which the prices entered on the form could be recorded by the person rendering the return, and (d) A supply of addressed post-free envelopes

* See Statutory Rules, 1912, No. 116, and Appendix VII. hereof.

for returning each month to the Commonwealth Statistician the completed forms. Copies of the forms used may be found in Appendix VII. hereof.

In the instructions issued with the forms it was pointed out that prices were to be quoted for the grade or quality most frequently sold to the mass of the community. Thus, if four different qualities of tea were sold, say, at 1s., 1s. 3d., 1s. 6d., and 1s. 9d. per lb., but most was sold at 1s. 3d., then that was the price to enter on the return. It may here be remarked that in order to get a true (weighted) average price, it would be necessary for each dealer furnishing returns to keep a record of the quantity of each commodity sold at each price; this information cannot, of course, in the vast majority of cases be obtained with anything like accuracy. The predominant, or most frequent price, is what is statistically known as the "mode."

The collection of these monthly returns was commenced in January, 1912, and it is intended to furnish index-numbers based thereon for each quarter after the issue of this Report. These index-numbers will, of course, be immediately comparable with those furnished herein.

As regards the collection of prices of bread, it may be stated that returns for the metropolitan (and a few other) towns are received each month from the Agents of the Labour and Industrial Branch of this Bureau. This was found to be necessary since grocers in those towns do not, as in most country towns, ordinarily sell bread.

(ii.) *Returns for Past Years, 1901 to 1911.*—The statistical organisation for the collection of current returns having been completed, attention was given to the question of procuring comparable information for past years. This was effected by obtaining special statements from a few representative firms and persons selected from among those who were already rendering the ordinary monthly returns—remuneration being offered in each case for this service.

In view of the expense entailed and of the difficulty experienced in getting thoroughly reliable information, this special investigation was limited to the capital town in each State. The information furnished gave the price of each commodity at the middle of each of the months of February, May, July, and October, for the years 1901 to 1911, inclusive. The arithmetic averages of the prices thus obtained were computed. In this connection reference may be made to the danger of taking, as has frequently been done, the prices merely at one particular point of time in each year, instead of taking an average. Thus it was found that evidence given by the manager of a large retail grocery business in Melbourne in August, 1912, in a case (under the Commonwealth Conciliation and Arbitration Acts) in which the question as to increase in cost of living was at issue, shewed that, by taking prices simply on the 1st July of each year, in the case of some commodities there had been a rise in price, and in others a fall, whereas according to average prices for the same years computed in this Bureau from periodic returns furnished by the same firm, in some instances an exactly opposite result was obtained.

In order to bring the results for past years (for which, as has already been pointed out, statements were obtained only from some of the persons rendering monthly returns) into line with those for the current and future years, average prices were first computed for each

year and each metropolitan town. Corresponding averages were then computed for the first three months of the current year (1912), firstly, from the monthly returns of those particular persons rendering the statements for past years also, and secondly, for *all* persons rendering current returns. The ratios between these two sets of averages were then computed for each commodity and each town, and new averages were re-computed for past years by multiplying the original averages by their corresponding ratios. The results for past years are thus fully comparable with current figures, provided that the proportional variations in prices obtained from the past year's statements for *some*, only, of the persons rendering current returns are representative of the variations in prices charged by *all* persons furnishing returns.

6. Sources of Information as to House Rents.—As regards House Rents, the same procedure for obtaining returns was followed as in the case of prices. Lists of names and addresses of representative agents were furnished by the Town Clerks of the various local Government bodies in the towns specified on page 24 hereinbefore. In regard to the metropolitan towns especially, care was taken to select agents in corresponding and representative suburbs and districts.

(i.) *Current Returns.*—The forms necessary for the collection of the requisite data were prescribed by Regulation* under the Census and Statistics Act, 1905, and were distributed to the house-agents in book form, as in the case of retail prices (see p. 24). Each book contained a form for each quarter of the year,† and in the instructions it was pointed out that particulars were to be given as to predominant weekly rents, that is, the rents most frequently paid for ordinary houses in a fair situation and in a good state of repair. The rents specified do not, therefore, refer to houses in particularly favoured situations, or to new houses having special conveniences or gardens or exceptionally well constructed, nor yet, on the other hand, to old or dilapidated houses, nor to houses in inconvenient or undesirable situations.

(ii.) *Returns for Past Years, 1901 to 1912.*—The arrangements made for the collection of information for past years were the same as in the case of retail prices (see p. 25). Particulars of rents were, however, asked only as at the middle of each year from 1901 to 1911, inclusive. No remuneration was paid for these statements, and the thanks of this Bureau, and of all interested in the question, are due to those agents who were good enough to furnish the information. As in the case of retail prices, the inquiry concerning rents for past years was restricted to the metropolitan towns. Re-computed averages for each year were obtained in the manner already indicated in regard to retail prices.

7. Cost of Living, General Results of Investigation in each Metropolitan Town, 1901 to 1912.—Index-numbers have been computed separately for each group of commodities (and for house-rent) included in the investigation, as well as for all groups taken together. These index-numbers are shewn for the capital town of each State in the

* See Statutory Rules, 1912, No. 184, and Appendix VII. hereof.

† The danger in obtaining merely one return referring to one particular point of time in the year has already been alluded to.

tables given hereinafter. In addition a weighted average index-number for all the capital towns combined has been computed by weighting the index-number for each town by a number representing its population. In each case the index-numbers have been computed with expenditure according to average prices in the year 1911 as base, that is to say, the figures shew the number of units which would have had to be expended, according to the average prices prevailing in each specified year, in order to purchase such commodities, or to pay such amounts for rent, as would, according to the average prices in 1911, have cost 1000 units.

It should be observed that these index-numbers do not in any way shew the relative purchasing power of money or cost of living in the several places specified; they merely shew the relative cost from year to year in each town independently. In other words, comparisons can be made between the numbers in the *horizontal lines*, but cannot be made *directly* between those in the *vertical columns*. That they are not directly comparable vertically is immediately evident when it is remembered that the expenditure in each town in 1911 (and the weighted average expenditure for all towns) is represented by the one figure—1,000—though actually the expenditure is not, of course, the same in each town. The question of the relative cost in different towns in the Commonwealth is dealt with hereinafter.

Index-numbers for the three main groups and for rent and for all groups and rent together are given separately in the following paragraphs.

