A SURVEY

OF THE DIETS

OF 50 EDINBURGH FAMILIES.

by

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VOL. I.

Thesis presented
for the Degree of M.D.
FOREWORD.

I have divided this survey into two volumes. Volume I consists of a discussion of all the factors in the composition of the diets of 50 Edinburgh families, excluding most tabular details. Volume II consists of the tabular details which form the basis of the discussion in Volume I. This division into two volumes has been carried out with a view to facilitating the easier reference to the tables of figures.
INTRODUCTION.

There is no subject in modern life, apart perhaps from the daily discussion of the vicissitudes of war, which has evoked so much study within recent times than that of the diets of everyday life. I can safely state that man's interest in food has turned from the purely primitive instinct of satisfaction in eating and necessary bodily requirements to the present study (by analysis) of food for the rightful satisfaction of eating with a view to enjoying good health and with necessary economy. The present day study is borne out in the publication of at least 5,000 scientific papers yearly dealing with some aspect of food requirements, whether as vitamin or mineral requirement, or with a definite bearing on the influence of food on health. Further evidence of the national consciousness in this country in the problem of nutrition, especially as regards the care and healthy development of the body both in its relationship to the individual and indirectly to the nation, was indicated when the Prime Minister in the latter part of 1936 appointed a Committee of the Economic Advisory Council to promote the application in our Colonial Empire of modern knowledge in regard to nutrition.

Although a great deal of information is available in/
in various forms and in various publications regarding the amount of foodstuffs produced in and imported into this country, relatively less has been written concerning the amounts of the actual foodstuffs consumed. I feel there is still insufficient evidence available to help us over one of the biggest problems - that of balancing the consumption of the foods imported with the everyday demand of the housewife. This gap is being gradually diminished but it will take years of patient propaganda in the education of the individual to the realisation of what constitutes a good healthy diet within his or her means and the present diets of to-day which are directly or indirectly the cause of the greatest proportion of the present ill-health of the human race.

The problem is really a question of deciding what a good health-giving diet is and how it differs from present day diets, considering always the factor of family income and expenditure. At present most medical men are agreed, as far as our present day knowledge goes, on what a good health-giving diet consists of, but we are on less secure grounds when we consider the diet of the individual as it is just now. A number of publications have been brought out from time to time and at the present time we await with interest the results of the government's investigation into the diet of 25,000 families at present being analysed, but/
but not yet published. (Ministry of Labour, London, S.W.1. Forms CLI, CLI(Ag.) and CL4.) With a view to studying the present day diets of a section of the population of Edinburgh I have brought together in the papers which follow my dietetic survey of a group of 50 families who are under my care in an Edinburgh general practice. The results I believe will be of interest both as an analysis of the diets of these 50 families as purchased and as eaten. I have also outlined the diets of some families giving the health of these families.
HISTORICAL ASPECT OF NUTRITION.

One question which is still of paramount importance even to-day is this - Is there a nutritional problem? I feel certain that unless very radical changes take place in this country in post-war years we will, and must, have a nutritional problem until propaganda and teaching are more intensive and until such a day arises when we will see the present knowledge of dietetics applied by each household, both in the manner of the purchase of food and in the manner of preparing that food. It is a constant problem this nutritional problem, ever since the dawn of the world, and I am afraid must continue unless some very drastic changes take place.

Before I continue with the outline of this investigation into dietetics in Edinburgh I feel certain that we must realise some of the historical facts about dietetics which have a bearing on the present problem. If we call all the facts, situations and changes which have affected the diet of the community and so of the individual, "scientific discovery" then I feel Robert Browning's words aptly describe the process -

"Man must pass from old to new,
From vain to real, from mistake to fact;
From what once seemed good to what now proves best.
How could man have progression otherwise?"

In/
In other words one conjures up a picture of our early ancestor in his animal loin cloth sitting with his spouse beside a river or stream satisfying his bodily food demands on a slain animal with nearby a collection of the various fruits of the trees - and in contrast to-day the father and mother sitting in a small bungalow room around a table set and on which repose a large number of opened tins and packages branded by a factory.

Resuming our historical survey from the past to the present we see various significant changes brought about by climate, inventions, and last but not least the upsets of war and the problems of war.

Primitive man subsisted - even though we believe somewhat precariously - on fruits, seeds, roots, eggs, honey, trapped fish and small animals. This man, we are led to believe by certain eminent scientists - archaeologists who have examined the fossils of pre-historic man - was, due to his native state and primitive diet, the healthiest of all the man species.

Then we see the large animals being killed and their flesh introduced into the diet when man invented and used his primitive weapons, whether his axe or his bow and arrow. Further time elapses and we next see our forebears with simple tools tilling the ground and sowing the seed, and also storing a certain amount of his crop so procured against the lean winter time and/
and a certain amount for his next year's sowing. So as he sowed he reaped, but his ground did not produce the results in the same way and on the same ground and so, with his herds, he had to migrate to another land not exhausted by his previous work. Then when his migration became less possible his art of avoiding exhaustion of his soil developed into the art of farming and as this improved his food supply became more certain. Here again other factors troubled him. Climate forced him to store for the winter and against a bad harvest, against the lack of winter pasture for his flocks and herds, and so a certain number of animals were killed and these were preserved for winter use either by salting or smoking or drying. At this stage we find that although the salted meat and dried food sustained the meat part of his diet, the famous "London disease", or scurvy, due to lack of fresh essentials, was most troublesome.

Next invention starts to play its part. The making or building of ships to sail the seas, and, as the art of sailing improves, the lengthening of voyages with the resultant exploratory expeditions and overseas raids, and, in more peaceful periods, overseas trade. This latter factor bringing about overseas trade and so a further introduction of the foodstuffs of foreign lands. Here is the turning point of the whole problem of our present day supply in relationship to present day/
day dietetics. If we were still accustomed to draw all our sustenance from the surrounding countryside we would, apart from factors of climate and soil, have no supply problems. As our country sent forth its ships on foreign trade and we exchanged our products produced by our communities now largely turned from agriculture to industry and of necessity our dependance on our re-importation of the agricultural products we have ceased to produce sufficiently for ourselves increased. The outcome of this brings us up to the present day when we are at war and the importance of our dependance on this re-importation of our food supply necessitates its bearing on the amount of food which can be supplied to the individual for dietetic purposes. In other words the agricultural change in the community of our country to that of a large industrial and metropolitan region of the world has made us immensely susceptible to the blockade of war, and we all remember too well a very similar state of affairs, without previous precedent, in the Great War. When I say without previous precedent I do not, of course, ignore other previous naval blockades in history which made very definite historical alterations in the course of the history of the world. I refer to early attempts as indicated in history by Lysander, the Spartan commander, when in 405 B.C. he concentrated his naval forces in the Dardanelles and effectively cut off/
off the Black Sea grain coming from Athens. Other historical examples are seen in the early eighteenth century during the French War when again both French and Genoese boats conveying food cargoes were intercepted and war became again not so much a fighting problem as a dietetic problem.

I have dwelt perhaps at length with the adverse factor of blockade but we must balance this with the introduction to Europe from Ecuador by the Spaniards in the early sixteenth century of the potato and later, in 1585, by Sir W. Raleigh who imported potatoes from abroad to Ireland. It was a long time after that - some 200 years - before the potato became such an important constituent of the diet as we find it to-day. The importation of fruits - oranges - by the Portuguese in the 16th century brought another factor into the diet which to-day we recognise of paramount importance in the relationship of oranges to vitamin deficiencies.

All those changes in diet took place insidiously and to-day we look back with a certain amount of horror at diets which lack either of these two articles. These are only two of the many changes which have taken place step by step down the years.

