

1948
NEW ZEALAND

REPORT OF INDEX COMMITTEE, 1948

Presented to Both Houses of the General Assembly by Leave.

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PREFACE

PERSONNEL

THE following Committee was set up by the Government "to investigate the need and method of establishing a revised cost-of-living index" :—

Mr. F. P. Walsh (Chairman).

Mr. K. McL. Baxter.

Mr. W. A. Fox.

Mr. E. C. Fussell.

Mr. M. J. Moriarty.

Mr. R. S. Odell.

Mr. G. E. Wood.

At the initial meeting of the Committee held on 11th August, 1948, Mr. E. J. Russell, of the Census and Statistics Department, was appointed Secretary to the Committee. A technical sub-committee, consisting of Messrs. Moriarty, Odell, and Wood, was also appointed. Owing to Mr. Odell's absence from New Zealand on official duties at the time of the completion of the report, his name does not appear among the signatories, although he attended numerous meetings of the technical sub-committee and of the main Committee before his departure.

ACKNOWLEDGMENTS

We desire to record our appreciation of the excellent work done by our Secretary, Mr. E. J. Russell, of the Census and Statistics Department. We are also appreciative of the work done by the staff of the Census and Statistics Department in preparing data for our consideration. Our work was greatly helped by the ready co-operation we received from the staff of the Department and from many other people who were approached for assistance on specific points.

CHAPTER 1—INTRODUCTORY

1. On the first point in its order of reference—the need for a revised cost-of-living index—the Committee had little difficulty in arriving at the decision that a new index representing post-war habits of consumption was desirable. The group weighting pattern of the retail prices (old series) index was based on the results of a family budget inquiry conducted in 1930. Since that year there have been many changes in consumption habits—for example, the greater use of electricity and electrical appliances in the home, increased relative consumption of fruits and vegetables, breakfast cereals, milk, ice-cream, &c.—so that the “old series” index has become out of date. The Wartime Prices Index, introduced in December, 1942, was designed to measure variations in the retail prices of a group of stabilized commodities and services. This group of commodities and services was selected to represent reasonable wartime standards of consumption. An index designed for this purpose cannot be regarded as a suitable measuring-rod to gauge post-war changes in prices.

2. For the reasons outlined above, the Committee decided to recommend that a new index, based on post-war habits of consumption, should be compiled. Following are our proposals.

CHAPTER 2—DEFINITION OF THE INDEX

3. The name, “cost-of-living index,” is applied at various times and in various circumstances to vastly differing concepts. The term has not been used in New Zealand as describing official price indices, and the Committee recommends that the new index be called a consumers’ price index, and that the term “cost-of-living index” be avoided. Actually, there is no such thing as a general cost-of-living index, since the cost of living of a family varies widely according to various factors—*e.g.*, size and age constitution of the family, variations from the conventional in the living habits of the particular family, and so on. However, changes in retail prices affect all families—hence the usefulness of some measure of average changes in such prices. Since, quite obviously, changes in prices of commodities and services used in great quantity have a much greater effect on average living-costs than price changes of items in less common use, a consumers’ price index must be “weighted”—that is, it must accord greater importance to price changes in the more important items. There is, however, room for considerable difference of opinion as to the proper criteria of importance. Some index numbers are confined to “essential” commodities and services, the designers of such indices deciding which items are essential and which are not essential. Again, other indices relate to “working class” patterns of expenditure; expenditure of “families of moderate incomes”; “minimal” standards of expenditure; “maintenance of proper nutritive standards”—their variety is legion. The position is further complicated by the fact that habits of expenditure may vary considerably according to the geographical location of the family, the economic group of the family, and other variants.

4. There is ample evidence to indicate that variations in living habits in New Zealand are less pronounced than is the case in most other countries, so that it should be possible to design a single consumers' price index which will be of reasonably general application in this country. The Committee has taken into account the recommendations of the Sixth International Conference of Labour Statisticians, held in Montreal in August, 1947. On the point of the appropriate basis of a consumers' price index, the resolutions include the following :—

3. (1) The purposes which may be served by such indices in the post-war period are the measuring of changes over time in retail prices currently charged consumers for—

- (a) The pre-war consumption level of a given economic group in specified types of communities ;
- (b) A post-war consumption level of a given economic group in specified types of communities ; or
- (c) A consumption level of a given standard taking account of price-induced substitutions and any other substitutions imposed by circumstances, with as close regard to the maintenance of the same standard of adequacy as practicable.

5. While the majority of existing national index numbers of retail or consumers' prices are based on pre-war habits of consumption,* the Committee considered that the post-war index in New Zealand should be based on post-war consumption habits. That is to say, the Committee regards Resolution 3 (1) (b) above as representing the proper objective of the index. We consider, however, that, in the circumstances existing in this country, the index should not be limited in application to a "given economic group" or a "specified type of community." Accordingly, we have sought to design an index representative of post-war consumption among the generality of New Zealand consumers. We do not favour the type of index suggested in 3 (1) (c), since the taking into account of "price-induced substitutions and any other substitutions imposed by circumstances" would place too much responsibility on the Department charged with the day-to-day task of recording prices and compiling the index. In short, the Committee's views as to the proper form and content of the index might, in such circumstances, be negated by administrative practice. Therefore we have laid down in considerable detail the pattern which we recommend the new index should take, and have defined clearly the directions in which some variation from this pattern might be found necessary in altered circumstances.

CHAPTER 3—ITEMS COVERED BY THE INDEX

6. As indicated in para. 5, we favour the compilation of an index of reasonably general application. While, in the past, considerable emphasis has been given to the criterion of "essentiality" in the selection of commodities and services for inclusion in retail prices indices, the objective in modern index-number making† is to include within the scope of a retail prices index all commodities and services used by the consumer group or groups to which the index relates. No index can be completely comprehensive in coverage ; nor is it necessary that this should be so, since the only implication involved by the omission of a particular class of expenditure is that prices in that particular group have moved in accord with prices in the groups covered. Nevertheless, the principle of making coverage as complete as possible has been followed in the designing of the proposed index ; and the Committee has not excluded any group of commodities and/or services because that particular class of living expenditure was regarded as non-essential or socially undesirable.

* For example, the revised index number of retail prices introduced by the United Kingdom Ministry of Labour in 1947 is based on the pre-war pattern of expenditure in the United Kingdom as disclosed by a family budget inquiry undertaken by the Ministry in 1937-38.

† *E.g.*, the revised United Kingdom index, the Canadian and United States Official Indices.

7. A list of the groups of commodities and services to be covered by the proposed index is shown in Appendix A. A summarized statement indicating the main groups of commodities and services covered is as follows:—

- | | |
|--|--|
| <p>1. Food—
 Meat and fish.
 Fruits, vegetables, and eggs.
 Other Foods—
 Dairy-produce.
 Cereals.
 Other groceries.
 Meals away from home.
 Drinks and sweets.</p> <p>2. Housing—
 Rented houses.
 Flats.
 Owner-occupied houses.</p> <p>3. Fuel and Lighting—
 Coal.
 Electricity.
 Gas.
 Firewood, coke, &c.</p> <p>4. Clothing and Footwear—
 (a) Clothing—
 Men's.
 Women's.
 Boys'.
 Girls'.
 Babies'.</p> | <p>4. Clothing and Footwear—<i>continued</i>
 (b) Footwear—
 Men's.
 Women's.
 Boys'.
 Girls'.
 Babies'.</p> <p>5. Miscellaneous—
 (a) Household Durable Goods—
 Furniture and floor coverings.
 Household drapery.
 Hardware, crockery, &c.
 Household appliances.
 Perambulator, baby's cot.</p> <p> (b) Other Commodities—
 Cleaning supplies.
 Personal requisites.
 Educational and cultural.
 Medicines and baby foods.
 Tobacco and cigarettes.</p> <p> (c) Services—
 Transport.
 Postage and telegrams.
 Entertainments.
 Union dues.
 Health services.
 Personal services.</p> |
|--|--|

8. As will be apparent from the above summarized list, the Committee has endeavoured to make the index fully representative of normal living-expenses in the average New Zealand home. Reference to the detailed list of groups of commodities and services covered (Appendix A) and the list of goods and services priced (Appendix B) will show that, under the various main headings, conventional necessities such as ice-cream, sweets, and cosmetics have not been overlooked; while the household amenities of modern living are represented by such items as radios, vacuum cleaners, washing-machines, &c. Entertainments, personal services, and health services outside social security have all been taken into account.

9. Certain groups of personal expenditure cannot be adequately represented in a consumers' price index, either because consumption varies so much as between different families that no standard system of weighting can be devised, or—more usually—because pricing is impossible. For example, in many index numbers fruits and vegetables, though important in the diet, are only poorly represented. As will be shown later, it is proposed to represent this group adequately in the new index, despite the technical difficulties involved; but we have excluded the following groups, where expenditure varies widely and "pricing" is difficult:—

- (a) Contributions to charity, gifts, and Church subscriptions. It is obviously impossible to "price" these items, since expenditure will vary widely as between different families and in differing circumstances.
- (b) Holiday expenditure is only partly represented in the index by such items as fares (rail, bus, and taxi), meals away from home, and entertainments.
- (c) Domestic help is excluded as being a relatively small item in the average urban home, though, in particular circumstances, this item may be important. It is partly represented by certain items—*e.g.*, laundering.
- (d) Private telephone. This item was excluded as being a relatively small item in average urban household living-costs.

10. Two further items—private motoring and expenditure on alcoholic liquors—were omitted. Although the aggregate expenditure in the Dominion on private motoring is considerable, expenditure on this item varies greatly in individual circumstances, while a large proportion of urban families do not possess private motor-cars. In these circumstances, the Committee decided to omit this specific item, but to include taxi fares in the index, with an appropriate weighting which would represent—in some measure at least—expenditure on private motoring. Alcoholic liquors are not generally included in retail (or consumers') price index numbers,* and the Committee recommends that normal practice be followed by excluding this item, expenditure on which (as in private motoring) follows no standard pattern, but varies greatly.

11. Since a consumers' price index is related to the pattern of family spending, the inclusion of items in which there is a saving element raises some difficulties. For example, while fire insurance on a home or furniture is included in the index, the position is not so clear in relation to life insurance. This item is included in retail price index numbers for some countries, although in many other cases it is omitted. The Committee decided to exclude this item, on the grounds that it would not be logical to differentiate between the saving element in life insurance and other forms of savings which are omitted as not being part of the spending pattern.

12. A consumers' price index is designed to measure changes in prices of goods and services purchased at retail—that is, out of disposable income; and, consequently, direct taxation is not commonly included in such index numbers. The Committee decided to exclude direct taxation, which, in any event, would be a difficult item to weight and “price,” since such taxation increases with taxable income and (as far as income-tax is concerned) decreases according to the number in the family in respect of whom deductions are allowable. Again, directly off-setting elements, such as family allowances and other benefits under social security legislation, could not be ignored if direct taxation were included in the index.

CHAPTER 4—GEOGRAPHICAL COVERAGE OF THE INDEX

13. It has been indicated earlier that the weighting pattern recommended is based on aggregate national consumption of the various commodities and services covered. The localities from which the Committee considers prices should be collected were selected with a view to making as wide a coverage of New Zealand as was practicable. The following towns were selected:—

- (a) Four chief centres—Auckland, Wellington, Christchurch, Dunedin.
- (b) Representative large centres (population 16,000 and upwards)—Hamilton, Gisborne, Napier, New Plymouth, Wanganui, Palmerston North, Nelson, Timaru, Invercargill.
- (c) Representative smaller centres (population 6,000 and upwards)—Whangarei, Tauranga, Rotorua, Masterton, Blenheim, Greymouth, Ashburton, Oamaru.

14. The selection of towns to be covered by the index was governed largely by the desirability of making as wide a geographical coverage as possible. No minimum population was fixed as a criterion for the inclusion of a town in the index, since this would have involved, in some cases, the coverage of contiguous areas, one or other of

* For example, alcoholic liquors are not included in the Canadian, United States, Australian, or South African index numbers. The United Kingdom (revised) index includes this item.

which would sufficiently represent price changes in both areas. Although rural centres of importance are well represented, the index must be regarded as covering more particularly urban localities. A rural index, as such, would require some adjustment of weighting and, perhaps, a greater representation of smaller shopping centres. Nevertheless, price *changes* move in reasonably close harmony throughout New Zealand, and it is considered that the proposed index will represent average retail price changes to rural consumers reasonably well.

CHAPTER 5—COLLECTION OF PRICES

15. While a carefully designed weighting pattern and representative geographical coverage are necessary if a consumers' price index is to reflect accurately the average movements in prices charged to consumers, it is even more important to ensure that the prices on which the index is based represent actual selling-prices. This point was given considerable emphasis by the International Conference of Labour Statisticians, as the following resolution shows:—

7. (1) The effective administration of the price-collecting programme requires the careful selection and training of price-collection personnel.