(i.) *Groceries*.—In this group the 18 commodities specified on page 20 are included. The index-numbers are shewn in the following table, computed with expenditure in 1911 as base. It has already been pointed out that these index-numbers are *reversible*. That is to say, if it be desired to take any other year as base, the necessary calculations can readily be made by making the index-number for the base-year equal to 1000, and altering the other index-numbers proportionately (see paragraph (viii.) hereof).

Retail Prices in Metropolitan Towns, Index-Numbers for Groceries (Group I.), 1901 to 1912.

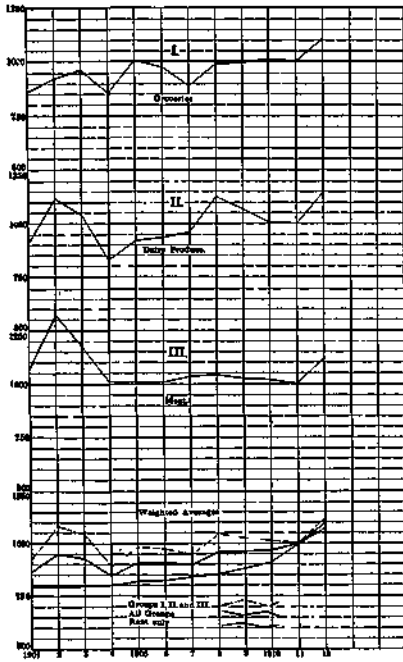
Town.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.*
Sydney	861	923	965	854	1,004	978	888	991	996	1,010	1,000	1,107
Melbourne	970	956	968	892	987	977	884	998	969	1,016	1,000	1,125
Brisbane	930	924	867	821	914	917	891	961	856	970	1,000	1,080
Adelaide	900	905	956	928	1,012	997	943	985	1,035	1,015	1,000	1,161
Perth	789	856	873	829	806	847	794	826	810	858	1,000	931
Hobart	932	939	958	881	944	955	886	958	1,016	1,009	1,000	1,128
Weighted Average†	916	930	951	872	981	966	887	979	976	1,000	1,000	1,106

* The first nine months only. † For the six capital towns.

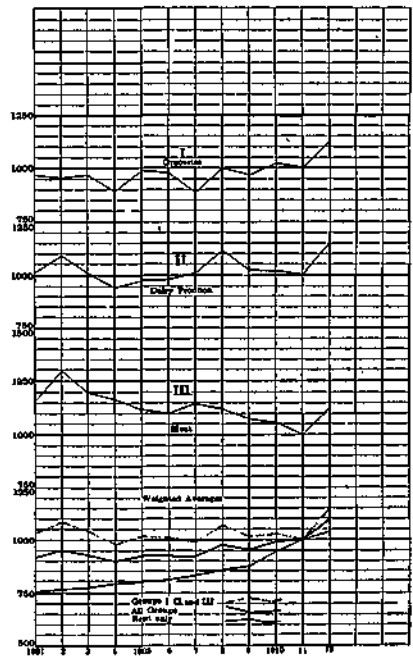
The above figures are shewn on the graphs on pages 28 and 29 the first graph (marked I.) in each case representing the index-numbers for this group. It may be seen that, while the graph for Perth shews certain distinctive features, there is a marked similarity between all the graphs for the different towns, prices being low in

RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS.
GRAPHS, 1901 TO 1912.

SYDNEY.

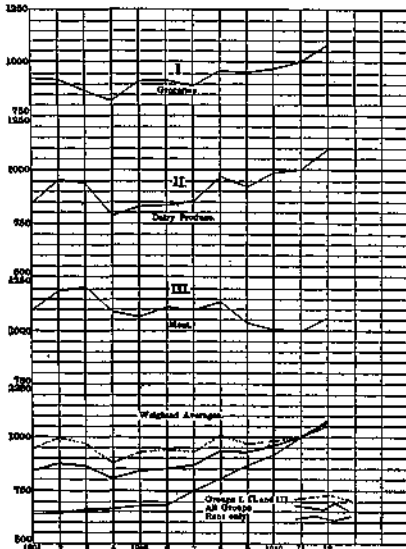


MELBOURNE.

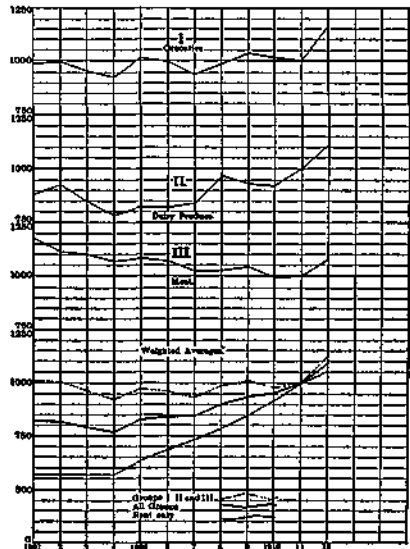


RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS.
GRAPHS, 1901 TO 1912.

BRISBANE.

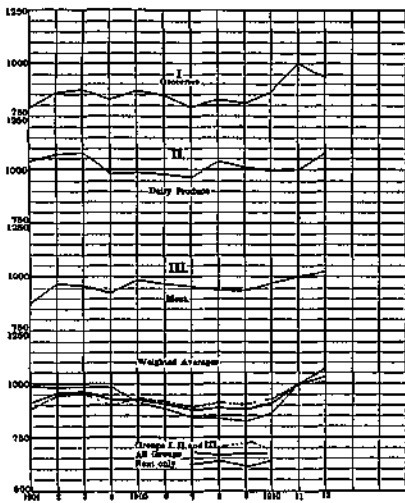


ADELAIDE.

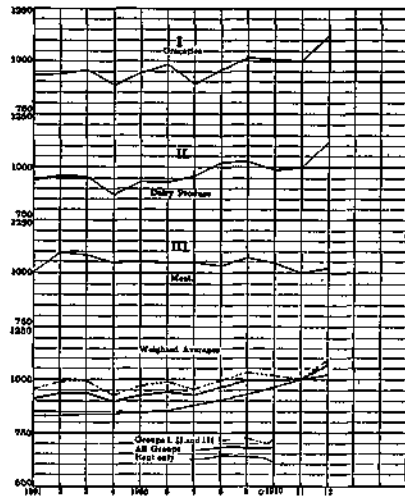


RETAIL PRICES, HOUSE RENT, AND COST OF LIVING IN METROPOLITAN TOWNS.
GRAPHÉ, 1901 TO 1912.

PERTH AND FREMANTLE.



HOBART.