Let us take yet another historical incident. The time is not so far away when sugar was a great luxury which, like tea and other imports, was most precious. At first it was imported from the West Indies as sugar cane/
cane and then refined. Later Germany produced sugar from beet - beet sugar - and so very quickly, sugar could be produced in large quantities and with its consequent availability to the public its ready assimilation into the diet where to-day it occupies with potatoes and meat a high place of importance. Sugar started the manufacture of our food-stuffs until to-day we manufacture all sorts and kinds of foods. In the factory we extract them from the original natural sources or even sometimes we produce them synthetically and reproduce their original appearance by camouflaging them with dyes, etc. to emulate their original colours, tastes and smell. In any particular food factor we like to mention I think we could give examples of the progression of changes which have taken place over the centuries to the present day, just as we can visualise the original raw meat being eaten by our forebears just after the kill, when as dried or salted meat at a somewhat later date, or as the chilled meat in the butcher's shop of to-day or as the bully beef of our armies in the field. I will refrain from further discussion of the whole structure of food and the food industry and outline the essential factors of dietetics which I am considering below.
OUTLINE OF METHOD EMPLOYED IN INVESTIGATING FAMILY DIETS.

In approaching the survey of the families and their diets it was necessary to set out a definite chart or pamphlet and give it to each family to fill in. A great deal of trouble was encountered in persuading each family to note down all the facts required at the time of purchasing or at the moment of consuming the food and not to put the figures down from memory at the end of the day. This required a great deal of constant supervision and on many occasions frequent visits to the homes of the families concerned before the figures were accepted by myself as accurate. To take a simple example - at the outset I hoped to be able to collect data on the average weekly earnings of the families. I had to abandon this attempt very quickly as some families refused point blank to divulge their weekly earnings. Whether they felt I was becoming too inquisitive and might either report their wage earnings to the Income Tax authorities, or whether they thought I might make it an excuse for alterations in any future bills I might render them for medical services, I will never know. Yet again, I thought it would be interesting to study also the problem of refuse and wastage, but found here that the figures given were so inaccurate and totally stupid/
stupid in some cases that again I gave that problem up as impossible in the present survey. In all other details I must say here that every member of the families investigated gave me their fullest co-operation in the keeping of all the various factors noted down, and they were all very interested in the manner of placing these factors down and all hoped it would lead to my being in a better position to advise them regarding any obvious deficiencies in their diet which could be corrected by them and so help their standard of health.

At the outset of the investigation a series of sheets with questions and spaces for answers was placed together. This questionnaire is reproduced on pages 1-5 Vol.II. and it will be seen that it is divided into a series of subsections. On the first page the name and sex of each member of the household is recorded. From this I collected the total number of people involved in the investigation. These figures are shown on pages 6-14 Vol.II and in the 50 families demonstrated there are 217 People, which gives us an average of 4.34 persons per family over the whole investigation. If we survey those 50 families it is seen that one family or group family - A 52 and B 52 - consists of 19 males. This is a most abnormal family but I included it in the investigation as the type of diet one would encounter in an institution. These men are workers in the Church Army Home - a/
- a home for out-of-work men with no friends and no home. In the tables of averages drawn up during the investigation and shown in columns 1 and 2, page 308 and 309 Vol. II it will be seen that even though we take the average of the other 49 families, with a total personnel of 198 persons, the family average works out at 4.04 - only a difference of .3 from the figure obtained over the 50 families.

At this point let me point out that the investigation was carried out twice for each family, the A group representing the investigation during the second week of December, 1937, and the B investigation during the second week of July, 1938, giving us a true winter and summer series of diets. In both groups A and B there are the same total number of people, the same families excepting one change in A 25 and B 25. These are different families due to the fact that A 25 is the family who are in charge of the Church Army Home and they were changed. B 25 is the family of the new Church Army Officer. In both cases the family consisted of a Father, Mother, and Daughter, but the ages were different and at a later date I shall discuss the diet and other differences.

Returning now to the basis of the sheets - Pages 1-5. Vol. II - other questions such as age, occupation and illnesses were tabulated and these again will be discussed below at a later stage. Then other columns are/*
are introduced for rent, rates and taxes, coal and fire. I have ignored these to any extent apart from the tabulation of them as shown in pages 15-31 Vol.II as I found so many of the families did not have to budget weekly for those factors and therefore they did not enter into the total weekly expenditure per se.

If we now turn to the remaining parts of the schedule, page 2 Vol. II consists of a long table of commonly purchased foods and a space left for the amount purchased and the price paid for each article. Now this page represents the total amount of food bought on that day - the first day of the investigation - and the price paid for it and has nothing whatever to do with the amount of food eaten on that day, although in a high percentage of sheets comparison with the diets of that day will show that a great amount of the food eaten was bought the same day. Now there are seven sheets of the page 2 type - one for each of the seven days of the investigation. From this page the total quantities of food purchased was ascertained, the type of food bought was amply illustrated and the expenditure on food determined. This expenditure on food was noted down and tabulated on pages 15-31 Vol. II and 308-309 Vol.II and the various calculations regarding money spent on food per man value etcetera worked out. On sheet 3 and subsequent pages there were tables of diet columns drawn up into which space each member of the family noted down each item of his diet as he ate it and gave accurate details of amounts and content/
content. Each member of the family indicated his meals - breakfast, lunch, tea or supper as the case might be - and this was noted for each of the seven days investigated. From these sheets all the various calculations concerning the composition of the diets were deduced. On sheet 4 page 4 Vol. II and sheet 5 page 5 Vol. II other items of expense were noted down, the items being indicated on one side of the page and the answer on the opposite side. From these sheets the factor of extra expenditure on materials outside the diet but necessary for the weekly budget was deduced and suitable tables drawn up as shown on pages 15-31. Vol. II and 308-309. Vol. II.

These sheets were the complete collection brought together and handed to each family in blank form to be filled up and from the answers sent back the various pieces of the investigation were carried out. Each family received one such group of sheets named A for the winter investigation and another such group of sheets named B for the summer investigation, the only difference being in regard to A 25 and B 25 where a change took place in the family of the Church Army Officer. Excepting this family there was no other change in the families in B from A group which meant the total number of families and total number of people was the same. On pages 1-5 Vol. II. I have shown the schedule of sheets, and on pages 56-72. Vol. II.
II. I have reproduced the exact filling in of one family, B 2, as returned to me. In the drawing up of this series of sheets I was guided to a large extent by the questions asked in the book drawn up by the Ministry of Labour in their investigation into the diets of 25,000 families - forms C.L.1, C.L.1(Aq.) and C.L.4., Ministry of Labour, London, S.W.1.
RESULTS OBTAINED FROM SCHEDULES RETURNED
BY EACH FAMILY.

Let us now pass from the actual schedules as outlined above and shown on pages 1-5. Vol. II and consider the results of the filling in of those schedules. This is where we begin the investigation proper, the other stages being the essential preliminaries.

When all the schedules were returned it was now necessary to carry out the various calculations involved in each sheet and these were all noted down and as I continue through the following pages the essential points will be brought out. I have shown how there are 50 families. Actually 52 diet sheets were sent out but No. 33 and No. 41 refused to send them in filled up so this brought the total number to 50 families. I have also shown on pages 6-14. Vol. II. the members of each family and then totalled those numbers, giving us a total of 217 people. Then the average number of people in the 50 families worked out at 4.34 persons per family. In an earlier section, pages 13 and 14, Vol. I., I mentioned the difference found on special investigation of A 52 and B 52, and over 49 families and 50 families. If we compare this figure with the investigation of Cathcart and Murray on 154 families in St. Andrews we see that we/

1. Privy Council Medical Research Council. (No. 151)
<table>
<thead>
<tr>
<th></th>
<th>Total No. of Families</th>
<th>Total No. of People</th>
<th>Average per family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathcart &amp; Murray</td>
<td>154</td>
<td>745</td>
<td>4.63</td>
</tr>
<tr>
<td>Present survey</td>
<td>50</td>
<td>217</td>
<td>4.34</td>
</tr>
<tr>
<td>Present survey, excluding A 52 and B 52.</td>
<td>49</td>
<td>198</td>
<td>4.04</td>
</tr>
</tbody>
</table>

We are here dealing with one-third the number of families, but yet the average per family is only 0.49 of difference, which is very small. If, however, we exclude the very abnormal family, A 52 and B 52, the difference is more marked - 0.79 of difference. At a later stage further comparisons will be made with this investigation.