(2) The use of appropriate methods of price verification, such as "check pricing" in which price quotations are verified by means of duplicate prices obtained by different agents, or "purchase checking" in which actual purchases of the goods priced are made, is recommended.

The Committee regards this matter of pricing as of first importance; and it has noted with satisfaction that a small staff of price-collectors has been appointed to the Census and Statistics Department to supervise the actual collection of prices for inclusion in the index. The necessity for making special arrangements to collect statistics of retail prices for inclusion in a consumers' price index is not lessened by the existence of price control. In the first place, actual prices of many commodities and services are not fixed by price control, but in these cases additions to retailers' actual costs are allowed, and these costs may vary, so that it is necessary to approach retailers to ascertain actual retail prices being charged. In yet other instances maximum prices are fixed by Price Orders. It is not sufficient to take, for the purposes of the index, controlled maximum prices. It frequently happens that the actual prices charged at a particular time do not reach the prescribed maxima; while, again, prices charged may, in individual instances, at times exceed the maxima. In either event, the prices actually charged should be recorded in the index. For this reason it is most important that the collection of price statistics should be made under the authority of the Census and Statistics Act, thereby ensuring secrecy of the individual returns, which are required for a purely statistical purpose—namely, the compilation of a prices index representing average prices charged to consumers.

16. As has been indicated previously, the index will be very comprehensive in its coverage of the goods and services used in the average household. Clearly, it would be impossible to collect prices for every commodity or service represented in the index; and a selection of items has been made, accounting for the greater part of expenditure in each group, and representing all items in that particular group. The list of goods and services priced is shown in Appendix B. Altogether, prices will be collected for 300 commodities and services.* As will be shown in the section on weighting, each priced item will carry a weight representing its own consumption plus consumption of related commodities or services not priced. By this means full coverage of all commodities and services of any importance in the household budget is ensured. It is,

* The numbers of items priced in the retail price index numbers for certain overseas countries are: Australia, 160; South Africa, 208; United Kingdom, 230; United States of America, 160; Canada, 152.

of course, most important that the "priced" items should be fully representative. Continuous supervision by the price-collecting personnel will be necessary to ensure that, if any of the items priced goes off the market or is replaced in popular demand by another commodity, appropriate alterations in the lists of items priced are made.

17. A further point of considerable importance is the effect on family expenditure of changes in the quality of goods. It is, of course, essential that, where possible, the prices reported should relate to identical qualities of goods at each period of reporting. For this reason the Committee stresses the importance of careful specification of each item to be priced; and the Government Statistician has drawn up price-collection forms after close consultation with expert opinion as to specifications for each item. Even with such precautions, difficulties in ensuring quotations for comparable qualities at each price collection are not easily overcome; and supervision of this aspect of the price-collecting programme will form an important part of the work of the price-collectors. The Committee has noted practice in United Kingdom, Canada, and Australia. The following quotations refer:—

United Kingdom.—"If there is a change in quality they (the retailers) are asked to report the fact and to give such information as may be necessary to assess the real changes in price level, after allowing for the effect of the change in quality."^{*}

Canada.—"For many years the Bureau has asked firms reporting prices of clothing and home furnishings to make at the same time estimates of any changes of quality in these goods. When the Bureau receives a report of a reduction in quality, this reduction is treated just as if it were a price increase of the same amount. The Bureau, furthermore, instructs its field representatives to be on the watch for quality deterioration when obtaining price reports."[†]

Similar precautions are taken in Australia to ensure that changes in the wearing quality of goods (particularly in the clothing group) are reflected in the index.[‡] While it is difficult to lay down any hard-and-fast rules regarding the reflection of changes in quality in a retail price index, the Committee considers that changes of importance should be taken into account, since a marked depreciation or appreciation in the quality of an article priced is equivalent to a price change and should be reflected in the index. In some countries samples of the goods to be priced are kept by the price-collectors; and, for the more difficult items, this practice is recommended.

18. While, in the majority of instances, there is little difficulty in arriving at the current retail price charged by a retailer for any commodity on a particular date, some ruling is necessary to cover special circumstances which may be operating in a shop at the time when a collection of prices statistics falls due. In that connection the following resolution of the International Conference of Labour Statisticians is quoted:—

9. (1) Prices charged for stale, damaged, shop-soiled, or otherwise imperfect goods should be ignored, but otherwise the index should be based on prices actually charged for cash sales.

(2) "Sale" or reduced prices should be taken where they are applied to the bulk of a shop's trade in the specified article and "cut" prices should be taken rather than "list" prices where they are in fact charged.

(3) Discounts should be taken into account if they are automatically given to all customers.

The Committee recommends that these principles should be followed, but that sale prices should be taken into account only if they apply to the normal quality of a particular article at the time of the sale. Again, a cash discount should be deducted from the selling-price only if it is automatically given to all customers.

19. The question of the periodicity of collection of prices is a matter of considerable importance from the administrative point of view, particularly in view of the fact that it is of the utmost importance that the price-collection should be carried out with great care. Again, it is most desirable that the demands on retailers to supply the necessary

* Ministry of Labour and National Service: "Industrial Relations Handbook 1944," Supplement No. 2, January 1948 (Index of Retail Prices), page 9.

† "Cost of Living Quiz," issued by Canadian Bureau of Statistics.

‡ This is done by adjustments to the weighting.

price data should be reduced to the minimum consistent with the compilation of an accurate prices index. With these principles in mind the Committee has drawn up the following schedule of a pricing programme which it is considered will fill the necessary minimal requirements for statistical accuracy :—

Group.	Periodicity of Collection.	Date of Collection.	Towns Covered.
Food (excluding seasonal fruits and vegetables)	Monthly ..	15th of month ..	Twenty-one towns.
Seasonal fruits and vegetables ..	Weekly ..	Every Friday ..	Ten main towns.
Housing—			
Rents: Houses and flats ..	Six monthly ..	February and August ..	Twenty-one towns.
Rates	Yearly ..	.. ..	.. ..
Repairs and maintenance .. ..	.. ..	.. ..	Four chief centres.
Fuel and lighting	Monthly ..	15th of month ..	Twenty-one towns.
Clothing	Quarterly ..	February, May, August, November ..	Ten main towns.
Miscellaneous—			
Hardware .. ..	.. ..	Ditto .. ..	.. ..
Furniture .. ..	.. ..	.. ..	.. ..
Household appliances .. ..	.. ..	.. ..	Four chief centres.
Cleaning supplies .. ..	.. ..	.. ..	Ten main towns.
Personal requisites .. ..	.. ..	.. ..	Four chief centres.
Educational requisites .. ..	.. ..	.. ..	.. ..
Services—			
Postage, &c. .. ..	.. ..	.. ..	.. ..
Entertainment .. ..	.. ..	.. ..	.. ..
Personal services .. ..	.. ..	.. ..	.. ..
Health services .. ..	.. ..	.. ..	.. ..
Transport .. ..	.. ..	.. ..	.. ..
Patent medicines .. ..	.. ..	.. ..	.. ..
Union dues	Yearly ..	.. ..	.. ..

For the basic groups—food, housing, and fuel and lighting—complete coverage of all towns, monthly in the case of food and fuel and lighting, is considered necessary. Prices will be collected on the 15th of each month or nearest selling-day, with the exception that prices of fruits and vegetables will be recorded in ten towns only, but at weekly intervals. For clothing, hardware, furniture, minor household appliances, and cleaning supplies, quarterly quotations will be obtained from ten major towns—namely, Auckland, Wellington, Christchurch, Dunedin, Hamilton, Napier, New Plymouth, Palmerston North, Nelson, and Invercargill. These towns have been selected as being shopping centres for large areas. For certain of the miscellaneous groups—*e.g.*, major household appliances, personal and educational requisites and services—quarterly collections of prices in the four main centres are considered sufficient; while in some few instances—*e.g.*, railway fares, insurance—quotations from a single source covering the whole country are sufficient. The methods of collection of prices in each individual group are described in more detail in a later section of this report, paras. 33 to 41.

CHAPTER 6—METHOD OF WEIGHTING

20. While the Committee considers that care in the collection of prices for comparable qualities of commodities and services is the most important requirement in index-number making, a carefully designed weighting pattern is also necessary. Reference has already been made to the Committee's decision that the index should relate to post-war consumption habits.* The methods used in giving effect to that decision are described in the following paragraphs.

* See paras. 4 and 5.

21. Normally, in designing the basis of compilation of a consumers' price index, statistical experts favour the taking of a family budget inquiry. Indeed, if the application of the index is to be limited to any "given economic group" or to a "specified type of community," a family budget inquiry is necessary in order to ascertain the spending habits of the particular group or groups covered by the index. Previous practice in New Zealand—and in some other countries—has been to use the "aggregate expenditure" method* for the major groups, combining the group indices by percentages representing the relative importance of the groups as ascertained by a family budget inquiry in order to obtain an "all groups" index. New Zealand's experience in family budget inquiries has been uniformly disappointing. The first family budget inquiry in this country, carried out by the Department of Labour in 1910-11, covered the living-expenses of 69 families; a second official budget inquiry, carried out in 1919, covered 109 households. The third (and latest) comprehensive family budget inquiry was conducted by the Census and Statistics Department in 1930.† Although many thousands of budgets were distributed, and although generous prizes were offered for well-completed books, only 318 useable budgets were received in that year. But, more important still, analysis of the results of the last-mentioned inquiry showed that, while the national virtues in spending habits were generously represented in the family budgets received, the national vices were curiously absent. The reason for this apparent anomaly does not require much seeking. Obviously, if only a scant 300 budgets are received out of many thousands issued, the probability is that those completing the budgets will represent not the community as a whole, nor any section of it other than the most careful, painstaking, economical, and admirably virtuous section. The "weaker members" fall by the wayside when it comes to filling in a detailed account of household expenses over an extended period. Yet, if the results of the budget inquiry are to be regarded as typical, the sample of households covered must include a proper proportion of all types of spending habits.

22. Family budget inquiries, conducted by staffs of skilled enumerators, covering families selected in accordance with recently developed sampling techniques can yield results freed from the sources of bias which largely nullified the usefulness of such inquiries conducted in New Zealand—and elsewhere—by the cruder techniques of the past. The Government Statistician has advised us that it would take at least twelve to eighteen months to organize and carry out a properly designed family budget inquiry in this country. The results of such inquiries, conducted by modern methods, would shed a great deal of light on social and economic problems: in fact, the provision of a weighting pattern for a consumers' price index is but one of the lesser ends served by such inquiries. We consider that family budget inquiries should be carried out in New Zealand: but, for the purposes of the proposed index, the time element involved ruled out this source of information and led us to seek alternative means of designing a weighting diagram. We were advised by the Government Statistician that a sufficiently

* For a detailed description of this method (which consists essentially in the adoption of Laspeyres' formula), see G. H. Knibbs, "Price-indexes, their Nature and Limitations, the Technique of Computing them, and their Application in Ascertaining the Purchasing-Power of Money" (Commonwealth Bureau of Census and Statistics, Melbourne, 1918), Part I. Section 4, &c. The formula of Laspeyres may be written—

$$i_n = \frac{\sum q_0 p_n}{\sum q_0 p_0}$$

where i_n is the price index number for the n th period of time (or at the n th epoch), the p_0 's and the q_0 's prices and quantities respectively of the items in the regimen for the base period (or at the base epoch), and the p_n 's prices of the same items for the n th period (or at the n th epoch). The q_0 's may, according to Knibbs, be (a) compiled from household budgets, &c., or (b) deduced from the total consumption of a population; method (b) being, in his judgment, "probably the safest."

† Official inquiries covering limited groups of workers were carried out by the Department of Scientific and Industrial Research in 1938-39 covering tramwaymen (128 families) and boot operatives (122 families) (see H.-43, 1944, pages 22-23).

accurate pattern of weighting could be devised by an extension of the "aggregate expenditure" method used for years past in this and many other countries in the compilation of various price index numbers, and, accordingly, this method was explored.

23. An aggregate expenditure pattern can be drawn up from statistics of aggregate national consumption of goods and services entering into household living-costs. The Government Statistician, acting on instructions from the Committee, prepared an estimate of the retail cost of goods and services entering into household consumption for the latest year for which complete statistics were available to him—namely, the year 1946. There are, of course, obvious difficulties in basing the weighting pattern of the post-war index on 1946 consumption habits. Rationing of several commodities was in force in that year: while imports of many household commodities were on a restricted scale. On the other hand, consumption of certain groups of commodities—*e.g.*, clothing and furniture—was undoubtedly affected by the abnormal demands of ex-servicemen re-establishing themselves into civilian life. In short, 1946 was not a normal year. However, even if complete statistics for 1947 or 1948 had been readily available, these could still hardly be regarded as "normal" post-war years. It should be stressed, however, that differences in weighting are not of fundamental importance: and the Committee considers that, with the modifications outlined in paras. 24 and 25, a weighting diagram based on 1946 will be satisfactory.