1904 and again in 1907. There is a rapid rise in the price-levels in 1912 (the figures relating to the first nine months only) except in Perth, where the prices had been unusually high in the preceding year. With the exception of that town, prices were higher in 1912 in each of the metropolitan towns than in other year during the period under review.

In Sydney, Brisbane, Adelaide, and Hobart, prices were lowest in 1904, but in Melbourne they were somewhat lower in 1907, and in Perth they were lower in each of the years 1907, 1908, and 1909, than in 1904.

(ii.) *Dairy Produce.*—In this group there are 7 commodities included (see p. 20). The index-numbers for each metropolitan town for the period 1901 to 1912 are shown in the following table, the figures being computed with prices in 1911 as base (= 1000). The index-numbers are reversible, and may readily be computed for prices in any year other than 1911 as base (see paragraph (viii.) hereof).

Retail Prices in Metropolitan Towns, Index-Numbers for Dairy Produce (Group II.), 1901 to 1912.*

Town.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.*
Sydney ..	907	1,117	1,043	828	922	938	60	1,125	1,069	1,005	1,000	1,149
Melbourne	1,011	1,092	1,010	945	976	980	1,008	1,112	1,031	1,017	1,000	1,152
Brisbane ..	848	957	941	787	832	837	352	969	922	989	1,000	1,096
Adelaide ..	834	930	850	784	824	821	842	969	932	922	1,000	1,113
Perth ..	1,039	1,070	1,077	981	989	980	966	1,038	1,006	997	1,000	1,077
Hobart ..	937	963	959	869	933	931	961	1,021	1,023	988	1,000	1,121
Weighted Average†	945	1,068	1,002	871	927	934	955	1,082	1,023	998	1,000	1,136

* For first nine months only. † For all capital towns.

These figures are shown separately for each town on the second set of graphs (marked II.) on pages 28 and 29. It may again be observed that there is great similarity in the general contour of the graphs. Prices are high in 1902, 1908, and 1912, and in each town the maximum during the period under review was reached in the last year. These years of high prices coincide with the drought years, and it should be noticed that the increases are relatively larger in Sydney than in Melbourne, and in Melbourne than the other capital towns. In every case prices were lowest in 1904, which was also a year of low prices for groceries and meat. In Perth the maximum price-level in 1912 was equalled in 1903, but in the other towns the level in 1912 was distinctly above that for other years.*

(iii.) *Meat*.—This group includes the prices for 21 different commodities and joints, or cuts of butchers' meat (see p. 20). The index-numbers computed with prices in 1911 as base (= 1000), are shewn in the following table. These numbers are *reversible*, and the results for any other year as base can, therefore, be readily computed (see paragraph (viii.) hereof).

Retail Prices in Metropolitan Towns, Index Numbers for Meat (Group III.),
1901 to 1912.

TOWN.	1901.	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.*
Sydney ..	1,070	1,320	1,173	1,007	1,007	1,007	1,037	1,043	1,024	1,010	1,000	1,116
Melbourne ..	1,159	1,299	1,199	1,168	1,116	1,100	1,148	1,123	1,074	1,052	1,000	1,173
Brisbane ..	1,098	1,190	1,209	1,089	1,064	1,111	1,096	1,136	1,035	1,002	1,000	1,060
Adelaide ..	1,178	1,113	1,100	1,068	1,083	1,060	1,021	1,023	1,043	995	1,000	1,079
Perth ..	874	970	962	929	985	970	958	939	938	973	1,000	1,062
Hobart ..	1,003	1,094	1,083	1,044	1,050	1,046	1,047	1,033	1,067	1,045	1,000	1,021
Weighted Average†	1,101	1,251	1,161	1,072	1,058	1,053	1,074	1,069	1,040	1,024	1,000	1,121

* For first nine months only. † For all capital towns.

The price-indexes for this group, shewn in the third set of graphs (marked III.) on pages 28 and 29 present a very different aspect from those already referred to for Groups I. and II. Except for the increase in all the towns in 1912,* and in some of the towns in 1902, there is not any marked similarity between the price movements in most of the capital towns. Nor does it appear, as in the case of the other groups, that there has been any general increase (except in 1912) over the whole period under review. The rise in prices in 1902 and 1912 is, no doubt, due to the effects of the droughts in these years, and the drought-year of 1908 also shews increased prices in most of the towns.

In Sydney, the most noticeable features are the increases in price in 1902 and 1912, from 1904 to 1911 prices remaining fairly level. The maximum level was reached in 1902, and the minimum in 1911. The graphs for Melbourne and Brisbane prices are, in some respects, very similar to that for Sydney, the minimum prices occurring in the

* This may, of course, to some extent be due to the fact that the prices refer only to the first nine months of the year 1912, and the average therefore includes six winter months, when prices of commodities in this group may be said to be relatively high, and only three summer months, when prices are relatively low.

same year (1911) in all three towns, the maximum for Melbourne being in 1902, and for Brisbane in 1903. In Melbourne, the years intervening between the maximum and minimum shew a general fall, with a temporary increase in 1907, while in Brisbane there are increases both in 1906 and 1908.

In Adelaide prices shew a general fall from 1901 to 1911, the maximum level occurring in the former year, and the minimum in the latter. In Perth, on the contrary, the graph for this group on page 29 shews a general upward tendency over the period, though prices fell in the years 1902-4 and 1905-9. Conditions governing the meat supply in Western Australia are presumably different from those in the Eastern States. In Hobart, except for the rise in 1902, prices have been fairly level during the period under review.

(iv.) *Groceries and Food, Combined.*—The results obtained from the three groups referred to above have been combined so as to shew a weighted average for groceries and food. These results are of importance as shewing the aggregate effect on the cost of living of the movements in prices of commodities apart from variations in house rent. The index-numbers thus computed for the three groups are shewn in the following table. Since they are reversible, the necessary calculations for any other year as base can readily be made (see paragraph (viii.) hereof).

Retail Prices in Metropolitan Towns, Index-Numbers for Groceries and Food (Groups I, II. and III.), 1901 to 1912.*

TOWN.	1901	1902.	1903.	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.*
Sydney ..	927	1,078	1,040	886	982	974	946	1,041	1,023	1,011	1,000	1,119
Melbourne ..	1,032	1,035	1,041	980	1,018	1,010	989	1,064	1,015	1,026	1,000	1,145
Brisbane ..	948	998	970	877	928	943	930	1,006	966	983	1,000	1,080
Adelaide ..	1,008	1,007	963	922	974	963	933	990	1,008	981	1,000	1,124
Perth ..	880	946	953	899	935	919	890	911	901	930	1,000	1,009
Hobart ..	955	992	996	927	973	990	955	997	1,033	1,015	1,000	1,093
Weighted Average†	972	1,056	1,019	924	936	980	955	1,031	1,006	1,005	1,000	1,118

* For first nine months only. † For all capital towns.