The next necessary calculation carried out was the adding up of each of the sheets representing the purchases of each day, and at the foot of each page this was totalled up for each day. These figures were then transferred to the pages reserved for calculations and then the seven days of each investigation totalled up. This total represents the total amount of money spent by each household on food for the week and this figure is taken as being the purchase price of the food eaten for that week. This figure is not strictly accurate, but in previous investigations in this country, e.g. Cathcart & Murray, Privy Council Medical Research Reports, 151, 165 and 218, this has been the method accepted as the most accurate. This is also the/
the accepted method which is being applied to the Ministry of Labour investigation, C.L.1 and C.L.1 (Ag.) and I have followed those methods strictly. It might be possible to ask each family to assess for their weekly expenditure an approximate price for the obvious constituents of their individual diets, but I fear this would vary so much that it would not be strictly accurate, or easy either. Thus I have taken as my figure of the cost of the diets for the week the amount in £.S.D. actually spent by each family per week and future monetary calculations are based on this reading.

The expenditure on other articles is given on sheets 4 and 5 of each family schedule book and all the money noted down there has been added up on each schedule and then the results noted on pages 15-31. Vol. II. These figures represent the money spent on articles other than food per week and are tabulated with the figures obtained for the expenditure on food. These two columns are then added together and the figure obtained for each family represents the total expenditure per family per week. Total expenditure on food for each family plus total expenditure on other articles per family equals total expenditure per family per week. All these figures are shown on pages 15-31. Vol. II. Future calculations are based on these figures and will be referred to from time to time below.

I/
I next passed to the calculation of the value of each diet per day per person. This necessitated taking each diet as it was noted down on Sheet 3 and referring to a table for food values. The first essential in the diet value is to determine the carbohydrate value of each daily diet; next the protein value of the same diet, then the fat value of the diet per day, and finally the total number of calories derived from those carbohydrate, protein and fat values added up. The table of values used was that in use in the Dietetic Department of the Royal Infirmary, Edinburgh. I have tabulated all those values on pages 32-55. Vol. II.

If these values are looked at it will be seen that each article is given a certain grammie weight and the equivalent grammes of carbohydrate, protein and fat with their calorific value as well. Each diet was evaluated on this basis, the various individual items being divided up into the constituent parts and then written down and tabulated. If we return to family B 2 - the diets which were reproduced in full on pages 56-72. Vol. II and referred to above - I have on pages 73-76. Vol. II detailed the various diets consumed by this family for the first day of the B. investigation and on pages 73-76. Vol. II. I have shown the valuation of those diets worked out in detail for one day of the week. From those figures the future calculations of the dietary value were based/
based. It will be seen that a double check was kept on the figures by the figures balancing out by addition and multiplication, both vertically and horizontally, where each grammme of carbohydrate and protein was taken to yield 4 calories and each grammme of fat to yield 9 calories. To each daily diet of each member of each family this method was applied and the results noted down as shown on pages 77-277. Vol. II. Then every family was taken in turn and these calculations continued for each day of the investigation for both A and B groups. At a later date for further purposes each of the seven days of A and B for each member of the family were added together (see pages 77-277. Vol. II) and then the average of the seven days taken in both A and B. Next the averages so obtained for each member of the family were added together to give the total average diet of the whole family in A and B weeks, pages 278-305. Vol. II. When those values were obtained more abstract values were worked out.

I have not noted down in this thesis the individual diets of each member of each family for each day for one week in each group A and B as the space taken to type all those diets would have made the size of the volume far too great. I have, however, typed all the resultant total food values of each member of the investigation/
investigation in A and B groups, as it is necessary to illustrate those values for the purposes of the discussion. Several of the more outstanding diets have been typed in full with appropriate values attached where they have been criticised or deemed worthy of criticism below.
MAN VALUE ESTIMATIONS.

In the investigation of family diets a constantly recurring factor is that of the "man value" of the family diet - the value to be assigned to different members of the family. This "man value" has varied within close limits from investigation to investigation and I have outlined four of these valuations. In the dietetic survey presented in these pages I have followed the values given by Cathcart & Murray in their report to the Medical Research Council in 1930-1931 on the inquiry into 154 family diets in St. Andrews. I feel justified in following their figures closely rather than the other three sets of figures in that Edinburgh and St. Andrews are both closely related geographically and so climatically, and in that they are more intellectual, or shall we say university, centres rather than industrial centres. In order however, to show the close variations in this factor and to show that even to-day it is not yet a fixed factor I have tabulated the four variations below.

A. Atwater introduced figures which were the basis of most of the early work on this subject both in America and this country.

2. League of Nations Report A 12 (A) 1936 11 B.
Atwater.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>1.00</td>
</tr>
<tr>
<td>Woman</td>
<td>0.80</td>
</tr>
<tr>
<td>Boy 14-16</td>
<td>0.80</td>
</tr>
<tr>
<td>Girl 14-16</td>
<td>0.70</td>
</tr>
<tr>
<td>Child 10-13</td>
<td>0.60</td>
</tr>
<tr>
<td>Child 6-10</td>
<td>0.50</td>
</tr>
<tr>
<td>Child 2-5</td>
<td>0.40</td>
</tr>
<tr>
<td>Child 0-2</td>
<td>0.30</td>
</tr>
</tbody>
</table>

B. Lusk more recently drew up a standard scale of coefficients which is said to be an improvement on the standard of Atwater. In this standard he raised the co-efficient for boys and girls at puberty.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>1.00</td>
</tr>
<tr>
<td>Woman</td>
<td>0.83</td>
</tr>
<tr>
<td>Boy 13-20</td>
<td>1.00</td>
</tr>
<tr>
<td>Girl 13-20</td>
<td>0.83</td>
</tr>
<tr>
<td>Child 10-13</td>
<td>0.83</td>
</tr>
<tr>
<td>Child 6-10</td>
<td>0.60</td>
</tr>
<tr>
<td>Child 0-6</td>
<td>0.50</td>
</tr>
</tbody>
</table>

C. Cathcart and Murray. Privy Council Report, 1931, No. 151, on diets of 154 families at St. Andrews. This standard is a modification and combination of the work of Atwater and Lusk.
Cathcart and Murray

<table>
<thead>
<tr>
<th>Category</th>
<th>Co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Man</td>
<td>1.00</td>
</tr>
<tr>
<td>Woman</td>
<td>0.83</td>
</tr>
<tr>
<td>Boy 14 upwards</td>
<td>1.00</td>
</tr>
<tr>
<td>Girl 14 upwards</td>
<td>0.83</td>
</tr>
<tr>
<td>Child 12-14</td>
<td>0.90</td>
</tr>
<tr>
<td>Child 10-12</td>
<td>0.80</td>
</tr>
<tr>
<td>Child 8-10</td>
<td>0.70</td>
</tr>
<tr>
<td>Child 6-8</td>
<td>0.60</td>
</tr>
<tr>
<td>Child 3-6</td>
<td>0.50</td>
</tr>
<tr>
<td>Child 2-3</td>
<td>0.40</td>
</tr>
<tr>
<td>Child 1-2</td>
<td>0.30</td>
</tr>
<tr>
<td>Child 0-1</td>
<td>0.20</td>
</tr>
</tbody>
</table>

D. Co-efficient Man-Value from League of Nations

Report A 12 (A) 1936 11 B.