24. Statisticians lay great stress on the desirability of adopting a "normal" period of consumption as the basis of the weighting pattern of a consumers' price index; but in this connection it has been remarked that ". . . experience has shown that, from the index statistician's point of view, the search for a normal base period is a 'will o' the wisp.'"^{*} This, of course, is particularly true of the present somewhat disturbed post-war period. The International Conference of Labour Statisticians, referred to earlier, met this difficulty by the following Resolution:—

3. (2) In cases where a post-war consumption level is adopted, the index may—

- (a) Measure the variations in the cost of maintaining unchanged the pattern of consumption in a specific year or period; or
- (b) Measure price changes using the current pattern of consumption as a weighting diagram adjusted as necessary to conform to changes in the consumption pattern.

(3) Where a decision is taken to measure the variations in the cost of maintaining unchanged the pattern of consumption in a specific year, the pattern of consumption should be examined, and the weighing diagram adjusted, if necessary, at intervals of not more than ten years to correspond with the changes in the consumption pattern.

If it were decided that the post-war index should be based on a rigidly fixed pattern of consumption as envisaged in Resolution 3 (2) (a) above, we would consider that the specific year or period could not be decided on as yet. We considered, therefore, that the realistic approach to the problem was to adopt as the basis of the weighting diagram the statistics of 1946 consumption supplied by the Government Statistician, subject to the condition that the weights should be altered in the event of any marked changes in consumption of any item of importance. Such changes might occur, for example, when a commodity is taken off the ration, or when adequate supplies of an important commodity previously in short supply become available. This would be in accord with the principle expressed in Resolution 3 (2) (b) quoted above; but we would not advocate strict observance of this principle. In our view, any major permanent change in consumption of an important commodity should be taken account of in the weighting pattern as soon as it becomes clear that the change is more than a temporary fluctuation in consumption habits. We would not, however, advocate the *complete* annual overhaul of all weighting which would seem to be implied by the words "*current* pattern of consumption" used in Resolution 3 (2) (b) above. The object of the index is to

^{*} *Journal of the Statistical and Social Inquiry Society of Ireland*, Volume XVII, page 353. "Some Thoughts on the Making of Irish Index Numbers," by R. C. Geary.

record price changes; and consequently, in our view, changes in weighting should be avoided, unless circumstances demand the immediate revision of the weight given to a particular item or items. We think that a complete overhaul of the weighting pattern should be made at intervals of five years.

25. In assessing the weighting of the proposed index it is necessary to take account of changes in prices between 1946 and 1948, so that the weighting of the new index will represent, at least approximately, the 1948 pattern of expenditure—that is, the 1946 distribution adjusted to take account of price changes between 1946 and 1948 (see Appendix A). The group weighting of the proposed index compares with that of pre-existing New Zealand indices as follows:—

NEW ZEALAND: WEIGHTS OF RETAIL PRICES INDICES
(At prices ruling in June, 1948)

Group.	Proposed Consumers' Price Index.	Wartime Prices Index.	Government Statistician's Old Series (1926-30 Base) Index.
	Per Cent.	Per Cent.	Per Cent.
Food	35½	43	38
Housing	16½	23	21
Fuel and lighting	3½	6½	7
Clothing, drapery, and footwear ..	19½	13½	18
Miscellaneous	24½	14	16
All items included in index	100	100	100

The greater coverage of miscellaneous commodities and services in the proposed consumers' price index compared with previous indices is reflected in the above figures. Miscellaneous goods and services account for 24½ per cent. of total expenditure at June, 1948, prices in the proposed index, compared with 16 per cent. in the Government Statistician's 1926-30 base index and 14 per cent. in the Wartime Prices Index. The wider coverage of the new index, reflected in the higher importance of miscellaneous items, has resulted, of course, in lower percentages for other groups except clothing, where wider coverage and relatively higher prices have resulted in a higher weight for this group than in previous indices. Despite the inclusion of water-heating in the new index (an item not covered previously), the percentage of fuel and lighting to total expenditure is much lower in the new index than in previous indices owing to relatively low prices in this group (notably of electric current).

26. The weighting pattern for the proposed index was designed with due regard to the principles laid down by the International Conference of Labour Statisticians in the following resolution:—

11. (1) In establishing the weighting diagram for a cost-of-living index for a particular group, individual items priced should be assigned weights corresponding to the consumption expenditures not only on the individual items themselves but also on other articles not priced, in accordance with the principle that the weights for items not priced may be added to the weights for those priced, when the price movements of the latter are representative of the price movements of the former.

(2) In this manner, all items purchased by the group covered can be represented in the index, although not all are priced.

This resolution brings out a most important point—namely, that full importance should be accorded to all commodities and services represented in the index, including items for which price quotations are not collected. The Committee recommends that this principle be followed.

27. The actual steps in the process of applying the principles stated in the foregoing paragraphs were—

- (a) The aggregate expenditure, valued at retail prices in 1946, of every class of commodity and service—*e.g.*, meat, fish, boys' clothing, &c.—included in the index was computed.
- (b) The values shown under (a) were divided up into constituent sub-classes—*e.g.*, meat into cuts, fish into different classes of fish, &c.
- (c) Representative items were selected for pricing purposes, each of these items being allotted a "weight" representing expenditure on all constituent items in the particular sub-class.
- (d) The values shown under (c) were adjusted to bring them up to the level of retail prices in 1948.
- (e) The weights estimated under (d) were converted to per-million proportions. These, representing the "weights" allotted to the items included in the list of commodities and services priced, are shown in detail in Appendix B.

Actually, since the index will be computed throughout on the aggregate-expenditure method, the proportions of total value shown in Appendix B will be converted to a quantity basis by dividing the values by the retail prices of each item as ascertained at the first complete collection. This calculation will produce a set of quantity weights which, when multiplied by prices for the unit of quantity for which prices are recorded, will give properly weighted aggregates for each group and for all groups combined.

28. In order to afford an indication of the full extent of the coverage of the new index, a computation (necessarily very approximate) of the aggregate national expenditure on the omitted items was made, and it was estimated that the proposed index would cover approximately 95 per cent. of normal consumer expenditure excluding private motoring for pleasure and alcoholic liquors, or approximately 85 per cent. of such expenditures including these items. This coverage is very much greater than the coverage of any previously existing New Zealand retail prices index. The "old series" retail prices index covered 81 per cent. of the total household expenditure recorded in the 1930 budget inquiry; but the families returning budgets at that inquiry recorded very little non-essential expenditure. The coverage of the Wartime Prices Index represented 85 per cent. of essential wartime expenditure.

29. As will be apparent from this discussion on the method of weighting, the Committee did not select a "typical" family on which to base the pattern of the index, but relied on aggregate consumption statistics as the basis of weighting. However, the index is intended to apply more particularly to family living-conditions as such, and for this reason such items as hotel charges, board and lodging charges, and rentals of furnished rooms are not represented. The living-costs of persons not living as a family are thus not directly represented in the index. This must be so, for a general index can only apply to typical conditions, and special indices with probably very different

weighting patterns would be necessary to represent correctly the expenditure patterns of "lodgers" and "roomers." Again, a consumers' price index represents the expenditure pattern of a family as a "going concern." Newly established families or families just moved to a new locality would have abnormal expenditure patterns which would not necessarily be well represented by any general consumers' price index.

CHAPTER 7—COMPILATION AND PUBLICATION OF GROUP AND ALL GROUPS INDEX NUMBERS

30. As has been indicated in para. 19, prices of food and fuel and lighting will be collected from all twenty-one towns each month. Prices of seasonal fruits and vegetables will be collected from the ten major towns at weekly intervals. Price statistics for clothing, drapery, footwear, services, and various miscellaneous items will be collected at quarterly intervals from the ten major towns (in some instances the four chief centres only); while the collection of rent statistics will be made in February and August of each year from each of the twenty-one towns. The following programme of compilation is proposed :—

Group.	Frequency of Compilation.	Towns Covered.
Food	Monthly	Twenty-one towns.
Fuel and lighting	"	"
Housing	Twice yearly (February and August)	"
Clothing, drapery, and footwear ..	Quarterly (February, May, August, and November)	Ten towns.
Miscellaneous commodities and services	Ditto	Ten towns, or (in some cases) four chief centres.

Monthly index numbers for food and fuel and lighting for each town and for the Dominion should be compiled and published by the Government Statistician; half-yearly indices for housing; quarterly index numbers for each of the ten towns for clothing, drapery, and footwear; and quarterly indices for each of the four chief centres for miscellaneous items. The all groups index numbers should be compiled at quarterly intervals in the following manner :—

Quarter.	All Groups Index Number Represents—
March ..	Average of January, February, and March index numbers for food and fuel and light combined with February housing index and February indices for clothing, drapery, footwear, and miscellaneous groups.
June ..	Average of April, May, and June index numbers for food and fuel and light with May index numbers for clothing, drapery, footwear, and miscellaneous groups and the February index number for housing.
September ..	Average of July, August, and September index numbers for food, fuel and light combined with August index numbers for housing, clothing, drapery, footwear, and miscellaneous groups.
December ..	Average of October, November, and December index numbers for food and fuel and light combined with the November indices for clothing, drapery, footwear, and miscellaneous groups and the August index for housing.

All groups index numbers should be published for each quarter for each of the ten towns for which complete (or nearly complete) price-collections covering all groups are available. The New Zealand all-groups index numbers will be a combination of the required index numbers for food, housing, and fuel and lighting (twenty-one towns) and clothing and miscellaneous items (ten towns or, in some cases, four chief centres). This national average index for all groups will be a weighted average index—that is, it will combine the twenty-one towns weighted by suitable population weights. Details of the population weighting and the method of combining the regional index numbers are given in Appendix C.

CHAPTER 8—SEASONAL CHANGES

31. The problem of purely seasonal changes in consumption and prices is one which constantly causes difficulties in index-number construction. These difficulties are not, however, as pronounced in New Zealand as in countries where there are wide variations in climate and, consequently, very considerable changes in the pattern of consumer expenditure as between one season and another—*e.g.*, summer and winter expenditure on fuel and lighting and clothing. Actually, in this country it is only in the fruit and vegetables group and for certain other foods—notably eggs and potatoes—where seasonal fluctuations are of such magnitude as to cause technical difficulties in the construction of a retail or consumers' price index. However, here, as elsewhere, it is considered undesirable that the index should be subject to sudden fluctuations, upwards and downwards, caused by purely transitory seasonal phenomena, and special techniques have been devised to avoid these fluctuations, while at the same time recording any "non-seasonal" movements in prices. The actual methods followed to meet this problem are described later in the detailed description of the method of compiling the food groups indices.*

CHAPTER 9—BASE PERIOD OF THE INDEX

32. The selection of the base period for a prices index is a matter of considerable importance, since any errors in pricing in the particular period chosen as the starting-point for the index will reflect themselves in all subsequent index numbers, which in such circumstances would not correctly reflect the changes in prices which have occurred since the base period. The Government Statistician's previous index of retail prices was related to average prices ruling during a five-yearly period (1926-30), while the Wartime Prices Index related to a base date (15th December, 1942†). In view of the fact that the proposed index will include a large number of commodities and services not covered in any previous index in this country, it is clearly undesirable that the first period for which prices are collected for these new items should be the base for the index. Difficulties will inevitably arise in the completion of specifications, in pricing, and in making reporting retailers fully conversant with what is required of them. Such difficulties can only be cleared up by practical experience. We understand that the Government Statistician is provisionally collecting prices of the additional items on the new basis commencing in November, 1948. By February, 1949, when the six-monthly census of rents is due, the problems connected with the initiation of the prices collection should have been overcome. We recommend, therefore, that the base period of the proposed index should be the first quarter of 1949. It should be observed that the selection of this period as the starting-point for the proposed index does not preclude the Government Statistician from calculating the new index backwards.

*See para. 36 and Appendices E and F.

† As required by the Economic Stabilization Emergency Regulations 1942 (Part IV, Regulation 40).

CHAPTER 10—DESCRIPTION OF GROUP INDEX NUMBERS

33. Following is a description of the methods of compilation of the index in each of the main groups of expenditure :—

A. FOOD

34. The index for this group covers all items of food habitually consumed in New Zealand. In view of the importance of this group, subdivision into three sub-groups has been made as under :—

- (i) Meat and fish.
- (ii) Fruits, vegetables, and eggs.
- (iii) Other foods.