The price-indexes for groceries and food are shewn by the broken lines on the graphs on pages 28 and 29 in relation to the price-indexes for house-rent alone, and to the weighted averages for all groups. It may be seen that there is again considerable similarity between the graphs for Sydney, Melbourne, and Brisbane, the price-level being high in 1902, 1908, and 1912, and low in 1904. The fluctuations are more marked in Sydney than in either of the other two towns. In all the capital towns prices for groceries and food reached their maximum in 1912,* and, reviewing the whole of the period, it may be seen that, broadly speaking, prices have tended to move upward. This upward tendency is most marked in Perth, Adelaide, and Brisbane, and is least noticeable in Melbourne.

The general trend of prices may perhaps be more clearly seen by considering the average price-level in 1911 and 1912 in relation, firstly,

* See footnote * on page 30.

to the average level during the five years 1901 to 1905, and secondly, to the average level in 1905 to 1910. Figures shewing such comparisons may be found in paragraph (vii.) hereinafter, both for the groups under consideration, for house-rents, and for all groups together.

(v.) *House Rent*.—In the following table index-numbers have been computed for the weighted average house-rent in each of the capital towns from 1901 to 1912, taking the average rent in 1911 as the base (= 1000). The average rent has been obtained for each town separately by multiplying the average predominant rent for each class of house (i.e., houses having less than 4 rooms, 4 rooms, 5 rooms, 6 rooms, 7 rooms, and over 7 rooms) by a number ("weight") representing the relative number of houses of that class in the particular town. The sum of the products thus obtained, divided by the sum of the weights, gives the weighted average for all houses.* The number of houses in each class for each town was obtained from the results of the 1911 Census. It should be observed, therefore, that these index-numbers are based on the weighted average rents for all houses, and that they do not refer to any particular class of houses. The actual predominant rents for each class are given in Appendix IV. hereof, and an examination of these figures will shew that for some classes of houses the increase has been greater, and in some less, than the general increase indicated in the following table.

The index-numbers may readily be computed for any year other than 1911 as base (see paragraph (viii.) hereof).

House Rents in Metropolitan Towns, Index-Numbers shewing Weighted Average Rents (Group IV.), 1901 to 1912.

TOWN.	1901.	1902	1903	1904.	1905.	1906.	1907.	1908.	1909.	1910	1911.	1912.*
Sydney ..	792	792	794	797	818	822	840	851	880	910	1,000	1,074
Melbourne	756	767	771	788	795	806	829	854	868	945	1,000	1,037
Brisbane ..	637	641	660	662	676	683	750	803	862	912	1,000	1,051
Adelaide ..	566	566	566	566	631	684	730	784	845	916	1,000	1,051
Perth ..	938	932	989	985	912	883	844	837	823	859	1,000	1,070
Hobart ..	829	831	836	838	846	852	880	904	931	964	1,000	1,023
Weighted Average†	755	759	763	770	784	794	818	841	868	921	1,000	1,055

* For first nine months only. † For all capital towns.

The above figures are shewn on the graphs on pages 28 and 29, in relation to the combined price-indexes for the other groups and for all groups together. It may be seen that, except in Adelaide, where rents remained constant from 1901 to 1903, and in Perth, where they decreased from 1903 to 1907, and again in 1909, there has been a uniform increase in each metropolitan town during the whole of the period under review. The increase has been greater in Adelaide (where the average rent in 1901 was only 566 compared with 1000 in 1911, and 1051 in

* The process may be illustrated mathematically as follows:—If a_1, a_2, a_3, \dots etc., be the average predominant rents in any town for houses of under 4 rooms, 4 rooms, 5 rooms, etc., respectively, and if n_1, n_2, n_3, \dots etc. be the corresponding numbers of houses of each such class in that town, then the weighted average rent =
$$\frac{n_1 a_1 + n_2 a_2 + n_3 a_3 + \dots}{n_1 + n_2 + n_3 + \dots} = \frac{\sum (na)}{N}$$
 where N = the total number of houses in the town.

1912), and in Brisbane than in the other towns. It should be observed, however, that at the commencement of the period rents were exceptionally low in Adelaide, and were comparatively low in Brisbane (see Appendix IV. hereof). The graph for Perth presents features entirely different from those for the other towns; the fall in rents commencing in 1903, and lasting until 1907, is followed, after another temporary decline in 1909, by a rapid rise.

The general results of these index-numbers can perhaps be better appreciated by a comparison of the average rents in the years 1911 and 1912, compared with the average rents during the two preceding quinquennial periods. These comparisons are shewn in paragraph (viii.) hereof.

(vi.) *Weighted Average for All Groups.*—The weighted averages for all four groups are of importance as indicating the general results of this investigation so far as cost of living is concerned. The following table shews the index-numbers for groceries, food, and house-rent for each metropolitan town computed to the year 1911 as base (= 1000). As already pointed out, these index-numbers are *reversible*, and if it be desired to take any other year as base, the necessary arithmetical work can readily be done (see paragraph (viii.) hereof).

Cost of Living in Metropolitan Towns, Index-Numbers shewing Weighted Average Results for all Groups (Groceries, Dairy Produce, Meat, and House Rent), 1901 to 1912.

TOWN.	1901.	1902.	1903	1904.	1905	1906.	1907.	1908.	1909.	1910.	1911	1912.*
Sydney	866	950	929	846	909	906	898	956	950	965	1,000	1,099
Melbourne	916	951	927	899	924	924	922	976	953	992	1,000	1,100
Brisbane	841	875	863	803	841	853	868	936	930	950	1,000	1,070
Adelaide	817	816	791	768	826	843	845	901	986	953	1,000	1,093
Perth	912	957	964	925	928	909	876	880	878	909	1,000	1,027
Hobart	911	937	941	897	929	942	929	965	998	997	1,000	1,089
Weighted Average†	880	920	910	858	901	902	897	951	948	970	1,000	1,091

* For first nine months only. † For all capital towns.