<table>
<thead>
<tr>
<th>Age in Years</th>
<th>Man-Value Co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>0.35</td>
</tr>
<tr>
<td>2 - 3</td>
<td>0.42</td>
</tr>
<tr>
<td>3 - 5</td>
<td>0.50</td>
</tr>
<tr>
<td>5 - 7</td>
<td>0.60</td>
</tr>
<tr>
<td>7 - 9</td>
<td>0.70</td>
</tr>
<tr>
<td>9 - 11</td>
<td>0.80</td>
</tr>
<tr>
<td>11 - 12</td>
<td>0.90</td>
</tr>
<tr>
<td>12 - 15</td>
<td>1.00</td>
</tr>
<tr>
<td>15 upwards</td>
<td>1.00</td>
</tr>
<tr>
<td>Women - pregnant</td>
<td>1.00</td>
</tr>
<tr>
<td>Women - nursing</td>
<td>1.25</td>
</tr>
</tbody>
</table>

This/
This scale does not in any way bring out the differences which are seen in the food requirements of the diets of boys and girls at puberty nor in the normal difference in diet between man and wife or man and woman as noted in practically all investigations reported.

In the following analysis of the 50 families in Edinburgh I have used the scale of Cathcart and Murray (1951) as my standard and have totalised these findings -

(a) for each family; see pages 6-14. Vol. II.
(b) for the whole series of families; see page 14. Vol.II.

There are 49 families with a total of 198 people, with one extra family - a very large family, an institution, a church army home of 19 men - giving a total of 217 people both in A and B schedules. There is one difference, however, in the personnel of A and B schedules in the A 25 and B 25 families, both of 3 people, but this is due to a change in the governor of the Church Army Home. There is a father, mother and daughter in each but the daughter's age is very different - viz. 22 years to 4 years - and this gives a man value difference of 0.33. Allowing this difference in this family and also the fact that the age of the members of the families is 6 months older in B than in A, and allowing for this as shown in the tables there is only a difference in the final totals of .03 - an insignificant factor. Thus the average of the 49 families works out at 3.44 both in A and B, and/
and if we take the average man value for the 50 families at 3.75, but this is an abnormal factor and I prefer to leave out the Church Army family A 52 and B 52 and our average man value over 198 people in 49 families is 3.44.

Now if we compare this with the figure given for St. Andrews' investigation of Cathcart and Murray (Privy Council Report 151, 1931) their reading is 3.37 over 154 families, that is, three times the number but still only a difference of 0.07 - a very close figure.
CALORIC REQUIREMENTS.

When we investigate the food requirements of the individual we must have some basis for studying this and in the analysis of those requirements there must be some standard. In the last half century this standard has been measured in calories and has varied from 3,000 calories per day per man to 3,400 and even down to 2,400, and it has been considered that any diet which failed to fulfil this requirement was necessarily a poor diet. Now we know that this calory requirement is only one factor in the investigation and is very largely dependent on a large number of factors - the actual chemical components of the food taken, which necessarily depends on the age of the person, sex, the build of the individual; factors such as work, rest, climate, and season of year. If we investigate this calorific requirement of the average adult male or female living an everyday life in a temperate climate and not engaged in manual work, in this series we must first assume a standard and I have:

have followed the standard set by the League of Nations Report and I have tabulated these. From other recent observations it would seem that the observations of Prof. Cathcart and Dr. Murray seem to be in close agreement with this figure rather than the more generally quoted figure of 3,000 calories.

### TABLE OF CALORIE REQUIREMENTS

<table>
<thead>
<tr>
<th>Age in Years (1)</th>
<th>Man Value Coefficient. (2)</th>
<th>Calories without muscular activity (3)</th>
<th>Calories with muscular activity (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>0.35</td>
<td>840</td>
<td>1200</td>
</tr>
<tr>
<td>2 - 3</td>
<td>0.42</td>
<td>1000</td>
<td>1400</td>
</tr>
<tr>
<td>3 - 5</td>
<td>0.50</td>
<td>1200</td>
<td>1600</td>
</tr>
<tr>
<td>5 - 7</td>
<td>0.60</td>
<td>1440</td>
<td>1800</td>
</tr>
<tr>
<td>7 - 9</td>
<td>0.70</td>
<td>1680</td>
<td>2000</td>
</tr>
<tr>
<td>9 - 11</td>
<td>0.80</td>
<td>1920</td>
<td>2300</td>
</tr>
<tr>
<td>11 - 12</td>
<td>0.90</td>
<td>2160</td>
<td>2700</td>
</tr>
<tr>
<td>12 - 15</td>
<td>1.00</td>
<td>2400</td>
<td>3200</td>
</tr>
<tr>
<td>15 upwards</td>
<td>1.00</td>
<td>2400</td>
<td>3500</td>
</tr>
<tr>
<td>Women - pregnant</td>
<td>1.00</td>
<td>2400</td>
<td>3000</td>
</tr>
<tr>
<td>Women - nursing</td>
<td>1.25</td>
<td>3000</td>
<td>3000</td>
</tr>
</tbody>
</table>

x4. Tables from the League of Nations Report. A 1936 (excepting column 4.)

x5. Privy Council Medical Research Council, 1936. - A Dietary Survey in Terms of the Actual Foodstuffs Consumed. By E.P. Cathcart, F.R.S. and A.M.T. Murray, Ph.D.
Column 4 is not from the League Report but is added by addition of the extra calories allowed for muscular work as suggested by Prof. E.W.H. Cruickshank in his book Food and Physical Fitness, page 14, where it is allowed as follows:

1 - 11 - 50 - 75 calories per hour of activity

Girls 11 - 15 - 75 calories per hour of activity

Boys 11 - 15 - 75 - 100 calories per hour of activity

Boys over 15 - 100 - 150 calories per hour of activity

Adults - Light work 75 calories per hour of activity

" Moderate work 150 calories per hour of activity

" Hard work 300 calories per hour of activity

Let us now turn to the calorific values of the diets shown here and we see the various total calories given on pages 77-277. Vol. II. for the members of each family in A and B groups, and again on pages 278-305. Vol. II. we see the average calorie value of each family worked out with reference to the man value of each family. On page 306. Vol. II. Table 1 this man value-calorific value of each family is tabulated and the man value derivative values of man value carbohydrate, protein, and fat are also given. Neglecting for the moment the source of the calories and taking only the calorific value of the diets as shown on page 306. Vol. II. Table 1, we see that in both A and B groups there is a wide difference in this value, but yet/
yet if we take the average of the 49 families, i.e. excluding A 52 and B 52, the average calorific value for these families is 2528 calories in the A, or winter, group, and 2596 in the B, or summer, group; and including A 52 and B 52, 2559 for A and 2610 for B. These figures run very close to the figures considered sufficient in the League of Nations Report, A 12 (A) 1936, 11 B, where the figure is given as 2400 calories. Cathcart and Murray in the preface to their report No. 218 to the Privy Council Medical Research Council state that their more recent view is more towards this lower figure as shown by their study of 109 women students at St. Andrews, average age 21, physique excellent, and whose average calories worked out at 2035. Yet again, if we compare our average result with the original report of Cathcart and Murray on the St. Andrews' diets - Privy Council Medical Research Report No. 151, Table 11, and again their later analysis of the St. Andrews' diets, Privy Council Medical Research Report, 218, Table III, and explanation paragraph below Table III, we see that this investigation in Edinburgh tends to favour the lower value, while these two investigators are nearer the 3000 calorie mark frequently quoted, viz.:
### Survey.