It is intended that index numbers for each of the sub-groups will be compiled and published as well as an index for food groups combined.

MEAT AND FISH

35. In the meat and fish sub-group, total New Zealand consumption of all types of meat and fish has been taken into account in the weighting. Actual prices are collected for 23 items in this group, the weight for the items not priced being spread over the priced items. For example, the weight allotted to prime ribs represents expenditure on this and allied cuts—namely, prime ribs, back ribs, and chuck. This principle is followed throughout all items in the index. Poultry is not priced owing to the difficulty of obtaining standard quotations for this item, and the weight for poultry has been spread over other items. Again, in the fish group the weight for fish on the market only for limited periods in the year—*e.g.*, oysters—is spread over the items priced. Price quotations for meat and fish are collected from representative firms in the twenty-one towns covered by the index, prices being collected on the 15th day of each month.

FRUITS, VEGETABLES, AND EGGS

36. Special difficulties are encountered in including this group of items in a prices index, but, in view of its importance in the diet, a special technique has been worked out to permit of the inclusion of this group without introducing violent seasonal fluctuations in the index. The principle adopted was to isolate the highly seasonal items which are not in continuous supply throughout the year and which are subject to marked seasonal price changes, and to form a special sub-group (fruits, vegetables, and eggs) containing these items. Using the technique devised, which is explained in Appendices E and F it is possible to eliminate the effects of these purely seasonal changes and yet to retain the non-seasonal trend of prices of these items in the index. Fruit and vegetable (seasonal items) prices are collected each week from representative retailers in the ten main towns.

In addition to the seasonal fruits and vegetables, certain “non-seasonal” items—namely, potatoes, onions, oranges, and bananas—are included with fixed weights. These items are non-seasonal, in that distribution is arranged reasonably evenly throughout the year, while, excepting for potatoes (which present rather a special problem), there are no marked seasonal price changes. As regards potatoes, a problem arises when both new potatoes and main-crop potatoes are on the market. The procedure suggested for this item is to include main-crop potatoes in the index for the months March to October inclusive. In November an average price will be calculated

for potatoes in North Island towns, averaging the price of new and main-crop potatoes in the ratio of: new, 25 per cent., old, 75 per cent. In the South Island, main-crop potato prices only will be used in the November index. In December, new- and old-potato prices will be averaged, using the following ratios—North Island: new, 75 per cent., old, 25 per cent.; South Island: new, 50 per cent., old, 50 per cent. In January and February prices for new potatoes only will be used in both Islands. Some variation in this procedure may be necessary in an abnormal year—*e.g.*, a very late season or a poor main crop. In such circumstances, the Government Statistician should have discretion to vary the formula, but should publish a statement of any adjustments made at the time of publication of the indices. Potato prices will be collected at weekly intervals in the transitional months (October–December).

OTHER FOODS

37. This sub-group covers a wide range of items—namely, dairy products, cereals, sugar, honey, jam, sweets, aerated waters, condiments, &c. (for detailed list, see Appendix B). Prices are collected for 31 items in all twenty-one towns covered by the index.

B. HOUSING

38. It has been the practice in New Zealand hitherto (and it still is the practice in many other countries) to regard, for price index purposes, movements in rents of unfurnished houses as sufficiently typical of changes in housing costs. The Committee, however, considered that the scope of the index should be widened to include all housing-costs within the proposed prices index. The following facts influenced us in making this recommendation:—

- (a) The 1945 census revealed that only 35·38 per cent. of the private European dwellings in the Dominion were rented, while 7·73 per cent. were rent-free (mostly with job), 31·36 per cent. owner-occupied subject to mortgage, and 25·38 per cent. owner-occupied without mortgage. A small percentage were not specified. In the urban areas (to which the proposed index will have application) the proportions of rented and owner-occupied houses to total private dwellings are 43 per cent. rented, 57 per cent. owner-occupied. We considered, therefore, that costs of owner-occupied houses should be represented in the index.
- (b) Rented unfurnished houses comprise rather a special class of dwelling, being largely either (i) old houses in private ownership, or (ii) new houses erected by the State for renting. The rents charged for class (i) are, in general, subject to tenancies over long periods, while, as regards (ii), the State, as a matter of public policy, keeps these rents at a minimum.
- (c) For the reasons advanced in (b) above, the rentals of rented houses do not in any degree represent reletting values. We considered, therefore, that rentals of unfurnished flats, as representing in some measure at least reletting values, should be included in the index.

Acting on instructions from the Committee, the Government Statistician prepared a plan for the inclusion of rents of flats and costs of owner-occupied houses in the index as well as rented houses. The relative weights allotted to the different classes as ascertained from the estimate of housing-costs in the base period are—

	Weight— <i>i.e.</i> , Proportion of Aggregate Housing Cost in Base Period.			
Rented houses and flats	..	..	..	40
Owner-occupied houses	..	..	..	60
				100

Rents of houses and flats will be collected twice a year, in February and August, from individuals, firms, and State organizations letting houses in the twenty-one towns covered by the index; while an assessment of changes in costs of owner-occupied houses will be made at yearly intervals, taking into account interest on capital, depreciation, repairs and maintenance, rates, and insurance. Further details of the method of compiling the housing index are given in a technical appendix to this report (Appendix D).

C. FUEL AND LIGHTING

39. This group is represented by the following items: coal, coke, firewood, gas, electric current (lighting, heating, and water-heating), and matches. Kerosene, which has become a relatively insignificant item for heating or lighting, has been omitted from this group, as have candles. The weights allotted to each item represent household consumption—*i.e.*, excluding quantities used in hotels, hospitals, and in industry. Prices are collected for each of the twenty-one towns at monthly intervals.

D. CLOTHING, DRAPERY, AND FOOTWEAR

40. In designing the weighting of this group, aggregate national consumption of all clothing, drapery, and footwear items was estimated from statistics of imports, exports, and local production. The values were marked up to retail prices by using the conventional "mark-up" applying to different sections of the trade to convert import, factory door, or workshop values to retail values. Considerable difficulty was experienced in drawing up a representative list of items for which prices could be collected. Purely fashion goods had to be omitted owing to the impossibility of securing standard price quotations for such items. For example, the problem of arriving at a standard definition of a lady's hat completely defeated the Committee and the experts whom we consulted. In the circumstances, we had to omit this item. A reasonably well balanced selection of items was made covering each of the main groups under this heading (see Appendix B). For the purpose of this group we assumed a family consisting of a man, wife, boy fourteen years, girl eight years, and baby under two years; and on this basis, consulting expert opinion, we designed a reasonably standard list of items under each heading, and also estimated the quantity of each item consumed in a year in order to arrive at a properly balanced system of weighting each item. A suitable representation of infants' wear was included. Prices for this group will be collected from ten major towns (Auckland, Wellington, Christchurch, Dunedin, Hamilton, Napier, New Plymouth, Palmerston North, Nelson, and Invercargill). The collection will be made at quarterly intervals (in February, May, August, and November). The desirability of securing a proper balance between locally produced and imported items in the list of goods priced has been given particular attention in this group.

E. MISCELLANEOUS ITEMS

41. The coverage of this group is very much greater than has been attempted before in a New Zealand prices index. The group has been subdivided into the following sub-groups:—

- (a) Household durable goods.
- (b) Other commodities (including cleaning supplies, personal requisites, educational and cultural requirements, patent medicines, baby-foods, tobacco and cigarettes).
- (c) Services (transport, postage and telegrams, entertainment, personal services, health services outside social security, union dues).

(a) HOUSEHOLD DURABLE GOODS

The importance of including this group of items in a consumers' price index is referred to in the following resolution of the International Conference of Labour Statisticians :—

13. Every effort should be made to include a suitable representation of semi-durable and durable consumer goods in the list of goods priced.

The following classes of durable consumer goods are represented in the proposed index (see Appendix A) : household drapery, furniture, floor coverings, radios, household hardware, crockery and glassware, household electrical and other appliances. In the case of durable goods—*e.g.*, furniture, radios, floor coverings, electric appliances—the weight allotted to each item represents an estimate of the annual replacement value of the goods. Prices will be collected from representative dealers in the ten larger towns at quarterly intervals (February, May, August, and November).

(b) OTHER COMMODITIES

This sub-group includes a miscellaneous collection of domestic and personal requirements, which do not fit logically into any other group, as follows : household cleaning supplies, personal requisites (cosmetics, toilet-soap, razor-blades, toothpaste, &c.), educational and cultural supplies (school books and stationery, newspapers and magazines, library subscriptions, books), patent medicines and baby-foods, tobacco and cigarettes. In each instance estimates of total expenditure at retail prices (based on imports plus local production minus exports) were made in order to form a basis of weighting these items. Prices will be collected at quarterly intervals in the four chief centres, excepting for cleaning supplies, prices of which will be obtained from selected grocers in ten towns.

(c) SERVICES

This sub-group will be represented in the index by the following groups :—

- (i) Transport.
- (ii) Postage and telegrams.
- (iii) Entertainment.
- (iv) Union dues.
- (v) Health services not covered by social security.
- (vi) Personal services.

Prices will be collected at quarterly intervals in the four chief centres, excepting in cases—*e.g.*, rail fares—where a New Zealand quotation is applicable.

(i) Transport

This sub-group includes railway, tramway, bus and taxi fares, cycle tires and tubes. The weight allotted to rail fares represents total passenger journeys by rail with a deduction on account of business travel ; the weight for tram and bus transport represents total passenger fares without deduction. On the pricing side, fares for journeys of specified lengths will be collected. Tram and bus fares will be weighted by weights representing the number of journeys over each section travelled during the year. In view of the varying length of sections, the average fare (cash and concession) per 100 chains on each length of journey will be used to price tramway fares. An estimate of the annual expenditure on taxis was made, using statistics of the number of taxis in operation and estimates of the annual takings. Statistics of taxi fares per mile in the four chief centres will be used in pricing this item. Prices of cycle tires and tubes have been included in this group as indicating in some measure changes in the cost of cycle repairs, the weight being derived from employment and import statistics.

(ii) *Postage and Telegrams*

Costs of ordinary telegrams and postage charges are included under this item, consumer expenditure being taken as half the total, excluding press telegrams.

(iii) *Entertainment*

Cinema admission charges are included in this sub-group with a weight based on the known admission receipts. Football admission charges have been included as representing other entertainment, the weight assigned being calculated from amusement-tax statistics. No difficulty was experienced in arriving at a suitable weighting for radio entertainment, since statistics of licences in force are available and there is a standard licence fee applying to the whole Dominion.

(iv) *Union Dues*

Union dues paid by representative groups of workers will be used as the basis of pricing for this sub-group, the weight being based on figures of union membership.

(v) *Health Services Outside Social Security*

This group is intended to cover health services not provided for by social security. It covers fees paid to general medical practitioners above the social security benefit, fees in private hospitals (general and maternity) dentists' and opticians' fees, and—as representing specialist services—radiologist fees. The price applicable to these items will be net fees—*i.e.*, less social security refund. The weight given to private-hospital services is based on statistics of the number of admissions to private hospitals. As regards dentists and opticians, statistics of registrations and census statistics were used in arriving at a weight for these items.

(vi) *Personal Services*

Statistics of numbers engaged as disclosed by the results of the 1945 census were used as a basis of weighting for this group. A deduction was made in the case of laundering to cover laundering for institutions, hotels, &c.

CHAPTER 11—SUMMARY OF RECOMMENDATIONS

42. We recommend that a revised prices index, to be known as the Consumers' Price Index, be compiled and published by the Government Statistician, and that the Wartime Prices Index be discontinued upon publication of the new index.

43. Our proposals relate to one index applying to the generality of New Zealand consumers. The commodities and services represented in the index are not limited to essentials, but the index will cover the whole range of commodities and services used in the average household—with representation, as far as possible, of the amenities of modern living.

44. The commodities and services included in the proposed index are representative of the expenses of a family as a going concern, and less normal expenditure patterns—*e.g.*, expenditure of newly married couples or of families just moved to a new locality—are not so well represented. This must be so, for no single index can adequately represent all variants from normal living patterns. Again, living-expenses of lodgers, "roomers," and people living in hotels can be only very generally represented by an index which is based on the family as a unit.

45. The Committee recommends that prices of seasonal items such as seasonal fruits, vegetables, and eggs should be included in the index, despite the difficulties caused by seasonal variations in purchases and prices. Nevertheless, we consider it undesirable that the index should be subject to sudden fluctuations, upwards or downwards, owing to purely transitory seasonal phenomena. Therefore we approve of the principle of smoothing seasonal fluctuations in these items by appropriate techniques (see Appendices E and F).