These figures are shewn separately for each town by the heavy line in the graphs on pages 28 and 29, in comparison with graphs shewing index-number for groceries and food and for house-rents. In all the towns the graphs disclose a distinct upward movement during the period under review, the rise in 1912* being particularly marked.

Generally speaking, prices were low in 1904, high in 1902 and 1908, and still higher in 1912. The general trend of the graph for Perth is different to that for the other towns, owing mainly to the decline in house-rents in that place, which occurred from 1903 to 1907, and again in 1909.

(vii.) *Relative Cost of Living at Different Periods, 1901 to 1912.*—Owing to the saltatory nature of the index-numbers, it is somewhat difficult, merely from the tables and graphs of annual index-numbers which have been given, to gauge the effect of the variations in the index-numbers on the cost of living over periods of several years.

* See footnote * on page 30.

In order to illustrate the method which may be employed for comparisons of this character, the average index-numbers during each of the quinquennial periods 1901-5 and 1906-10 have been computed, and the average index-number for 1911 and 1912 (first nine months only) compared with the average for each preceding quinquennium.

In the following table index-numbers for the average prices in 1911 and 1912 are shewn, firstly, computed with the average prices in 1901-5 as base (= 1000), and secondly, with the average prices in 1906-10 as base (= 1000). In other words, the first part of the table shews the number of units which would have had to be expended, according to the average prices prevailing in 1911 and 1912, in order to purchase such commodities, and to pay such amounts for rent as would, according to the average prices in 1901-5, have cost 1000 units.

Similarly, the second part of the table shews the cost in 1911-12 of what would, in 1906-10, have cost 1000 units.

Cost of Living in Metropolitan Towns, 1901 to 1912, Index-Numbers showing Average Cost in 1911 and 1912, compared with Average Cost in each preceding Quinquennium respectively.

Particulars.	Base Period.	Sydney.	Melbourne.	Brisbane.	Adelaide.	Perth.	Hobart
PRICE-INDEXES FOR 1911-12, THE AVERAGE EXPENDITURE IN 1901-5 BEING TAKEN AS 1,000 IN EACH GROUP OR SERIES OF GROUPS.							
Groceries and Food (Groups I., II., III.)	= 1,000 for 1901-5	1,077	1,040	1,102	1,089	1,088	1,079
House Rent— (Group IV.)	= 1,000 for 1901-5	1,298	1,314	1,565	1,770	1,066	1,209
Weighted Average for All Groups	= 1,000 for 1901-5	1,166	1,138	1,225	1,301	1,081	1,126
PRICE-INDEXES FOR 1911-12, THE AVERAGE EXPENDITURE IN 1906-10 BEING TAKEN AS 1,000 IN EACH GROUP OR SERIES OF GROUPS.							
Groceries and Food (Groups I., II., III.)	= 1,000 for 1906-10	1,060	1,050	1,077	1,080	1,103	1,048
House Rents— (Group IV.)	= 1,000 for 1906-10	1,204	1,184	1,278	1,294	1,219	1,116
Weighted Average for All Groups	= 1,000 for 1906-10	1,120	1,102	1,139	1,167	1,136	1,076

In every case these numbers are greater than the base number (1000), representing the average cost during each preceding quinquennium respectively, and the cost of living in each group was accordingly greater in 1911-12 than in either 1901-5 or 1906-10. For example, in Sydney the average cost of groceries and food in 1911-12 was 1077, compared with 1000 in 1901-5, that is, an increase of 77, or 7.7 per cent. Similarly for house-rent the increase in 1911-12 over 1901-5 was 29.8 per cent., and for all groups was 16.6 per cent.

The greatest increase shewn by the above figures is in house rents in Adelaide, comparing 1911-12 with 1901-5, namely 77 per cent. As might be expected from the graphs the increases in 1911-12 over 1906-10 are not ordinarily as great as over the preceding quinquennium, though in Perth the reverse is the case. Thus for all groups together

the increase in 1911-12 over 1901-5 in Sydney is 16.6 per cent., Melbourne 13.8 per cent., Brisbane 22.5 per cent., compared with increases over 1906-10 of 12.0 per cent., 10.2 per cent., and 13.9 per cent. respectively.

(viii.) *Reversibility of Index-Numbers.*—Attention has already been drawn to the fact (see page 14) that index-numbers computed by the aggregate expenditure method adopted in this Report are *really reversible*, so that, if it be desired to ascertain the price-indexes with any year other than that shown in the tables herein as base, the necessary arithmetical work can readily be performed.

For example, turning to the table on page 27 shewing index-numbers for groceries, if it be desired to ascertain the index-number for Sydney with the year 1901 as base (1901 expenditure = 1000), the index-number for 1901 will, of course, be 1000 instead of 861, that for 1902 will be $\frac{923}{861} \times 1000 = 1072$, for 1903 will be $\frac{965}{861} \times 1000 = 1121$, for 1911 it will be $\frac{1000}{861} \times 1000 = 1161$, and so on.

Similarly in regard to all other index-numbers given in this part of the Report *the figures may readily be reversed* so as to shew the relative expenditure with any desired year as base.

8.—General Results of Investigation, Relative Cost of Living in Different Towns, 1912.—The index-numbers given in the preceding paragraphs shew the cost of living separately for each individual town during the years 1901 to 1912. The figures given in the table on page 37 shew the relative cost of living (based on the average prices for the first nine months of the year 1912) in the thirty towns for which particulars are now being collected. The cost of living in each town is compared with the weighted average for all towns. That is to say, the average expenditure in each group in each town has been weighted by a number representing the population of the town and a weighted average expenditure for all towns has been computed.* Taking this average expenditure as the base (= 1000) the relative expenditure in each town has been computed. Owing to the concentration of population in the capital towns the prices and rents in these towns have a preponderating influence on the weighted average index-numbers for all towns combined.

* The population weights used in this computation are as follow:—

Population Weights used in Computation of Index-Numbers shewing Cost of Living in different Towns, with weighted average for all Towns as Base (= 1000).