<table>
<thead>
<tr>
<th></th>
<th>Family Man Value</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Fat</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.151 1931</td>
<td>3.37</td>
<td>410.7</td>
<td>83.8</td>
<td>118.6</td>
<td>3119</td>
</tr>
<tr>
<td>No.218</td>
<td>3.51</td>
<td>401</td>
<td>81.</td>
<td>113.</td>
<td>2945</td>
</tr>
<tr>
<td>Present 49 A.</td>
<td>3.44</td>
<td>330</td>
<td>97.</td>
<td>90.</td>
<td>2528</td>
</tr>
<tr>
<td>50 A.</td>
<td>3.751</td>
<td>335</td>
<td>98.</td>
<td>90.</td>
<td>2559</td>
</tr>
<tr>
<td>49 B.</td>
<td>3.44</td>
<td>345</td>
<td>98.</td>
<td>90.</td>
<td>2596</td>
</tr>
<tr>
<td>50 B.</td>
<td>3.751</td>
<td>347</td>
<td>98.</td>
<td>91.</td>
<td>2610</td>
</tr>
</tbody>
</table>

**N.B.** The number preceding the A or B represents the number of families and not the number of the family.

The greater amount of work and discussion of the work on diets has for the past 50 years been centred on this calorific value, but I now propose to leave this value except in respect of the recurrence of the calorie figures which will be discussed in the various analyses which I wish to proceed with. I will now immediately turn to the tabulation of results before going into more detail with individual diets.
GENERAL SUMMARY.

Following the example of previous workers in their reports on dietetic surveys I have now turned to a general summary of results. On pages 306-309 Vol. II the various results have been tabulated and I have drawn up in a table below the general results found. Some of these results have been tabulated and discussed earlier; many have not been encountered so far.

<table>
<thead>
<tr>
<th>Man Value Family</th>
<th>Carbohydrate grammes</th>
<th>Protein grammes</th>
<th>Fat grammes</th>
<th>Calories</th>
<th>Expenditure on Food per Man Value weekly</th>
<th>Calories per ld</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) 3.75</td>
<td>335.</td>
<td>98.</td>
<td>90.</td>
<td>2559.</td>
<td>13/6.6</td>
<td>124.6</td>
</tr>
<tr>
<td>(B) 3.75</td>
<td>347.</td>
<td>98.</td>
<td>91.</td>
<td>2610.</td>
<td>13/10.8</td>
<td>121.8</td>
</tr>
</tbody>
</table>

In this table I have contrasted the general results of the A and B investigations taken of the 50 families and it will be seen how very close these figures run. The family man value, as mentioned before, was exactly the same - see discussion on man values page 27, Vol.I. Next the diet man value has been omitted since each person had all their meals at home and fortunately there were no visitors during the weeks of the investigation. This latter fact was singularly fortunate as it cut down the mathematics considerably.
considerably in assessing values.

A study of the columns showing the average carbohydrate, protein and fat and total calories shows that the general diet did not vary much between the summer and winter months. This fact is borne out very forcibly when the complete list of these four factors is studied, see page 306 Vol. II, Table I. where the figures in all four columns A and B, are practically the same. The most striking factor is that the figures for protein and fat are identical, although the fat in the summer is 1 unit higher. A very interesting increase in the figure in the summer in B. group is the increase in the carbohydrate factor. In actual fact 32 out of the 50 families show a noticeable increase in the carbohydrate intake during the summer months. This I assume is due to the fact that most people are taking more out-door exercise in summer, and probably more violent, and requiring a higher amount of readily assimilated food for quick energy production. Naturally this increase affects the total calories also where there is an average increase in this figure as shown in the table above. On previous occasions I have referred to a 49 family average, noting the abnormal type of family A 52 and B 52, and I have discussed the figures in dealing with man values and family averages. Again referring to page 306, Vol. II, Table I. we see there is not a great deal of alteration in the average figures obtained in the 49 families as compared with the 50 families.
I have summarised these findings for A and B:

<table>
<thead>
<tr>
<th>Man Value</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Fat</th>
<th>Calories</th>
<th>Expenditure on food per Man Value weekly</th>
<th>Calories per ld</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 49.</td>
<td>3.44</td>
<td>330.</td>
<td>97.</td>
<td>90.</td>
<td>2528.</td>
<td>13/6½</td>
</tr>
<tr>
<td>B 49.</td>
<td>3.44</td>
<td>345.</td>
<td>98.</td>
<td>90.</td>
<td>2596.</td>
<td>13/11</td>
</tr>
<tr>
<td>A 50.</td>
<td>3.75</td>
<td>335.</td>
<td>98.</td>
<td>90.</td>
<td>2559.</td>
<td>13/6½</td>
</tr>
<tr>
<td>B 50.</td>
<td>3.71</td>
<td>347.</td>
<td>98.</td>
<td>91.</td>
<td>2610.</td>
<td>13/10½</td>
</tr>
</tbody>
</table>

* (The numbers here refer to the number of families, not the number of the family.)

Here again we see the constancy of each set of figures in each column, more especially in the Protein and Fat columns; also in the amount spent per man value on food, and thus the calories consumed per penny spent. It will be noted that the summer diet costs more per man value, thus giving us a lower figure in calories per ld return. This, of course, is due to the fact that summer fruits and vegetables are more expensive and also consumed in higher proportions in the summer.

Let us now compare our results with the results of other investigations, and in order to save the number of lines of figures required let me take the results of 50 families in A group as our average figure and compare them with the figures reported from time to time in other investigations, always remembering that the figures here are for 1937, whereas/
whereas other investigations are prior to that. In 1937 the cost of living in respect of food purchase price has risen considerably from even 1931 when Cathcart and Murray published their first report on the St. Andrews' investigation, Report No. 151, Privy Council Medical Research Council.

<table>
<thead>
<tr>
<th></th>
<th>Man Value</th>
<th>Carbohydrate</th>
<th>Percentage Carbohydrate</th>
<th>Protein</th>
<th>Percentage Protein</th>
<th>Fat</th>
<th>Percentage Fat</th>
<th>Calories</th>
<th>Per Man Value</th>
<th>Food Expenditure on Weekly per Man</th>
<th>Calories per 1d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Study</td>
<td>3.71</td>
<td>335.</td>
<td>52.</td>
<td>98.</td>
<td>15.</td>
<td>90.</td>
<td>32.</td>
<td>2559.</td>
<td>13/6(\frac{1}{2})</td>
<td>124.6</td>
<td></td>
</tr>
<tr>
<td>Cathcart &amp; Murray No. 151</td>
<td>3.37</td>
<td>410.7</td>
<td>53.6</td>
<td>83.8</td>
<td>11.0</td>
<td>118.6</td>
<td>35.6</td>
<td>3119.</td>
<td>12/1(\frac{1}{2})</td>
<td>159.6</td>
<td></td>
</tr>
</tbody>
</table>

From observations on these two investigations it will be seen that the total amount of food consumed by the families in Edinburgh is less than that consumed in St. Andrews, and also that the percentage of each factor, carbohydrate, fat and protein, is different. The carbohydrate percentage is practically the same - 52% to 53.6%. In the protein percentage there is a very noticeable increase in the amount of protein consumed in Edinburgh - 4% more; 15% in Edinburgh to 11% in St. Andrews. And there is a proportionate decrease - 3.6% - in the amount of fat consumed in Edinburgh as compared with St. Andrews. The last two columns again indicate the very marked rise/
rise in cost of food as indicated by expenditure per man value weekly and the resultant drop in the number of calories obtained per lb.

Analysing our results further in general terms and comparing them with other published results we get this:

<table>
<thead>
<tr>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present Study.</td>
<td>335.</td>
<td>52.</td>
</tr>
<tr>
<td>(1) Cathcart &amp; Murray Report 151.</td>
<td>411.</td>
<td>54.</td>
</tr>
<tr>
<td>(2) Voit</td>
<td>500.</td>
<td>67.</td>
</tr>
<tr>
<td>(2) Rubner</td>
<td>509.</td>
<td>67.</td>
</tr>
</tbody>
</table>

(1) Privy Council Medical Research Council, No.151, Table III.