46. Durable consumer goods such as furniture, household appliances, radios, &c., will be well represented in the proposed index. The weight allotted to such items represents the annual replacement cost.

47. While the normal practice is to include only rentals of unfurnished houses in a consumers' (or retail) prices index, the Committee recommends that, in addition, rentals of unfurnished flats and the costs of owner-occupied houses should be represented in the index.

48. Certain groups of commodities and services—*e.g.*, contributions to charity and gifts—cannot be represented in a consumers' price index. Two other groups—namely, private-telephone charges and domestic service—have been omitted as not being important items in the average urban New Zealand household. Holiday expenditure is partly but not fully represented by such items as rail and taxi fares and entertainments. The index as recommended would cover 85 per cent. of normal consumer expenditure, or 95 per cent. of expenditure excluding the items mentioned in the following paragraph.

49. Expenditure on private motoring for pleasure and on alcoholic liquors are not represented in the proposed index, principally because of the great variability in expenditure (from nothing to considerable amounts) on these items.

50. Savings and direct taxation are not represented: the former because the index covers spending, not saving; and the latter because the index covers purchases of commodities and services out of disposable income—*i.e.*, after direct taxes have been paid.

51. The weighting pattern of the proposed index is based on post-war habits of consumption.

52. In order to give effect to the proposal in para. 51, the Government Statistician estimated the value, at retail prices, of goods and services purchased in 1946—the latest year for which a complete compilation is available. The statistics were adjusted to take account of price changes between 1946 and 1948. This estimate forms the basis of the weighting diagram. We recognize that 1946 and 1948 are not “normal” post-war years, and we recommend that if the consumption of any commodity of importance changes materially an immediate adjustment of the weighting of that commodity should be brought into effect. The index should be completely revised every five years.

53. While the items included will represent more particularly living-costs in urban localities, the index will still indicate, reasonably well, *changes* in prices affecting all consumers.

54. Although all commodities and services purchased at retail—with the exceptions indicated in paras. 48–50—are represented in the index, it would be clearly impossible to “price” the many thousands of individual items represented. Accordingly a selection of key items—300 in all—has been made for which actual prices will be collected. Each of these items will carry a weight representing all similar items. The selection of items to be priced has been given careful consideration to ensure that properly representative items are priced and that a proper balance between locally produced and imported items is secured. It is worth noting that the number of items to be priced is considerably greater than is the case in other countries of which we have records. In the Australian index, for example, 160 commodities and services are priced; in the United Kingdom, 230; in Canada, 152; in the United States of America, 160; in South Africa, 208.

55. The number of towns which we recommend should be covered is twenty-one (see Appendix C) spread over the whole country and adequately representing all urban localities. The New Zealand index will represent an average of indices for these towns weighted according to population.

56. The Committee has noted with satisfaction that the Government has approved the appointment of a small price-collection staff. Great care is essential to ensure that the goods and services priced are truly representative of the buying habits of the people. This involves careful specification of the items priced and continuous supervision of the process of price-collection. Important changes in the quality of commodities priced should be taken into account.

57. We recommend that monthly index numbers should be compiled and published for the food and fuel and lighting groups ; and quarterly index numbers for all groups combined.

58. The base period of the new index should be the first quarter of 1949.

CHAPTER 12—CONCLUSION

59. The essential purpose served by price indices is to shed light on the interplay of complex economic forces. Index numbers of wholesale prices, import and export prices, producers' prices, &c., all view the subject from different aspects. Most important, however, from the point of view of the general public are the changes which occur in the prices of the goods and services which enter into normal family expenditure. These are the prices which affect virtually every one. Therefore, there is an obvious need for a reliable indicator of changes in prices of this kind, and the Committee has tried to design an index which will meet this need as effectively as is technically possible. We have laid great emphasis on the need for continuing careful supervision of price-collection, since the effectiveness of the new index as a measure of retail-price changes will depend in greater measure on the accuracy with which prices are recorded than on the technical design of the index.

60. The Committee has taken into account the recommendations of the Sixth International Conference of Labour Statisticians, convened by the International Labour Office in August, 1947 ; and, in making our recommendations, we have had due regard to the expert advice contained in the resolutions of that Conference.

61. We feel confident that the proposed index will afford an accurate indication of changes in prices as they affect consumers in the post-war period. As such, its sphere of usefulness in relation to such problems as the relationship between wages and prices, anti-inflation measures, the impact of price changes in New Zealand and overseas on our economy, and a host of other social and economic problems needs no emphasis.

F. P. WALSH, Chairman.

K. McL. BAXTER, Member.

W. A. FOX, Member.

E. C. FUSSELL, Member.

M. J. MORLARTY, Member.

G. E. WOOD, Member.

APPENDICES

APPENDIX A.—DETAILED LIST OF GROUPS OF COMMODITIES AND SERVICES
REPRESENTED IN THE INDEX

		Consumer Expenditures at 1948 Prices.	
		£ (000)	£ (000)
1. FOOD			82,392
Meat (beef and *veal; mutton and *lamb; pork, ham, and bacon; sausages and offals; †canned meat; †poultry)	.. ..	16,559	
Fish (fresh fish; smoked fish; canned fish; †shell-fish)	.. ..	2,099	
Fruits (apples, pears, quinces; berries; stone-fruits (peaches, plums, apricots); oranges; lemons; other citrus fruits; bananas; canned fruits; dried fruits)	.. ..	6,514	
Vegetables (potatoes; onions; carrots, parsnips, swedes, beetroot; pumpkin; tomatoes; cabbage, cauliflower, Brussels sprouts, silver beet, lettuce; peas, beans; other fresh vegetables; canned vegetables; dried vegetables)	.. ..	7,894	
Eggs	.. ..	2,389	
Dairy-produce (milk, fresh; cheese (hard and *processed); butter)	.. ..	13,647	
Cereals (flour; *cornflour; bread; pastry, cakes, buns, biscuits, &c.; oatmeal and *rolled oats; breakfast cereals)	.. ..	10,312	
Other Groceries (sugar, *icing-sugar, golden syrup, *treacle and honey; jam and marmalade; tea, coffee, cocoa; condiments (*pickles, sauces, vinegar, spices, salt, &c.); baking and custard powders; sandwich spreads and †essences; milk, condensed and *dried)	.. ..	11,542	
Meals, Restaurant, three-course..	.. ..	4,117	
Drinks, sweets, &c. (aerated waters; cordials; confectionery; ice-cream)	.. ..	7,319	
2. HOUSING (rented houses; rented flats; owner-occupied houses (‡return on capital; †depreciation; maintenance; rates; insurance)	.. ..		38,766
3. FUEL AND LIGHTING (coal; coke; electricity; gas; firewood; †candles; matches)	.. ..		8,603
4. CLOTHING AND FOOTWEAR	.. ..		44,997
Clothing	.. ..	38,226	
Men's (outerwear; underwear; night-wear; sports-wear; other apparel).			
Women's (outerwear; underwear; nightwear; †sports-wear; other apparel).			
Boys' (outerwear; underwear; night-wear; sports-wear; other apparel).			
Girls' (outerwear; underwear; night-wear; †sports-wear; other apparel).			
Babies' (outerwear; underwear; material; wool).			
Footwear	.. ..	6,771	
Men's (boots; shoes; sandshoes; slippers; repairs).			
Women's (shoes; sandshoes; slippers; repairs).			
Boys' (*boots; shoes; sandshoes; gum boots; sandals; repairs).			
Girls' (shoes; sandshoes; gum boots; sandals; repairs).			
Babies' (shoes; slippers).			
5. MISCELLANEOUS—			
(a) Household Durable Goods	.. ..		12,776
Appliances (electric washing-machine; vacuum cleaner; sewing-machine; jug; iron; toaster; radiator) radio; lawn-mower; wringer	.. ..	2,862	
Furniture (suite; tallboy, sideboard, &c.; tables; chairs; bedstead, mattress, pillows, &c.; other furniture)	.. ..	2,801	
Floor-coverings (linoleum, congoleum, &c.; carpets; feltex)	.. ..	1,378	
Household Drapery (blankets; sheets, *pillow-cases; towels, tea-towels)	.. ..	2,150	
Hardware and Crockery (tools (including garden tools); cleaning equipment; enamel and aluminium utensils; cutlery, &c.; crockery; glassware; electric-light globes)	.. ..	3,031	
Infants (perambulator; baby's cot)	.. ..	554	

* Represented by certain items in list of commodities and services priced.
in list of commodities and services priced.

‡ Not priced.

† Represented by groups of items

APPENDIX A.—DETAILED LIST OF GROUPS OF COMMODITIES AND SERVICES
REPRESENTED IN THE INDEX—*continued*

		Consumer Expenditures at 1948 Prices.	
		£ (000)	£ (000)
5. MISCELLANEOUS	<i>continued</i>		
(b) Other Commodities			25,036
	<i>Cleaning Supplies</i> (soaps; starch; polishes; disinfectants; kerosene and *other cleaning agents)	1,902	
	<i>Personal Requisites</i> (toilet soap; toothpaste; shaving requisites; cosmetics and toilet preparations)	2,413	
	<i>Educational and Cultural</i> (school books; school and other stationery; books, newspapers, and magazines; library subscription)	3,644	
	<i>Medicines and Baby-foods</i> (patent medicine preparations; prepared baby-foods)	2,375	
	<i>Tobacco and Cigarettes</i> (tobacco; cigarettes; *cigars)	14,702	
(c) Services			20,087
	<i>Transport</i> (rail; tram; bus; taxis; cycle repairs)	8,501	
	<i>Postage and Telegrams</i> (postage; telegrams)	1,240	
	<i>Entertainments</i> (cinema; football; radio licence)	4,765	
	<i>Union Dues</i>	400	
	<i>Health Services</i> (medical; hospital; maternity; dentist; optician; radiologist)	2,425	
	<i>Personal Services</i> (hairdressing; laundering and dry-cleaning)	2,756	
Total consumer expenditure on commodities and services represented in the index			232,657

* Represented by certain items in list of commodities and services priced.

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS

		Weights—i.e., Relative Expenditures.		
		Items.	Sub-groups.	Groups.
1. FOOD—				
(a) Meat and Fish—				
Beef—				
Fresh—				
Sirloin, rolled and boneless	6,245			
Prime rib (roast), including bone	7,827			
Rump steak	3,452			
Blade steak	2,067			
Corned brisket, rolled	8,506			
Mutton, fresh—				
Leg, shank end	10,221			
Forequarter, shank end	6,649			
Chops, middle loin	5,656			
Pork, fresh—				
Leg	2,489			
Loin chops (best end)	1,130			
Tripe	1,307			
Sheep's liver, fresh	911			
Sheep's tongue, fresh	469			
Sausages, beef	3,804			
Luncheon sausage	1,268			
Bacon, side, rashers	5,910			
Ham, cooked, sliced	3,262			
Snapper, fresh, fillets, skinned, wings off	2,493		71,173	
Tarakihi, fresh, fillets, skinned, wings off	2,003			
Groper, fresh, steaks, pieces, trimmed	1,285			
Sole or flounder, gutted	1,410			
Smoked blue cod	554			
Herrings in tomato sauce	1,277			
			9,022	
				80,195

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS—*ctd.*

				Weights— <i>i.e.</i> , Relative Expenditures.		
				Items.	Sub-groups.	Groups.
1. FOOD—continued						
<i>(b) Fruits, Vegetables, and Eggs—</i>						
Fresh Fruit—						
Apples—						
Eating	..	..				
Cooking	..	..				
Apricots	..	..				
Bananas	..	..				
Gooseberries	..	..				
Grapefruit	..	..				
Lemons	..	..		*	21,611	
Oranges	..	..				
Pears	..	..				
Peaches	..	..				
Plums	..	..				
Raspberries	..	..				
Strawberries	..	..				
Tomatoes	..	..				
Processed Fruit—						
Apricots, dried	..	..		142		
Dates, dried, loose	..	..		1,018		
Peaches, canned, standard slices	..	..		1,685		
Prunes, 30/40's, dried, loose	..	..		1,135		
Sultanas, dried, loose	..	..		2,407		
					6,387	
Fresh Vegetables—						
Beans—						
Runner	..	..				
French	..	..				
Beetroot	..	..				
Brussels sprouts	..	..				
Cabbage	..	..				
Carrots	..	..				
Cauliflower	..	..				
Kumara	..	..		*	29,017	
Lettuce	..	..				
Onions	..	..				
Parsnips	..	..				
Peas	..	..				
Potatoes	..	..				
Pumpkin	..	..				
Silver beet	..	..				
Swedes	..	..				
Processed Vegetables—						
Peas, New Zealand—						
Dried	..	..		980		
Canned	..	..		3,933		
					4,913	
Eggs, hen, fresh, standard grade	..	..		..	10,268	
						72,196
<i>(c) Other Foods—</i>						
Dairy-produce—						
Milk, fresh, delivered	..	..		35,340		
Butter, New Zealand, first grade, creamery	..	..		20,244		
Cheese, New Zealand, first grade, mild	..	..		3,073		
					58,657	

* For further details, see Appendix B.