Town	Weight	Town.	Weight	Town	Weight.	Town.	Weight.	Town.	Weight.	Town.	Weight.
Sydney	638	Melbourne	590	Brisbane	140	Adelaide	190	Perth, etc.	105	Hobart	42
Newcastle	62	Ballarat	53	W'woomba	20	Kadina, etc	12	Kalg'lie, etc	31	Launceston	25
Br'ken Hill	31	Bendigo	44	R'k'hamton	21	Pt. Pirie	11	Mid. J'nry	7	Q'ntown	5
Goulburn	13	Geelong	34	Chrs Twrs	17	Mt Gam'br	7	Bunbury	4	Zeehan	4
Bathurst	9	W'nambo'1	9	Warwick	6	Petersburg	3	Geraldton	4	Beaconsfield	3

It is proper to observe that these index-numbers are also *reversible*, that is to say, if it be desired to take the expenditure in any particular town as base, the necessary calculations can readily be made. For example, referring to the index-numbers for all groups, taking expenditure in Melbourne as the base (= 1000 instead of 968), the relative cost in Sydney is—

$$\frac{1078}{968} \times 1000 = 1114; \text{ in Brisbane } \frac{907}{968} \times 1000 = 937; \text{ and so on.}$$

In other words, cost of living is 11.4 per cent. more in Sydney, and 6.3 per cent. less in Brisbane than in Melbourne.

Comparing the last three columns it may be seen that the relative costs in the different towns in regard to the two main divisions, and the weighted average for all groups combined, differ considerably. Thus, in Sydney the index-number for rent is 1232, or 23.2 per cent. above the weighted average for all towns, whereas the index-number for groceries and food is 981, or 1.9 per cent. below the average. In Brisbane, on the other hand, the index-number for groceries and food is greater than that for house-rent, both numbers being below the weighted average. In some of the smaller towns, too, especially in the mining districts, it may be seen that rents are very low, and groceries high, compared with the weighted average.

(i.) *House Rent*.—The index-numbers in the fourth column show that the most expensive town for house rent is Sydney, followed in the order named by Adelaide, Geraldton (W.A.), Melbourne, Goulburn, Geelong and Perth. Rents were cheapest in Beaconsfield and Zeehan.

(ii.) *Groceries and Food*.—As regards groceries and food, it may be seen that the most expensive towns are in Western Australia, where prices in Kalgoorlie and Boulder are highest. In the other States Broken Hill is the most expensive, followed in the order named by Charters Towers, Zeehan, Queenstown, Port Pirie, Beaconsfield and Hobart. Prices were lowest in Mount Gambier and Warrnambool.

(iii.) *All Groups*.—The last column shows that in regard to cost of living generally (according to the prices and house rents prevailing in the first nine months of the year 1912) the most expensive towns were Kalgoorlie and Boulder, where the cost was 24.5 per cent. above the weighted average. The next towns in point of expense were Geraldton (W.A.), Sydney, Perth and Fremantle, Adelaide, Midland Junction, Bunbury, Broken Hill and Melbourne. The least expensive towns were Beaconsfield, Ballarat, Bathurst, Kadina, Moonta and Wallaroo, and Bendigo, in the order named.

As regards the capital towns, it may be seen that Sydney was the most expensive, followed in the order named by Perth and Adelaide (equal), Melbourne and Hobart, Brisbane being the cheapest.

Cost of Living, 1912.* Index-Numbers shewing Cost in each of Thirty different Towns (including the Average Rent for All Houses) compared with Weighted Average Cost for All Towns.†

TOWNS	I. Groceries.	II. Dairy Produce.	III. Meat.	IV. Rent.	I, II, III. Groceries and Food.	All Groups ‡
New South Wales—						
Sydney ..	1,009	980	936	1,232	981	1,078
Newcastle ..	1,028	946	976	678	991	871
Broken Hill ..	1,145	1,192	1,230	658	1,181	980
Goulburn ..	1,013	972	841	905	955	936
Bathurst ..	1,021	943	806	668	941	836
Victoria—						
Melbourne ..	930	976	954	997	950	968
Ballarat ..	902	864	1,135	645	954	835
Bendigo ..	971	937	996	949	908	846
Geelong ..	941	920	969	860	942	911
Warrnambool ..	933	893	947	763	925	863
Queensland—						
Brisbane ..	1,052	951	867	799	974	907
Toowoomba ..	1,121	909	803	806	976	911
Rockhampton ..	1,082	948	977	690	1,016	891
Charters Towers ..	1,314	1,043	964	597	1,144	934
Warwick ..	1,138	908	936	818	1,019	942
South Australia—						
Adelaide ..	996	1,083	979	1,150	1,016	1,072
Kadina Moonta Wallaroo ..	987	1,075	986	567	1,012	841
Port Pirie ..	1,033	1,091	1,047	721	1,054	926
Mt. Gambier ..	982	800	911	639	993	801
Petersburg ..	1,072	946	1,006	798	1,019	934
Western Australia—						
Perth and Fremantle ..	1,063	1,180	1,467	859	1,204	1,072
Kalgoorlie and Boulder ..	1,406	1,438	1,703	846	1,495	1,245
Midland Junction and Guildford ..	1,090	1,127	1,560	737	1,226	1,038
Bunbury ..	1,100	1,092	1,878	667	1,252	1,027
Geraldton ..	1,181	1,186	1,414	1,069	1,245	1,177
Tasmania—						
Hobart ..	1,012	984	1,091	816	1,025	945
Lancaster ..	949	924	1,083	810	978	813
Zeehan ..	1,063	1,055	1,328	448	1,132	860
Beaconsfield ..	1,009	960	1,131	294	1,023	746
Queenstown ..	1,070	1,034	1,309	583	1,124	916
Weighted Average for all Towns	1,000	1,000	1,000	1,000	1,000	1,000

* For first nine months only. † The weighted average for all towns is found as follows:—
Let E denote the group-expenditure in any town and P its population, suffixes being used to
relate the two, the weighted average for the whole of the towns is $E = \frac{E_1 P_1 + \text{etc.}}{P + \text{etc.}} = \frac{\Sigma(E P)}{\Sigma P}$

‡ Weighted averages.

Some few words as to the proper interpretation of the above table may not be out of place. The weighted average for all towns represents the price paid, on the average, by the people of all the towns regarded as a single community. In other words, if the people of the thirty towns are paying on the average £1000 for groceries, the people in Sydney

are paying £1009, those in Newcastle £1028, and so on. (See column I.) Or again, if the people of the thirty towns are paying on the average £1000 for the four series of items, then those of Melbourne are paying £968, of Ballarat £835, and so on. (See final column). Thus in this table the figures are *comparable vertically, but are not directly comparable horizontally*, and this is to be carefully borne in mind in making comparison. That they are not directly comparable horizontally is immediately evident when it is remembered that each series, or group, for all towns is represented by the one figure—1000—though actually they do not represent equal amounts.