Comparisons in this table show that the present study in Edinburgh and that by Cathcart and Murray in St. Andrews, both of which have been contrasted above (see page 37, Vol. I), show a lower percentage of carbohydrate in the diet, up to approximately 15% less, whereas/
whereas the fat figures are approximately 15% higher in Edinburgh and St. Andrews compared with those of Voit and Rubner. When we consider the Protein we see that whereas the present survey of 15% corresponds very closely to the 16% or 17% of Voit and Rubner it is very much higher - 4% - in the Edinburgh survey than in St. Andrews.

These various figures are all very interesting but when analysed with figures given for other cities prove just as interesting. I will now tabulate these results:-
<table>
<thead>
<tr>
<th>Survey</th>
<th>Man Value</th>
<th>Carbo-hydrate</th>
<th>Percentage Carbo-hydrate</th>
<th>Protein</th>
<th>Percentage Protein</th>
<th>Fat</th>
<th>Percentage Fat</th>
<th>Calories</th>
<th>Expenditure on Food per man-value weekly</th>
<th>Calories per ld.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>3.71</td>
<td>335</td>
<td>52</td>
<td>28.15</td>
<td>90</td>
<td>32</td>
<td>80</td>
<td>2559</td>
<td>13/6/1</td>
<td>124.6</td>
</tr>
<tr>
<td>St Andrews Cathcart &amp; Murray No. 151 (1)</td>
<td>3.37</td>
<td>410.7</td>
<td>53.6</td>
<td>83.61</td>
<td>11.7</td>
<td>35</td>
<td>118.63</td>
<td>3119</td>
<td>12/1 1/2</td>
<td>159.6</td>
</tr>
<tr>
<td>Cardiff Cathcart &amp; Murray No. 165 Table II (2)</td>
<td>4.55</td>
<td>440.9</td>
<td>56.7</td>
<td>78.74</td>
<td>10.1</td>
<td>33</td>
<td>113.63</td>
<td>3174</td>
<td>8/6</td>
<td>225.0</td>
</tr>
<tr>
<td>Reading Cathcart &amp; Murray No. 165 Table III (3)</td>
<td>4.35</td>
<td>408.2</td>
<td>57.4</td>
<td>75.01</td>
<td>10.5</td>
<td>32</td>
<td>100.66</td>
<td>2906</td>
<td>7/3 3/8</td>
<td>242.2</td>
</tr>
</tbody>
</table>

(2) " " " " " No. 165. " " " " " Table II, page 7.
(3) " " " " " No. 165. " " " " " Table III A, page 7.
A comparison of these results shows that in the British Isles the amount, or percentage, of carbohydrate in the diet is very constant, varying from 52% to 57% of the total calories in the diet. The Fat percentage, or the amount of energy value or calorific value derived from that source, is also very close, varying within 3% from 32% to 35.6%. When we consider the Protein percentage we see that St. Andrews, Cardiff and Reading show a figure within 1% of each other, and that Edinburgh shows a figure of 15% - from 4 to 5 per cent higher than the other investigations, and yet this figure it will be remembered is very close to the figure for protein of Voit and Rubner quoted on page 38, Vol. I above. From this it would seem that the people of Edinburgh consume less fat and more protein in their diet when compared with the residents of St. Andrews and when compared with the more industrial centres of Reading and Cardiff they consume very much more protein, almost the same proportion of fat, but a considerable amount less of carbohydrate. Once more we see that the average figure of total calories is lower in the Edinburgh than in the St. Andrews, Cardiff and Reading diets which are approximately closer to the often quoted figure of 3000 calories. When we study the figures of expenditure on food and the consequent number of calories per penny expended we see that the Reading and/
and Cardiff figures are extraordinarily low. It must be remembered, however, that the families in Edinburgh and St. Andrews are of a mixed section of the population while those in Reading and Cardiff, as Cathcart and Murray point out on page 8 of the Report No. 165 (Privy Council Medical Research Council) are of less well to do members of the community whose income is less and who necessarily buy food in a cheaper market. Even so, the results shown in the above table are remarkably close as regards percentage derivatives of the three main constituents of the diet.

I have refrained from a comparison of the Edinburgh results with those of Glasgow and Dundee which were reported by Tully (Lancet, 1921. ii 57); Tully and Mar (Glasgow Medical Journal, 1922. 16. 353); Medical Research Council Report, No. 191, p. 162; Tully, (Glasgow Medical Journal, 1924. 19.1); Medical Research Council Report No. 101, p. 165. In these the population studied were more restricted in their grouping being of the less well to do people of these two towns and were comparable with the labouring and manual workers and unemployed of the City of Edinburgh. It is sufficient to say at this stage that the percentage of protein and of fat was lower than in the comparisons in the above table and the percentage of carbohydrate was very much higher. This is naturally what we expect and what has been seen in the unemployed diets and the institutional diets in this/
this investigation.

One further comparison on the above lines I will make. Let me compare the figures of Edinburgh as found in this investigation and those published before the war by Rubner and indicated by Lusk in *Science of Nutrition*, London, 1928, and quoted on page 11 of No. 151 Report by Cathcart and Murray.

<table>
<thead>
<tr>
<th>Town</th>
<th>Carbohydrate</th>
<th>Protein</th>
<th>Fat</th>
<th>Calories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grammes</td>
<td>Grammes</td>
<td>Grammes</td>
<td>Grammes</td>
</tr>
<tr>
<td></td>
<td>Per-</td>
<td>cent-</td>
<td>cent-</td>
<td>cent-</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>335</td>
<td>52</td>
<td>98</td>
<td>15</td>
</tr>
<tr>
<td>Konigsberg</td>
<td>414</td>
<td>72</td>
<td>84</td>
<td>15</td>
</tr>
<tr>
<td>Munich</td>
<td>492</td>
<td>67</td>
<td>96</td>
<td>13</td>
</tr>
<tr>
<td>Paris</td>
<td>465</td>
<td>66</td>
<td>98</td>
<td>14</td>
</tr>
<tr>
<td>London</td>
<td>416</td>
<td>64</td>
<td>98</td>
<td>15</td>
</tr>
</tbody>
</table>

Although it is perhaps not very fair to compare such widely different periods of investigation - a matter of a quarter of a century - it is interesting from this point of view that the percentage of calorie value derived from protein is almost the same - around the 15% - while the other values are in no way closely comparable.
Before leaving the study of those diets in relation to carbohydrate, protein, fat, calories, and expenditure on food, etc. I thought it would be interesting to tabulate the results mentioned above and consider all those findings in relation to social grouping. On many occasions before I have referred to the work of Prof. Cathcart and Dr. Murray in their investigations into families in St. Andrews, Cardiff, and Reading (Reports to Privy Council Medical Research Council, Nos. 151, 165, 218) and in the report No.218 they demonstrated many interesting findings arising from their investigation into social grouping. Once again I have followed in general terms their social division and have divided the 50 families of this investigation into six groups, 1 to 6. On page 310. Vol. II will be seen a table of the occupations of the major wage earners. I have based the household status on this wage-earner's occupation. These 50 families were then subdivided into six groups as shown on page 312. Vol. II.

Group 1. Professional class.