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS—*ctd.*

					Weights— <i>i.e.</i> , Relative Expenditures.		
					Items.	Sub-groups.	Groups.
1. FOOD—continued							
(c) Other Foods—continued							
Cereals—							
	Bread, white, split, cash over counter				19,166	44,323	
	Flour, wheaten, white, calico packed				3,314		
	Block cake				10,342		
	Biscuits, wine, plain, loose				7,934		
	Oatmeal, New Zealand, calico packed				1,891		
	Breakfast cereal, prepared				1,676		
Other Groceries—							
	Sugar, 1A, white, granulated				12,276	49,610	
	Golden syrup, New Zealand				567		
	Honey, New Zealand				2,463		
	Baking-powder				1,006		
	Custard-powder				843		
	Tea, first grade				13,466		
	Cocoa, first grade				1,612		
	Coffee, pure, ground				756		
	Jam, New Zealand—						
	Raspberry				2,098		
	Plum				2,588		
	Marmalade, New Zealand				1,556		
	Salt, iodized, calico packed				842		
	Pepper, white				232		
	Vinegar				1,151		
	Tomato sauce, New Zealand				3,318		
	Vegetable extract				714		
	Condensed milk, New Zealand, sweetened				4,122		
	(d) Meals, Restaurant, Three-course				..	..	152,590
	(e) Drinks, Sweets, &c.—						17,696
	Aerated water				6,533	31,458	
	Chocolate, plain, tablet				13,410		
	Toffees, wrapped				5,184		
	Ice-cream, slice and wafers				6,331		
	Total, Food				..	..	354,135
2. HOUSING—							
Rents of—							
	Houses				66,201		
	Flats						
	Local-authority rates on property				11,046		
	House repairs and maintenance				15,065		
	Fire and earthquake insurance on property				3,013		
	Return on capital				56,233		
	Depreciation				15,065		
	Total, Housing				..	..	166,623
3. FUEL AND LIGHTING—							
	Coal				9,688		
	Coke				924		
	Firewood				2,179		
	Gas				7,126		
	Electric current—						
	Lighting				11,670		
	Water-heating				2,876		
	Matches, New Zealand				2,514		
	Total, Fuel and Lighting				..	..	36,977

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS— *ctd.*

					Weights— <i>i.e.</i> , Relative Expenditures.		
					Items.	Sub-groups.	Groups.
4. CLOTHING AND FOOTWEAR—							
(a) Men's Clothing—							
Suit, three-piece, ready made in New Zealand, worsted—							
	New Zealand	..	..	..	10,926		
	Imported	..	..	..	10,926		
	Overcoat, tweed	..	..	..	3,215		
	Oilskin	..	..	..	3,370		
Trousers—							
	Working	..	..	..	1,633		
	Sports	..	..	..	8,648		
Shirt—							
	Neglige, two collars	..	..	..	3,941		
	Working, collar attached	..	..	..	2,450		
Singlet—							
	New Zealand, all wool, short sleeves	..	..	..	3,116		
	Cotton, athletic	..	..	..	2,012		
	Pyjamas, flannelette	..	..	..	2,338		
	Pullover, New Zealand, all wool	..	..	..	2,609		
	Socks, New Zealand, all wool	..	..	..	1,685		
	Hat, fur felt	..	..	..	4,217		
	Bathing-costume, shorts	..	..	..	795		
						61,881	
(b) Women's Clothing—							
	Costume coat and skirt, ready made	..	..	..	7,711		
	Skirt, ready made, tweed	..	..	..	2,102		
	Overcoat, ready made, tweed, no fur trim	..	..	..	6,993		
	Raincoat, ready made, cotton gaberdine	..	..	..	5,570		
	Dirndl, cotton print	..	..	..	5,747		
Piece-goods—							
	Tweed coating	..	..	..	7,659		
	Figure print	..	..	..	5,764		
	Art silk	..	..	..	7,492		
	Wool (New Zealand), hand knitting	..	..	..	3,898		
Stockings, F.F.—							
	Silk	..	..	..	3,297		
	Nylon	..	..	..	3,297		
	Underslip, locknit	..	..	..	4,075		
	Vest, locknit	..	..	..	2,553		
	Panties, interlock	..	..	..	2,832		
	Nightdress, locknit	..	..	..	3,817		
	Brassiere	..	..	..	1,693		
	Corsets	..	..	..	3,026		
	Gloves, nappa	..	..	..	2,665		
	Umbrella	..	..	..	946		
						81,137	
(c) Boys' Clothing (fourteen years)—							
	Suit, two piece, worsted (New Zealand)	..	..	..	1,023		
	Trousers, shorts, serge	..	..	..	1,397		
	Overcoat, ready made, tweed (New Zealand)	..	..	..	2,622		
	Shirt, flannel, tennis style	..	..	..	1,354		
Singlet—							
	All wool (New Zealand), short sleeves	..	..	..	628		
	Cotton, athletic	..	..	..	963		
	Pyjamas, flannelette	..	..	..	799		
	School three-quarter hose	..	..	..	692		
	Bathing-costume, shorts	..	..	..	185		
	Cap, school	..	..	..	180		
						9,843	

APPENDIX B--LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS *etd.*

				Weights <i>i.e.</i> Relative Expenditures.		
				Items.	Sub-groups.	Groups.
4. CLOTHING AND FOOTWEAR—continued						
<i>(d) Girls' Clothing (eight years)—</i>						
	Gym frock, serge	..	2,121			
	Cotton piece-goods	..	1,318			
	Overcoat, ready made, tweed, no fur trim	..	1,083			
	Raincoat, ready made, cotton gaberdine	..	709			
	Vest, locknit	..	967			
	Pyjamas, winyette	..	1,663			
	Sockettes, wool	..	838			
	Hat, school	..	400			
	Bloomers, interlock	..	778			
					9,877	
<i>(e) Babies' Wear (under two years)—</i>						
	Coat, infant's	..	468			
	Clydella, plain	..	232			
	Nursery squares	..	473			
	Baby-wool	..	391			
					1,564	
	Total, Clothing	..	..			164,302
<i>(f) Men's Footwear—</i>						
	Boots, heavy working	..	3,022			
	Shoes—					
	Heavy working	..	2,059			
	Light	..	2,059			
	Sandshoes, rubber soles	..	1,418			
	Slippers, all leather	..	709			
	Shoe repairs, half-soled and heeled ..	..	1,603			
					10,870	
<i>(g) Women's Footwear—</i>						
	Shoes—					
	Heavy walking	..	2,708			
	Light	..	4,363			
	Sandshoes, rubber soles	..	950			
	Slippers, felt, leather toe-cap	..	1,900			
	Shoe repairs, half-soled and heeled ..	..	1,852			
					11,773	
<i>(h) Boys' Footwear (fourteen years)—</i>						
	Shoes, heavy	..	1,758			
	Sandals, leather sole	..	451			
	Gum boots	..	262			
	Sandshoes	..	219			
	Shoe repairs, half-soled and heeled ..	..	800			
					3,490	
<i>(i) Girls' Footwear (eight years)—</i>						
	Shoes—					
	School, lace-up	..	658			
	Light, one-bar	..	524			
	Sandals	..	447			
	Gum boots	..	249			
	Sandshoes, rubber sole	..	215			
	Shoe repairs, half-soled and heeled ..	..	628			
					2,721	
<i>(j) Babies' Footwear (under two years)—</i>						
	Shoes, glace kid	..	163			
	Slippers, felt	..	86			
					249	
	Total, Footwear	..	..			29,103
	Total, Clothing and Footwear ..	..	..			193,405

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS—*ctd.*

				Weights— <i>i.e.</i> , Relative Expenditures.		
				Items.	Sub-groups.	Groups.
5. MISCELLANEOUS—						
(a) Household Durable Goods—						
Appliances—						
	Sewing-machine			1,354		
	Washing-machine			1,186		
	Vacuum cleaner			1,522		
	Clothes-wringer, hand type			228		
	Radio receiving-set			7,109		
	Electric radiator			219		
	Electric water-heating jug			150		
	Electric toaster			150		
	Electric iron			155		
	Lawnmower, hand type			228		
					12,301	
Furniture—						
	Bedstead			744		
	Tallboy			1,191		
Mattress—						
	Wire woven			1,573		
	Kapok			2,067		
	Pillow, kapok			653		
	Dining table, draw leaf			529		
	Dining chair			714		
	Sideboard (buffet)			765		
	Kitchen table			189		
	Kitchen chair			309		
	Suite, upholstered (settee and two chairs)			3,305		
					12,039	
Floor-coverings—						
	Linoleum, inlaid			709		
	Congoleum			473		
	Carpet			3,555		
	Feltex			1,186		
					5,923	
Household Drapery—						
	Blankets			1,418		
	Sheets			6,404		
	Towels			787		
	Tea-towelling			632		
					9,241	
Hardware and Crockery—						
	Spade, garden			417		
	Fork, garden			133		
	Hammer, carpenter's			224		
	Axe			275		
	Broom			602		
	Mop, cleaning			348		
	Scrubbing-brush			116		
	Bucket, galvanized iron			203		
	Saucepan			1,174		
	Fry-pan			194		
	Teapot			447		
	Jug			2,072		
	Cup and saucer			2,037		
	Plate, dinner			2,355		
	Tumblers			645		
	Knives, table			421		
	Forks, table			176		
	Electric-light bulb			1,186		
					13,028	

APPENDIX B—LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS—*ctd.*

				Weights— <i>i.e.</i> , Relative Expenditures.		
				Items.	Sub-groups.	Groups.
5. MISCELLANEOUS—<i>continued</i>						
<i>(a) Household Durable Goods—continued</i>						
Babies'—						
Perambulator	..	..	..	1,393		
Baby's cot	..	..	..	989		
Total, Household Durable Goods				..	2,382	54,914
<i>(b) Other Commodities—</i>						
Cleaning Supplies—						
Soap, laundry	..	..	..	2,600		
Starch	..	..	..	181		
Soap powder	..	..	..	2,553		
Kerosene	..	..	..	1,629		
Metal-polish	..	..	..	249		
Boot-polish	..	..	..	456		
Disinfectant	..	..	..	507		
Personal Requisites—					8,175	
Toilet-soap	..	..	..	2,201		
Face-powder	..	..	..	756		
Powder-puff	..	..	..	116		
Lipstick	..	..	..	645		
Vanishing-cream	..	..	..	589		
Toothpaste	..	..	..	1,895		
Razor-blades	..	..	..	1,427		
Shaving-soap	..	..	..	1,423		
Bobby-pins	..	..	..	89		
Toilet-paper	..	..	..	946		
Baby's talcum powder	..	..	..	284		
Educational and Cultural—					10,371	
Newspapers	..	..	..	6,898		
Magazines	..	..	..	1,895		
Library subscription	..	..	..	1,423		
Book (popular series)	..	..	..	1,895		
School text-books, standard	second-					
ary—						
Mathematics	..	..	..	567		
Dictionary	..	..	..	619		
Atlas	..	..	..	567		
Writing block, ruled, school	..	..	..	284		
Exercise-book—						
8½ in. by 6½ in.	..	..	..	284		
10 in. by 8 in.	..	..	..	284		
Drawing-book	..	..	..	284		
Writing-pad, not ruled	..	..	..	331		
Envelopes, packet of 25	..	..	..	331		
Medicines and Baby-foods—					15,662	
Aspirin	..	..	..	2,368		
Cough medicines	..	..	..	2,368		
Malt extract	..	..	..	2,368		
Glucose "D"	..	..	..	1,208		
Karitane Baby Food—						
No. 1	..	..	..	946		
No. 2	..	..	..	950		
					10,208	

APPENDIX B —LIST OF COMMODITIES AND SERVICES TO BE PRICED WITH WEIGHTS—*ctd.*

	Weights— <i>i.e.</i> , Relative Expenditures.		
	Items.	Sub-groups.	Groups.
5. MISCELLANEOUS—continued			
<i>(b) Other Commodities—continued</i>			
Tobacco and Cigarettes—			
Tobacco, cut	26,743		
Cigarettes, packet of 10	36,449	63,192	
Total, Other Commodities	..		107,608
<i>(c) Services—</i>			
Transport—			
Rail	12,184		
Tram	11,564		
Bus	4,264		
Taxi	7,109		
Cycle—			
Tires	709		
Tubes	709	36,539	
Postage—			
Minimum letter rate	4,195		
Telegram	1,135	5,330	
Entertainment—			
Cinema admission	13,350		
Football admission	4,806		
Radio licence	2,325	20,481	
Labour Union Dues	..	1,719	
Health Services (outside social security)—			
Medical—			
Practitioner consultation fee	3,318		
Specialist	1,186		
X-ray fee	236		
Optician, standard correction lenses	1,423		
Dentist—			
Extraction	946		
Amalgam filling	1,423		
Dentures, full set	946		
Maternity fee	945	10,423	
Personal Services—			
Hair-cut—			
Men	2,368		
Women	1,182		
Hair, permanent wave, full head, electric	3,555		
Hair set	2,368		
Dry-cleaning—			
Man's—			
Suit	594		
Trousers	593		
Woman's dress	593		
Laundering men's shirts	593	11,846	
Total, Services	..		86,338
Total, Miscellaneous	..	..	248,860
Grand Total	..	..	1,000,000

NOTE.—As indicated elsewhere, the weight applied to any item priced represents not only expenditure on that item, but also on other allied items not priced (see para. 26). For purposes of convenience the grand total is shown as a million.