It should be clearly understood that, so far as house rent is concerned, the figures given in the preceding table shew the relative cost, including the weighted average for *all* houses in each town. If houses of any particular size only are included, different results may be obtained. This is evident when it is remembered that the distribution of houses according to number of rooms is substantially different in some of the towns; that is to say, there are a greater number of large, and therefore of relatively more expensive houses, in some towns than in others, and *vice versa*, and consequently the weighted average rents in the former class of towns refer to a larger size of house than in the latter class.

Analogous observations apply, perhaps less strongly but none the less truly, to other elements of the table. For example the regimen adopted, though accurately representative of Australia as a whole, no doubt varies from State to State and from town to town, as well as from class to class, and of course finally individually. And price-indexes may, of course, be regarded from this point of view, and will be as numerous as the classifications for which they are deduced. The regimen as regards columns I. to IV. may be taken as generally applicable, and none but general data exist for relative consumption of food and groceries. The census, however, has furnished evidence as regards certain differences obtaining in respect of houses.

The census results shew that as regards number of rooms, houses having four rooms are most numerous, followed by five and six-roomed houses in the order named. It has, therefore, been thought desirable to furnish extended tables shewing relative cost of living in the thirty towns specified for these classes of houses separately.

The following table furnishes index-numbers for house rent of four, five, and six-roomed houses, and also for all groups combined for each class of house separately. The figures shewn in the preceding table in regard to the weighted average for *all* houses are repeated for comparative purposes. These index-numbers have again been computed in the manner already indicated, with the weighted average for the whole thirty towns as base (= 1000).*

* Strictly speaking, in dealing with houses of a special class, the weights should be based upon the relative number of houses of that special class in the several towns, and not upon the relative population of the towns. The difference in using population weights is, however, small and only affects the results in so far as the weighted average for all towns is concerned; in other words the system of weights does not in any way affect the results in so far as relative costs between town and town is concerned, but merely concerns the relation between the cost in each town, and the weighted average cost for all towns.

Cost of Living, 1912.* Index-Numbers shewing Relative Cost in each of Thirty Towns (including 4, 5, and 6-roomed Houses and all Houses), compared with Weighted Average Cost for all Towns.

Town	HOUSE RENT.				FOOD, GROCERIES, AND RENT, INCLUDING HOUSES HAVING—			
	4-room'd Houses only.	5-room'd Houses only.	6-room'd Houses only.	All Houses Weight'd Average.	4 Rooms	5 Rooms.	6 Rooms.	All Houses. Weight'd Average.
NEW SOUTH WALES—								
Sydney ..	1,265	1,206	1,187	1,232	1,072	1,065	1,067	1,078
Newcastle ..	626	734	755	678	874	896	892	871
Broken Hill ..	308	830	764	658	1,062	1,051	1,007	980
Goulburn ..	618	847	870	905	848	915	920	836
Bathurst ..	682	638	663	668	843	829	825	836
VICTORIA—								
Melbourne ..	977	977	994	997	958	959	968	968
Ballarat ..	492	553	594	645	806	806	803	835
Bendigo ..	590	621	649	649	847	840	835	846
Geelong ..	731	779	838	860	875	882	899	911
Warrnambool ..	717	734	732	763	859	855	845	863
QUEENSLAND—								
Brisbane ..	682	700	759	799	831	873	884	907
Toowoomba ..	626	706	686	806	864	876	855	911
Rockhampton ..	626	610	649	690	891	866	863	891
Charters Towers ..	611	683	653	507	974	974	939	934
Waiwick ..	752	739	732	818	934	916	899	942
SOUTH AUSTRALIA—								
Adelaide ..	1,188	1,264	1,224	1,159	1,071	1,108	1,103	1,072
Mounta, &c ..	590	576	617	567	877	851	847	841
Port Pirie ..	343	706	755	721	978	958	929	926
Mt. Gambier ..	604	632	635	639	807	803	791	801
Petersburg ..	843	847	828	798	963	955	939	934
WEST AUSTRALIA—								
Perth ..	963	965	943	859	1,127	1,116	1,097	1,072
Kalgoorlie, &c ..	1,160	1,157	1,132	846	1,388	1,370	1,343	1,245
Mid. Junction, &c ..	752	858	870	737	1,075	1,090	1,077	1,038
Bunbury ..	878	841	842	667	1,133	1,101	1,081	1,027
Geraldton ..	1,384	1,377	1,252	1,069	1,239	1,293	1,247	1,177
TASMANIA—								
Hobart ..	822	802	787	816	961	943	926	945
Lanuceston ..	773	807	805	810	912	915	906	913
Zeehan ..	576	639	800	448	954	968	947	869
Beaconsfield ..	365	323	318	204	816	760	731	746
Queenstown ..	724	706	755	583	996	969	970	916
Weighted Average ..	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000

* For first nine months only.

9. Sydney and Hobart, Retail Prices for Past Years.—

Reference has already been made (see page 8) to the unsatisfactory nature of the data available in regard to prices in official reports and documents of the States Departments. For two of the metropolitan towns, however (viz., Sydney and Hobart), prices for restricted lists of commodities were found to be available for some years back, and index-numbers have accordingly been computed from these data. It should be observed, however, that there appears to be some doubt as to whether the prices given accurately represent true average prices, and also as to whether they refer to substantially the same qualities or grades of commodities for the whole of the respective periods under review. For example, on inquiry as to the grade or quality of one commodity for which the price given appeared too low, the reply elicited was that "the prices are said to be fair averages, although the price (in question) may perhaps be rather low." It should also be pointed out that

the commodities for which prices are available comprise only groceries, food, beer and tobacco, and that no particulars in regard to house rent are included.

(i.) *Sydney Retail Price Index-Numbers, 1850 to 1912.*—The eighteen commodities included in the computation of the index-numbers given hereunder are as follow, viz.:—Bread, beef, butter, cheese, sugar, tea, potatoes, maize, bacon, eggs, rice, oatmeal, coffee, salt, beer (colonial), soap, starch and tobacco (colonial and imported). These index-numbers have been computed by the aggregate expenditure method already referred to. In the last two columns of the table the index-numbers computed from the data secured by the Commonwealth Bureau of Census and Statistics are given for comparative purposes. These are shewn both inclusive and exclusive of rent, the items included in the former being more closely comparable with those on which the index-numbers for the full period are based.

Sydney Retail Price Index-Numbers, 1850 to 1911.