2. Intermediate class.


4. Skilled workers.

5. Unskilled workers.

6. Unemployed

At/
At this stage tables were drawn up (see pages 313-326 Vol.II.) showing the results of this classification for both A and B investigations. Let us now turn to this grouping and see what the results show. At first we notice the amazing differences in the figures of individual totals in each column as read downwards, and if the last horizontal column - the deviation column - is followed, the gross differences in the total number of grammes of carbohydrate, protein, and fat consumed per man value, and also the obvious differences in calories per penny of those families. Even so, it is seen that even allowing for this amazing difference from family to family, which must always take place as it is impossible to suppose that any two families in any investigation eat the same foods or spend the same amount of money on the food. We must note the very close reading of the average figures of those groups to the average figures for the whole investigation as regards grammes of protein, fat and carbohydrate, and their percentage of the total.

In Group 1 on comparison of the A and B groups, pages 313, 319 Vol.II we again see the close approximation of all the column average figures of this group with the noticeable rise in carbohydrate consumption in the summer (B investigation), the continuance of the same protein figures and the noticeable drop in the fat figures in B, and the somewhat increased number of total calories in the/
the summer when compared with the winter. In the question of expense on food there is a noticeable drop in the amount spent, in the B series, both on food and other expenses, with a resultant increase in the number of calories per penny spent. This expense factor is in marked contradistinction to the average increased expenditure on food as shown in the averages of the whole investigation in A and B, see pages 308 and 309, Vol. II.

In group 2, A and B investigation, (see pages 314 and 320, Vol. II) although the results seem very dissimilar in reality the average does not vary very much from the standard set by the average of the whole investigation, but we do notice the very marked difference in the amount spent on food in the summer when compared with the winter, with the resultant drop in the figure of calories per penny, and yet in conjunction with this the drop in the expenditure on other articles in the summer over the winter.

Group 3, A and B investigations, (see pages 315 and 321, Vol. II) reveals a very noticeable drop in the amount of carbohydrate, compared with an increase in fat in the A investigation (page 315 Vol. II), both when compared with the average for the whole investigation and as compared with the B investigation of this group (page 321, Vol. II). The B figures also show us a lower carbohydrate reading in percentage and an increased fat percentage when compared alone with/
with the general average. This group illustrates well the increased amount of food consumed by the whole group - group 3 in Summer - B. investigation. Further, the amount spent on food is lower in the summer than in the winter with consequent increase in the number of calories per penny, as also is the expenditure on other materials.

In group 4, A and B investigations (see pages 316 and 322. Vol. II) we are back again to figures on an average which are very close to the general average figures, with the noticeable rise in carbohydrate percentage in B over A, and the fat figure is almost the same, but the total calorie figure is down in B as compared with A. Once more we also see a drop in the expenditure on food in A over B, with consequent fewer calories per penny in B.

Group 5, A and B investigations (see pages 317 and 323. Vol. II.) reveals perhaps the closest figures of any group, being almost identical for A and B investigations, with a slightly higher carbohydrate content but similar carbohydrate percentage, and a lower fat content with same fat percentage, and where expenditure is about the same in Winter and Summer.

Group 6, A and B investigations, (see pages 318 and 324. Vol. II). This is the unemployed group in which there are only two families. We immediately notice the marked drop in the total number of calories consumed by those families, and yet further analysis shows/
shows us the interesting high carbohydrate percentage and very much lower fat percentage, both in A and B, and when compared with the general result average, with again the very noticeable summer or B increase in carbohydrate content and lower fat content over the A figures. The expenditure on food is very very low both in winter and summer, with a summer increased expenditure on food, and thus a lower figure for calories per penny figure.

All these findings are very rapidly brought out in the tables of averages for the six groups, A and B, as shown on pages 325-326 Vol. II) and only require to be drawn attention to rather than further criticised.

As would be expected from any observations based on a social scale the amount spent on food is very noticeably different in its reading. We descend the social scale from group 1 to group 6 and notice that the amount spent on food per man value decreases and that even although the amount of value - calorific value - is approximately the same throughout. In other words the more money available, or constantly available, means that more money will be spent on food and also the type of food bought will be dearer. The higher group - 1 - will buy in a dearer market than group 6 and also the quality of a great deal of the food will necessarily render it a dearer commodity. This is very well illustrated in the table of group averages/
averages - see page 325 and 326 Vol. II. Let us not forget that even this marked monetary difference does not reveal any gross differences in the calorific value of the diet as assessed in carbohydrate, protein and fat which are all adequate for the individual requirements.
It is not necessary at this stage to point out the great differences in money spent by individual families on food and yet with approximately the same end results. I have re-analysed all the family diets of both A and B investigations, in relation to the amount spent per week and tabulated the results. (See pages 327-339, Vol.II).

This part of the survey necessitated a further fresh grouping of the families on the basis of the expenditure on food per man value weekly and 7 groups were drawn up:

Group 1 – where the average per man value per week was under 10/-

Group 2 – " " " " between 10/- and 12/6
Group 3 – " " " " 12/6 and 15/-
Group 4 – " " " " 15/- and 17/6
Group 5 – " " " " 17/6 and 20/-
Group 6 – " " " " 20/- and 25/-
Group 7 – " " " " over 25/-

Observation of those groups will show firstly that the same families do not necessarily fall into the same group in the A and B investigations. Take the family No.6. A 6 falls into group 1 in the A investigation and B 6 into group 4 of the B investigation. Several changes like this take place and this is well illustrated when we look at the final tabulation/
tabulation of this grouping (see pages 338 and 339, Vol. II) where the number of families in each group is different in the A investigation as compared to the B investigation. Despite all those changes I must say there is still the striking factor of the continuance of the averages of carbohydrate, protein and fat and total calories and the percentage of those three factors when compared with the general average of the 50 families. From these tables I find there is here evidence of more money spent on food in the winter, or A, investigation, with the resultant drop in calories per penny. It is not so easy to compare the other results but I feel justified in again saying there is this tendency to consume more fat in the winter and relatively less carbohydrate, and more carbohydrate and less fat in the summer.
EXAMINATION OF DIETS IN TERMS OF AMOUNT OF FOODS CONSUMED.

I think one of the most interesting parts of the whole investigation is under discussion now and that is the actual tabulation of the individual components of the diet and the amounts consumed. Earlier in the investigation I discussed the diets consumed in terms of carbohydrate, protein, fat and calories. I do not intend to revert to this now. On pages 340 and 341, Vol.II, I have drawn up two tables, (Table III and Table IV), giving the total amount, in pounds weight, of the individual articles of the diet consumed by each family. In the case of milk the figure given represents pints of milk and the same applies to cream. The egg figure is given in number of eggs consumed and not a possible weight reading. The diets of each member of the family as eaten were taken and the weight of each individual food factor noted down, then the figure for the whole family was derived by simple addition. The figures obtained by this method were then transferred to the schedule or table No.III or IV as shown on page 340 and 341, Vol.II. A and B investigations were tabulated in this way and then the man value average for the 50 families was derived by division of the totals by the man value of the 50 families.
families which has been explained at an earlier period.

On the page following these sheets, i.e. page 342, Vol.II, I have made short notes on the foods constituting each group, i.e. meat, etc.

Comparing these two average man value figures so derived in A and B investigations I must confess the remarkable similarity in the results in each column. The most striking differences are to be seen in (1) the dairy produce column where there is a difference of .7 lbs, almost \( \frac{3}{4} \) lb. per man value, and this would fit in with my earlier finding of a marked drop in the amount of fat consumed in the summer, or B, investigation as compared with the winter, or A, investigation; in (2) the column relating to potatoes where there is a drop of .7 lb, or almost \( \frac{3}{4} \) lb. per man value, in the B investigation (summer investigation) as compared with the A, or winter, investigation. The only explanation I offer for this is the factor of expense as new, or summer, potatoes are always more expensive than old, or winter ones and probably the housekeeper does not buy so many or allow so many to be eaten; in (3) the bread column there is an increase of almost .4 lbs, in the B, or summer, investigation when compared with the A, or winter, investigation. Both the fruit and vegetable averages are up in amount in/
in the B, or summer, investigation. These two findings taken in conjunction with increased consumption of bread account for the increase in carbohydrate in the summer investigation - B - over the A, or winter investigation and will account for the percentage carbohydrate increase in B.