APPENDIX C—CONSUMERS' PRICE INDEX: POPULATION WEIGHTS

NOTE.—In designing these weights the populations of all towns with a population of 2,500 or over at 1st April, 1948, are included. The populations of smaller boroughs and town and road districts within ten miles of any of the twenty-one towns from which prices are collected are also included.

POPULATION WEIGHTS, SERIES A

(Applies to Food, Housing, and Fuel and Lighting Groups)

	Population Weights— i.e. Population at 1st April, 1948.
1. WHANGAREI (includes Whangarei and Dargaville Boroughs and Kamo and Onerahi Town Districts)	13,980
2. AUCKLAND (includes Auckland City, Birkenhead, Northcote, Takapuna, Devonport, Henderson, New Lynn, Mount Albert, Mount Eden, Newmarket, Ellerslie, One Tree Hill, Mount Roskill, Onehunga, Otahuhu, Papatoetoe, Papakura, Pukekohe, Thames, and Manurewa Boroughs, Glen Eden and Howick Town Districts, and Mount Wellington and Panmure Township Road Districts)	303,580
3. HAMILTON (includes Hamilton City and Huntly, Cambridge, Te Awamutu, and Te Kuiti Boroughs)	36,530
4. TAURANGA (includes Tauranga, Waihi, Te Aroha, Mount Maunganui, and Te Puke Boroughs)	14,690
5. ROTORUA (includes Rotorua and Whakatane Boroughs)	12,130
6. GISBORNE (includes Gisborne Borough and Patutahi Town District)	16,350
7. NAPIER (includes Napier, Wairoa, and Hastings Boroughs and Taradale Town District)	40,340
8. NEW PLYMOUTH (includes New Plymouth, Waitara, Taumarunui, Stratford, and Hawera Boroughs)	35,030
9. WANGANUI (includes Wanganui City and Marton Borough)	28,520
10. PALMERSTON NORTH (includes Palmerston North City and Dannevirke, Feilding, and Levin Boroughs)	41,390
11. WELLINGTON (includes Wellington and Lower Hutt Cities, Upper Hutt, Petone, and Eastbourne Boroughs, and Johnsonville Town District)	193,620
12. MASTERTON (includes Masterton and Carterton Boroughs)	12,410
13. BLENHEIM (Blenheim Borough)	6,400
14. NELSON (includes Nelson City, Richmond Borough, and Tahunanui Town District)	17,230
15. GREYMOUTH (includes Greymouth, Westport, Runanga, Brunner, and Hokitika Boroughs)	19,750
16. CHRISTCHURCH (includes Christchurch City and Riccarton, Lyttelton, and Rangiora Boroughs)	138,180
17. ASHBURTON (includes Ashburton Borough and Tinwald Town District)	8,940
18. TIMARU (includes Timaru City and Waimate Borough)	22,560
19. OAMARU (Oamaru Borough)	7,950
20. DUNEDIN (includes Dunedin City and Port Chalmers, West Harbour, St. Kilda, Green Island, and Mosgiel Boroughs)	88,130
21. INVERCARGILL (includes Invercargill City and South Invercargill and Gore Boroughs)	32,300
Total, Urban Population of New Zealand	1,090,010

NOTE.—The total population of New Zealand at the 1st April, 1948, was 1,834,270.

APPENDIX C—CONSUMERS' PRICE INDEX: POPULATION WEIGHTS—*continued*

POPULATION WEIGHTS, SERIES B

(Applies to Seasonal Fruits and Vegetables, Clothing, Hardware, Furniture, and Cleaning Supplies Groups)

	Population Weights— <i>i.e.</i> , Population at 1st April, 1948.
1. AUCKLAND (Whangarei and adjacent towns; Auckland and adjacent towns)	317,560
2. HAMILTON (Hamilton and adjacent towns; Tauranga and adjacent towns; Rotorua and adjacent towns)	63,350
3. NAPIER (Gisborne and adjacent towns; Napier and adjacent towns)	56,690
4. NEW PLYMOUTH (New Plymouth and adjacent towns)	35,030
5. PALMERSTON NORTH (Palmerston North and adjacent towns; Wanganui and adjacent towns)	69,910
6. WELLINGTON (Wellington and adjacent towns; Masterton and adjacent towns)	206,030
7. NELSON (Nelson and adjacent towns; Blenheim and Westport boroughs)	28,680
8. CHRISTCHURCH (Christchurch and adjacent towns; Greymouth and adjacent towns (but excluding Westport Borough); Ashburton and adjacent towns; Timaru City (but excluding Waimate Borough))	181,670
9. DUNEDIN (Dunedin and adjacent towns; Waimate and Oamaru Boroughs)	98,790
10. INVERCARGILL (Invercargill and adjacent towns)	32,300
Total	1,090,010

POPULATION WEIGHTS, SERIES C

(Applies to Household Appliances, Personal and Educational Requisites, and Services Groups)

	Population Weights— <i>i.e.</i> , Population at 1st April, 1948.
1. AUCKLAND (Whangarei and adjacent towns; Auckland and adjacent towns; Hamilton and adjacent towns; Tauranga and adjacent towns; Rotorua and adjacent towns; Gisborne and adjacent towns; New Plymouth, Taumarunui, and Waitara Boroughs (but excluding Stratford and Hawera Boroughs))	423,050
2. WELLINGTON (Napier and adjacent towns; Wanganui and adjacent towns; Palmerston North and adjacent towns; Wellington and adjacent towns; Masterton and adjacent towns; Stratford and Hawera Boroughs)	325,520
3. CHRISTCHURCH (Nelson and adjacent towns; Greymouth and adjacent towns; Christchurch and adjacent towns; Ashburton and adjacent towns; Blenheim Borough and Timaru City (but excluding Waimate Borough))	210,350
4. DUNEDIN (Dunedin and adjacent towns; Invercargill and adjacent towns; Waimate and Oamaru Boroughs)	131,090
Total	1,090,010

The successive steps in the compilation of the quarterly New Zealand all-groups index numbers are as follows:—

- (1) The group index numbers for each of the four chief centres are selected as indicated in para. 30 of this report.
- (2) The group or sub-group index numbers for each of the next six towns will be similarly selected, but in this case no sub-group index numbers for household appliances, personal and educational requisites, or services will be available.
- (3) The group index numbers for the remaining eleven towns will again be similarly selected, but will cover the food, housing, and fuel and lighting groups only.
- (4) The New Zealand index number for each sub-group and group in turn will then be computed by combining the individual-town index numbers which are available in that sub-group or group. In this process the population weights listed above will be employed—*i.e.*, for groups in which there is a group index number for each of the twenty-one towns, Series A population weights will apply; for sub-groups or groups where there are index numbers for only ten towns, Series B will be substituted; and for sub-groups where only the four centres are represented, Series C will be used. This procedure is equivalent to imputing to towns not fully covered in the price-collection, prices for the omitted items obtaining in the nearest town which is covered.
- (5) The New Zealand sub-groups index numbers are then (where required) combined into New Zealand group index numbers, and these again into the New Zealand all-groups index numbers by the application of the sub-group and group weights listed in Appendix B.
- (6) The compilation of monthly group index numbers will proceed along lines similar to those indicated above.

APPENDIX D

NOTE ON PROPOSED TREATMENT OF HOUSING-COSTS IN THE INDEX

1. It is the general practice in other countries, and has hitherto been in this also, to confine the study of housing-costs to rented houses. This is easily understood. Rents are fairly easy to collect, while the collection of statistics as to the outgoings on owner-occupied houses presents considerable difficulty. It may, too, with some show of justice be argued that the movement in rents should fairly represent the movement in landlords' costs; and this again should approximate to the movement in owner-occupiers' costs.

2. Rent control has, however, altered the picture, in that average rents of rented houses may no longer be typical of housing-costs in general; while, again, State houses rented as a matter of State policy at low rentals form an increasing proportion of rented houses. Attempts have therefore been made to devise a measuring-rod for housing-costs. Fresh ground has had to be broken, but it is probably correct to state that the need of such a new technique is greater in New Zealand than elsewhere on account of the comparatively large proportion of houses which are owner-occupied. The 1945 census revealed that only 35·38 per cent. of the private European dwellings in New Zealand are rented. Of the remainder, 7·73 per cent. are rent-free (mostly with job), 31·36 per cent. are owner-occupied subject to mortgage, and 25·38 per cent. owner-occupied without mortgage (a small percentage were not specified).

3. As with food and other items in the regimen, the weight for housing-costs was determined on a national expenditure basis with a primary division into three components: (1) rents of houses, (2) rents of flats, and (3) expenses of owner-occupiers:—

- (1) Rents at present being collected from twenty-five towns provided a basis of assessing total rent payments. The towns were classified into (a) four main centres, (b) other urban areas, and (c) other towns. In each of these classes an average rent of four, five, and six-roomed houses was calculated. (The weights for combining these three sizes of houses were in every case the respective numbers of all four, five, and six-roomed houses at the 1945 census.) A small adjustment provided a conversion from the average of four, five, and six-roomed houses to the average of all houses. This average for each class was then multiplied by the number of rented houses (excluding flats) in the class—i.e., (a), (b), and (c)—in turn. In the case of class (c), however (other towns), the number of houses used included also houses in rural areas, the index being designed to measure movements in urban costs only. For the above purposes, houses rent-free with job were reckoned as rented houses.
- (2) Flats were similarly treated, the sizes used being in this case two, three, and four rooms.
- (3) The gross rental value of owner-occupied houses had already been investigated as part of a national income survey, and data revealed in that computation were adapted to this purpose. (The computation was based on (a) estimated numbers of owner-occupied houses in 1946 (from 1945 census), excluding, of course, rent-free houses already taken in, and (b) rental values derived from 1936 census, increased by 20 per cent. to allow for the fact that it is generally the better class of house that is owner-occupied, and also adjusted by the movement in the present rent index from 1936 to 1946.)

While the proportion of total flats to total rented dwellings was shown by the 1945 census to be approximately 1 : 4 in twenty-one towns combined, the proportions vary considerably as between various towns, so that this factor has to be taken into account. To obtain a properly weighted combined rents and flats index, house and flat rents will be combined in the following proportions—Wellington: Rented houses, 2; flats, 1. Auckland, Christchurch, Dunedin, Hamilton, New Plymouth, Palmerston North, Nelson, and Timaru: Rented houses, 3; flats, 1. Other towns: Rented houses, 5; flats, 1. The index for each town for rented houses and flats will then be combined with the index of costs of owner-occupiers to obtain the housing index. This will be effected by using the following proportions: Rents (including flats), 40 per cent.; costs of owner-occupiers, 60 per cent. The New Zealand index for housing will be compiled by combining the indices for each of the twenty-one towns by the population weights shown in Appendix C.

4. Passing on now from weighting to pricing, groups (1) and (2) present no difficulty. The collection of rents of houses and flats will proceed as in the past, only with the revised geographical coverage (twenty-one towns, instead of twenty-five). The assessment of the changes in expenses of owner-occupiers, however, requires special care. The constituent elements of these costs were

divided into the following classes: Return on capital, depreciation, repairs and maintenance, rates, and fire and earthquake risk insurance. The first two of these items do not represent cash outgoings and will be represented by static amounts included in the current aggregate expenditure. The method of pricing the other three is as follows:—

- (i) A weighting pattern for repairs and maintenance expenses on owner-occupied houses has been drawn up on the basis of information obtained by the Census and Statistics Department. This indicates as follows:—

DISTRIBUTION OF REPAIRS AND MAINTENANCE COSTS						
Materials—						Per Cent.
Paint	..	..	..	..	..	23·21
Paper	..	..	..	..	..	5·02
Other	..	..	..	..	..	20·26
Labour ..	..	..	..	..	..	51·51
						100·00

Prices are to be collected for paint and paper. For other materials the wholesale prices index for building-materials will be taken as indicative of changes in costs of materials other than paint and paper; while the official index number of building wages will be taken as indicating the changes in labour costs. The index numbers for each sub-group—paint, paper, other materials, and labour costs—will be weighted by the proportions given above to obtain a single index for repairs and maintenance costs.