Year.	Index-Numbers (from State data for Groceries and Food, 18 com- modities).	Year.	Index-Numbers (from State data for Groceries and Food, 18 com- modities).	Year.	Index Numbers		
					(From State data for Groceries and Food, 18 com- modities).	From data secured by Commonwealth Bureau.	
						Without Rent (46 com- modities)	With Rent.
1850	1,020	1871	920	1892	961	..	..
1851	1,090	1872	841	1893	936	..	..
1852	1,100	1873	925	1894	822	..	..
1853	1,340	1874	1,005	1895	810	..	..
1854	1,736	1875	1,038	1896	823	..	..
1855	2,014	1876	1,002	1897	813	..	..
1856	1,513	1877	1,042	1898	808	..	..
1857	1,801	1878	902	1899	882	..	..
1858	1,674	1879	896	1900	836	..	..
1859	1,422	1880	882	1901	916	927	866
1860	1,402	1881	889	1902	1,023	1,078	950
1861	1,385	1882	1,087	1903	966	1,040	920
1862	1,264	1883	1,065	1904	868	886	846
1863	1,131	1884	1,010	1905	976	982	900
1864	1,161	1885	1,038	1906	976	974	906
1865	1,257	1886	1,086	1907	942	946	898
1866	1,183	1887	1,008	1908	1,010	1,041	956
1867	966	1888	1,004	1909	1,018	1,023	959
1868	1,053	1889	991	1910	997	1,011	965
1869	904	1890	991	1911	1,000	1,000	1,000
1870	939	1891	973	1912*	..	1,119	1,099

* For first 9 months only.

It may be seen, from the above table and from the graph given in paragraph 2 of Section V. hereinafter, that the index-numbers computed for the eighteen commodities since 1850 agree fairly closely for the years 1901 to 1912 with the index-numbers computed for prices of the 46 commodities for which particulars were secured by this Bureau. A comparison with the index-numbers inclusive of house rent (see last column) shews, however, that the former figures cannot be taken as in any way accurately determining relative cost of living. Though the list of commodities included in the index-numbers from

1850 is restricted, in the absence of any more reliable or comprehensive data, the results will serve to indicate the general trend of retail prices in Sydney during these early years.

The figures show that comparing the average price levels, prices in 1910-11 were 4.72 per cent. higher than in the preceding decade, 13.15 per cent. higher than in 1890-9, 0.80 per cent. lower than in 1880-9, 4.07 per cent. higher than in 1870-9, 17.13 per cent. lower than in 1860-9, and 45.49 per cent. lower than in 1850-9.

After rapidly increasing from 1850 prices reached their maximum level in 1855, and then fell, with occasional recoveries until 1872. The index-numbers from 1871 to 1911 inclusive are shown in relation to other index-numbers for Australia on the graph referred to in paragraph 2 of Section V. hereinafter:

Reference to this graph will show that prices were high during the years 1874 to 1877 and again from 1882 to 1886. From 1894 to 1900 prices were especially low, the minimum being reached in 1895. During the last decade prices have generally risen, though there was a marked decline in 1904.

(ii.) *Hobart Retail Price Index-Numbers, 1881 to 1911.*—The seventeen commodities included in the computation of these index-numbers, which have also been obtained by the aggregate expenditure method, are as follow, viz.:—Bacon, bread, butter, candles, cheese, coffee, eggs, flour, ham, ale (colonial), milk, oatmeal, kerosene, rice, sugar, tobacco and tea. In the last two columns the index-numbers for Hobart prices based on the data secured by the Commonwealth Bureau of Census and Statistics are shown, both inclusive and exclusive, of

Hobart Retail Price Index Numbers, 1881 to 1911.

YEAR.	Index-Numbers (based on State data for 17 com- modities, Groce- ries, Food, etc.).	YEAR.	Index- Numbers (based on State data, 17 com- modities).	Index-Numbers (based on data secured by Common- wealth).	
				Without Rent (46 com- modities.)	With Rent.
1881	1,253	1897	962	..	..
1882	1,212	1898	939	..	..
1883	1,246	1899	913	..	..
1884	1,119	1900	882	..	..
1885	1,224	1901	940	955	911
1886	1,237	1902	941	992	937
1887	1,208	1903	950	996	941
1888	1,229	1904	945	927	897
1889	1,231	1905	936	973	929
1890	1,243	1906	931	990	942
1891	1,140	1907	944	955	929
1892	1,080	1908	1,000	997	965
1893	961	1909	922	1,033	998
1894	959	1910	848	1,015	997
1895	960	1911	1,000	1,000	1,000
1896	973	1912*	..	1,093	1,069

* First nine months only.

A comparison for the years 1901 to 1912 between the results secured from the State data for 17 commodities only and those from the Commonwealth data for 46 commodities shows immediately that there is but little agreement between the two sets of figures. The data available from the State official publications is considered to be unsatisfactory, inasmuch as the prices are given in the form of one quotation for the whole of each year, and in many cases a fairly wide range was given, with no indication as to the predominant or average price within that range. For these reasons the index-numbers referred to have been rejected as unreliable.

10. Tables of Prices and House Rents.—As this Report forms the basis upon which index-numbers for future months and years will be based, it has been thought desirable to publish, as appendices to this Report, the actual prices of commodities and the actual house-rents upon which the index-numbers given in the preceding paragraphs are based. As already pointed out, average prices and rents for the capital towns have been computed for each year from 1901 to 1912, while for the other towns, for which particulars are now being collected, the information is available for the first nine months of the year 1912 only.

(i.) *Prices in Metropolitan Towns, 1901 to 1912.*—The tables in Appendix II. inclusive shew the average prices of each of the 46 commodities in each capital town from 1901 to 1912 inclusive. Each price is given to the nearest decimal of a penny.

(ii.) *Prices in Metropolitan and Country Towns, 1912.*—The table in Appendix III. gives the prices of each of the 46 commodities for all the towns to which the present investigation has been extended. A weighted average price for all these towns has been computed for each commodity by weighting the price in each town by a number representing its relative population.

(iii.) *House Rents in Metropolitan Towns, 1901 to 1912.*—The table in Appendix IV. shews the average rent for houses of different sizes in each capital town from 1901 to 1912. The rents are given to the nearest decimal of a penny.

(iv.) *House Rents in Metropolitan and Country Towns, 1912.*—In Appendix V. are shewn the average rents in the first nine months of the year 1912 for houses of different sizes in each town for which particulars have been collected. A weighted average rent for each class of house has been computed by weighting the rents in each town by a number representing its relative population.