- (ii) As to rates, the basis decided on was a house property of £250 unimproved and £1,500 capital value* (value of improvements, £1,250). From each town covered by the index the rates payable (including all special rates) on such a property will be ascertained. Whenever in any of these towns a general revaluation occurs, it will be necessary to inquire the total valuation of all rateable properties in the town (or in residential areas within the town if separately known) before and after revaluation, and to adjust the typical value (£250 or £1,500 as the case may be) accordingly.
- (iii) Fire-insurance rates are already collected by the Census and Statistics Department and the rate applicable to the typical house can be selected.

In order to combine these various elements in housing-costs of owner-occupiers into a single index, the annual rental value of a selected type of property—namely, a property valued at £1,500*—was broken up into its constituent items by the use of the fair rents formula, supplemented by information obtained by the Census and Statistics Department. Following are the percentages:—

						Percentage of Total Costs.
Return on capital	..	..	..	..	..	56
Depreciation	..	..	..	..	..	15
Repairs and maintenance	..	..	..	..	..	15
Rates	..	..	..	..	..	11
Insurance	..	..	..	..	..	3
						100

The price index numbers for each of the above groups will be combined by the weights given above in order to arrive at an index of costs of owner-occupied houses. As indicated earlier, this index will be combined with the index representing rents of houses and flats in order to arrive at the housing index.

APPENDIX E.—SEASONAL ITEMS IN INDEX

1. As indicated in para. 31 of this report, the Committee has given consideration to the special problems created by wide seasonal fluctuations in supply and prices of certain food items. In general, the weighting of the proposed index is based on fixed weights since the purpose of the index is to measure price fluctuations, and, to serve this end, a fixed pattern of weighting is desirable. Therefore, departures from the fixed-weighting system have been made only when seasonal variations in supply and/or prices are of such magnitude as to render seasonal changes in weights imperative. For this reason the following items, though subject to some seasonal variations in prices or supplies, are included in the food groups index with fixed weights: milk, meats, potatoes, onions, oranges, bananas.

* This figure was considered reasonable when towns outside the chief centres and houses which have been built for some years are taken into consideration, and is also the limit of rehabilitation loans.

2. In regard to milk, consumption is reasonably constant throughout the year, though there is a definite seasonal change in prices as between summer and winter. Meats are in much the same position as milk, though in this case there is evidence that meat consumption is actually higher in the colder winter months than in the summer. In consequence of the seasonal changes in prices of these two important groups of commodities, the monthly food groups indices will show some seasonal fluctuation. In view of the fact that the "all groups" indices are quarterly, these particular seasonal changes will have no material effect on the all-groups index. Potatoes present a special pricing problem in the months when both new and old potatoes are on the market. This is met by averaging the prices of "new" and "old" potatoes in the manner indicated in para. 36 of the report. The distribution of oranges and bananas is carried out through the Marketing Department in such a manner as to spread supplies as evenly as possible throughout the year. There are no marked seasonal changes in prices, so that a fixed weighting system for these items produces no anomalies.

3. The Committee considered that, in addition to the items enumerated above, the more seasonal foods, such as vegetables in season—which disappear in turn from the markets for several months—and eggs—which are subject to marked variations in price and consumption—should be included in the index. This was practicable only on a changing basket system; and all these items were grouped into the one sub-group of the food groups index—namely, fruits, vegetables, and eggs. The seasonal items included in this group, together with the months in which they apply are:—

Commodity.	Months Included in Index.	Commodity.	Months Included in Index.
Peas	.. November–April.	Tomatoes	.. December–April.
Beans—		Silver beet	.. Whole year, except October.
French	.. December–April.	Apples	.. Whole year.
Runner	.. December–April.	Pears	.. Whole year.
Lettuce	.. November–May.	Peaches	.. December–April.
Cabbage	.. November–September.	Plums	.. December–April.
Cauliflower	.. Whole year, except October.	Apricots	.. January–February.
Carrots	.. Whole year.	Lemons, New Zealand ..	.. Whole year.
Parsnips	.. April–October.	Grapefruit, New Zealand	.. June–October.
Swedes	.. April–September.	Raspberries	.. December–February.
Beetroot	.. Whole year.	Strawberries	.. November–December.
Kumara	.. March–June.	Gooseberries	.. November–December.
Brussels sprouts ..	.. May–September.	Eggs	.. Whole year.
Pumpkin	.. Whole year, except November.		

4. It will be seen that six of the items enumerated above are included throughout the year. The weight allotted to these items, however, varies considerably as between individual months. The weights allotted to the various commodities included in the basket for each month are adjusted in such a manner that, while each receives its proper weight in relation to any other item in the basket, purely seasonal fluctuations in prices or in quantities consumed are not reflected in the index, which, however, properly reflects non-seasonal changes in prices of these commodities. As stated earlier, potatoes, onions, bananas, and oranges are included in this group with fixed weights.

5. The formula by which this computation is made is given in the following technical appendix prepared by the Census and Statistics Department (Appendix F).

APPENDIX F.—TREATMENT IN INDEX OF SEASONAL ITEMS (WITH USE OF SYMBOLS)

(Prepared by Census and Statistics Department)

Let the successive months of a year taken as typical in respect of seasonal variations be denoted by the subscripts 1, 2, 3, . . . 12, and of a year y years later by $12y + 1, 12y + 2, . . . 12y + 12$. Let the price index number of the seasonal group at month c on the base month b be denoted by p_{bc} , and let $p_{bb} = 1000$.

It is required to find $_{12y+1}a'_{12y+m}$ where both a and $m < 12$.

Let $p_n, p'_n, p''_n, \&c.$, represent the respective prices of those commodities included in the seasonal group of the index which are in season in any month n ; $q_n, q'_n, q''_n, \&c.$, the (actual or imputed) quantities of the same commodities respectively purchased in that month; and $\Sigma q_n p_{12y+1+n}$ a summation over all the same commodities.

It is assumed that positive integral values only of a, b, c, m , and n , and integral values only of r, s , and y , are to be considered, and that $p_{12y+1+n}, p'_{12y+1+n}, p''_{12y+1+n}, \&c.$, cover the same range of commodities as $p_n, p'_n, p''_n, \&c.$, for all admissible values of n and s ,

Let k be the group (expenditure) weight for the seasonal group—*e.g.*, the annual total consumer expenditure on items in this group per £1,000,000 of all consumer expenditure represented in the index.

Let $f(m)$ be some function (to be defined) of m , subject to the condition that $f(1) = \Sigma q_1 p_1$. It is further assumed that—

- (i) $\frac{f(m)}{f(1)} = 1 + (m-1)T$, where
- $$T = (\text{say}) \frac{1}{3} \left[\frac{\Sigma q_{12} p_{12}}{\Sigma q_{12} p_0} + \frac{\Sigma q_{13} p_{13}}{\Sigma q_{13} p_1} + \frac{\Sigma q_{24} p_{24}}{\Sigma q_{24} p_2} - 3 \right]^*$$
- (ii) $i_m = \frac{f(m)}{f(1)} \times 1000$
- (iii) $m i_{12y+m} = \frac{\Sigma q_m p_{12y+m}}{\Sigma q_m p_m} \times 1000$
- (iv) $i_{12y+m} = \frac{m i_{12y+m} + i_m}{1000}$
- (v) $i_{12r+a} i_{12y+m} = \frac{i_{12y+m}}{i_{12r+a}} \times 1000$

It then follows that

$$\begin{aligned} i_{12r+a} i_{12y+m} &= \frac{m i_{12y+m} + i_m}{a i_{12r+a} + i_a} \times 1000 \\ &= \frac{\Sigma q_m p_{12y+m}}{\Sigma q_m p_m} \times \frac{\Sigma q_a p_a}{\Sigma q_a p_{12r+a}} \times \frac{1 + (m-1)T}{1 + (a-1)T} \times 1000. \end{aligned}$$

Let the expression

$$\frac{k}{\Sigma q_a p_{12r+a}} \times \frac{\frac{\Sigma q_a p_a}{1 + (a-1)T}}{\Sigma q_m p_m} \times \frac{1}{1 + (m-1)T}$$

be written as $\phi(m)$; this is independent of y , also k , r , a , and T are constant for all values of m .

Further, let Q_n , Q'_n , Q''_n , &c., be written for $\phi(n)q_n$, $\phi(n)q'_n$, $\phi(n)q''_n$, &c., respectively.

It follows that

$$\begin{aligned} i_{12r+a} i_{12y+m} &= \frac{\phi(m) \Sigma q_m p_{12y+m}}{k} \times 1000 \\ &= \frac{\Sigma Q_m p_{12y+m}}{k} \times 1000. \end{aligned}$$

In either of these last two forms the formula is well adapted to numerical evaluation for any month by using the set of weights (q_m , &c., or Q_m , &c.) appropriate to that month (there are only twelve sets of weights, corresponding to the twelve possible values of m , of which a is one) and the current monthly prices (p_{12y+m} , &c.).

More logically, however, it may be written

$$\begin{aligned} i_{12r+a} i_{12y+m} &= \frac{\phi(m) \Sigma q_m p_{12y+m}}{\phi(a) \Sigma q_a p_{12r+a}} \times 1000 \\ &= \frac{\Sigma Q_m p_{12y+m}}{\Sigma Q_a p_{12r+a}} \times 1000. \end{aligned}$$

This, despite the monthly changing weights in the numerator of the fraction, is actually based, *inter alia*, on Laspeyres' formula (see assumption (iii) above), which requires constant weights (values of q_m , &c.) in both the numerator and the denominator.

It will be seen that the method consists essentially of the following operations:—

- (i) Any current month is linked by the standard technique with the corresponding month of the regulating period. The year 1946 will be used as the regulating period for this purpose. This movement contains no seasonal variation, but trend only.
- (ii) A trend has to be established between the months of the regulating period. In the suggested formula, first the annual movement (again trend only) between each of three months (comprising the first month of this period and the immediately preceding and following months) and a month twelve months later in each case is ascertained; then the average of these three measures of trend is spread by "simple interest" or "straight line trend" over the months of regulating period.
- (iii) Combining (i) and (ii), the trend to any current month from a fixed month (say, the first) of the regulating period is obtained.
- (iv) The base period of the index (assumed a specific month) being chosen, the trend to this month from the fixed month of the regulating period is obtained exactly as in (iii).
- (v) The trend to the current month from the base month is derived from a comparison of the trends under (iii) and (iv).
- (vi) The index number formula developed from these principles involves simply (1) the determination of the aggregate for any month by the application to that month's respective prices of commodity weights which have been adjusted from the original quantity weights by multiplying throughout by the value of $\phi(m)$ appropriate to that month, and (2) division by a constant—*i.e.*, the group weight.
- (vii) As $\Sigma q_a p_{12r+a}$ enters into $\phi(m)$, the adjusted weights cannot be calculated until the prices for the base period (month $12r+a$) have been collected. Compare para. 27 of the report. Nor does the method lend itself to the predetermination of commodity expenditure weights within the seasonal group.

* This formula is suggestive only: in practice it may be found advisable to vary the selection of the months entering into it, or to increase their number so as to include a greater range of the commodities comprised in the seasonal group.

By a further refinement a separate value of t may be computed for each commodity, thus:—

$$t = (\text{say}) \frac{1}{36} \left[\frac{p_{12}}{p_0} + \frac{p_{13}}{p_1} + \frac{p_{14}}{p_2} - 3 \right]$$

$$t' = \frac{1}{36} \left[\frac{p'_{12}}{p'_0} + \frac{p'_{13}}{p'_1} + \frac{p'_{14}}{p'_2} - 3 \right] \text{ \&c., in which case}$$

$$\frac{f(m)}{f(1)} = \frac{\Sigma q_m p_m}{\Sigma q_m p_m} \cdot \frac{1 + (m-1)t}{1 + (m-1)t}$$

$$\phi(m) = \frac{k}{\Sigma q_a p_{12r+a}} \times \frac{\Sigma q_a p_a}{1 + (a-1)t} \cdot \frac{\Sigma q_m p_m}{1 + (m-1)t}$$

NOTE.—The subscript 0 denotes the month immediately preceding the month 1.

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