At this stage I thought it would be interesting to draw up a table of comparison with the figures given by Prof. Cathcart and Dr Murray in their report No. 218 to the Privy Council Medical Research Council. This table is shown on page 343, Vol. II. Earlier I recalled the high protein figure of 15% in this investigation when compared with the St. Andrews, Cardiff and Reading investigations of Prof. Cathcart and Dr Murray and here we see both A and B figures for meat and fish are very much above the St. Andrews, Cardiff and Reading figures. The milk figures of A and B are lower than the St. Andrews figures and almost 2½ times greater than the Cardiff and Reading figures. In regard to bread, the people of Edinburgh do not consume so much bread as the people of St Andrews, nor do they consume as much dairy produce as the St. Andrews families, and these two factors will account for the differences in the carbohydrate percentage and fat percentage between the Edinburgh and St. Andrews families. It will be recalled both the carbohydrate percentage and the fat percentage in St. Andrews were higher/
higher than in the Edinburgh figures.

A comparison of the Reading and Cardiff families with the present Edinburgh survey is strikingly different. In the former the meat and fish figures are very low but the bread figures are very much higher in Reading and Cardiff as I expected would be the case in comparing industrial centres with a University town.

I have refrained from comparison of the vegetable and fruit column as I have carried out my investigation on different lines from the other investigations under comparison here.

Before I leave this table I must say I was amazed at the very close approximation of the St. Andrews figures of Prof. Cathcart and Dr. Murray and the Edinburgh figures which I obtained.

Tables were next drawn up giving details of the diet constituents in terms of actual foods consumed with reference to the "social grouping" of those families based on the previous "social grouping" (see page 312, Vol.II). I have only tabulated this in relation to A investigation as B investigation is very similar (see page 340 and 341, Vol.II). Six groups so formed are again illustrated, pages 344-349, Vol.II, and once more we see the marked diversity of amounts eaten. The most interesting finding, however, is the/
the average so obtained for each "social group". These findings are well shown on page 349, Vol. II, table V. and are of immense interest. The first noticeable finding is the decrease in the amount of meat and fish consumed as the social scale is descended from group 1 to group 6. The same is seen as regards milk, even though it is a very good source of food both as regards its carbohydrate, protein and fat components, its total calories, and its mineral supply, and the fact of its being very cheap to buy.

There is not a great deal of difference in dealing with dairy produce although I find margarine is the main constituent of dairy produce in groups 4, 5 and 6. The egg totals are very similar in groups 1, 2, 3 and 4, but groups 5 and 6 show a lower reading especially group 6, the unemployed group, as would be expected in regard to the value per pence in return for food obtained of the group.

As I expected I found the consumption of bread rose as the social scale descended, again further evidence of the relationship of available money for food and necessary return or supply of assimilable food.

Comparison/
Comparison of the vegetable and fruit columns once more reveals the striking drop in consumption of these two articles of the diet as the social scale is descended from group 1 to group 6. There are no other striking differences unless I remark on the very high cereal figure in group 2 and the low potato figure when compared with the other figures, remembering of course, that this group contains only three families. The unemployed group, group 6, of 2 families, once more shows the necessity of close economy when translated into food – i.e. low meat and fish columns, low eggs, low milk, average bread intake, high potato figure, and low fruit and vegetable intake. This bears out the finding earlier of a low total calorie diet in this group.
Returning from the "Social Groups" to a general survey of the diets, I have analysed all the different food materials as eaten by those families, expressing my findings in table VI, page 350, Vol.II. From this table it will be seen that every family consumed beef and out of the 50 families only 4 bought chilled beef. This is a most remarkable finding but I expect it is due to Edinburgh being one of the main centres in Britain for the "dead meat" market. All 50 families consumed milk, eggs, bread, sugar, potatoes and tea. Previous tables (page 344-349, Vol.II) show the diminishing consumption of eggs in the diet as the social grouping is descended. I have remarked previously on the increasing consumption of bread in the less-well-off families and also the definitely increased consumption of potatoes as the social scale is descended. The amount of sugar consumed is very constant throughout the investigation irrespective of the "social grouping" of the families, and the same finding is evidenced as regards the consumption of tea.

MEAT. I have divided up the meat figures given in the previous tables into their component parts as shown in table VI, page 350, Vol.II, and as I remarked above every family eats beef. As regards mutton and lamb, I find 29 families consume this and of those/
those 29 families six only eat lamb. This is rather surprising. 33 families consume sausages which are a very cheap food and very simply cooked. This is roughly two-thirds of the families investigated eat sausages, and of these families in 3 cases are pork sausages eaten.

Only 2 families eat tripe; and 4 families eat tongue, either bought cooked or as cooked by themselves. 2 families are found to eat veal. I was rather interested to find that only 5 families eat rabbits and 3 families consumed chicken, even though both of those commodities are plentiful and rabbits are inexpensive in Edinburgh. When I examined the diets in regard to bacon and ham, I found 46 families consumed this article of diet, and only 9 families eat it as ham. I family consumed gammon. Pork is not an article of popular consumption in Edinburgh, only 5 families eating this excellent source of food.

FISH. As would be expected by most people knowing the proximity of Edinburgh to the East of Scotland fishing ports this commodity is consumed by 49 families and the amount consumed is very similar to the amount eaten in St. Andrews as shown by Prof. Cathcart and Dr Murray in their Report No.218. The amount eaten, however, is surprisingly low - on an average about .7 lbs. I expected the amount eaten would have been much/
much higher. I have not attempted to analyse the fish products as regards fresh, dry or smoked fish, but I noted that only 7 families eat salmon and that in tinned form.

MILK. Every family - 50 in all - drank milk or utilised it in some form or other. In my criticism earlier of the amounts consumed I have noted the variations in its consumption in individual families. I find it rather surprising that even in spite of the great push being made by the Milk Marketing Board the average figures are below the St. Andrews figures quoted earlier. Another surprising finding is that no family consumed skimmed milk and only 1 family consumed butter-milk, both of which are very useful forms of food—value both as regards calories and mineral requirements. This, I think, is due to the difficulty experienced in Edinburgh in obtaining those commodities. I have always had to issue a special medical note in Edinburgh to the dairies before those commodities are obtained - a most surprising condition.

CREAM. See page 64, Vol. I.

DAIRY PRODUCE. I have remarked earlier on the amounts of dairy produce consumed by the 50 families, but have noted that in this investigation 48 families consume butter in their diet - a very high proportion considering the number of families where strict economy/
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economy of purchasing power is necessary. One half, or 25 families, use margarine, although only 2 families use it for eating instead of butter. Cheese is very popular in Edinburgh where 37 families consume it. It is a cheap and an excellent source of food factors and I was most gratified to see that the amount consumed by some families was quite high – almost 5 ozs. per head. I have remarked about eggs earlier and will merely state here that although they are eaten by every family the number consumed is not as high as I would have expected considering their food value, especially their vitamin content.

BREAD. In the tables on page 340 and 341, Vol.II, I noted the amount of bread consumed by the various families and on page 350, Vol.II, table VI, the finding of 50 families consuming it. Further analysis of this shows that only 21 families, or under 50%, consume brown bread at all and of those 21 families only 4 eat brown bread and no white bread. In the luxury-bread class – cakes, scones, buns, biscuits, – 18 families consume these articles but in 4 families out of the 18 the amount spent on those is over 3/- per head per week – a most expensive article considering the relatively poor food return for money spent.
CEREALS. 42 families consume cereals in some form or other and the amounts consumed correspond very closely with the St. Andrews figures of Prof. Cathcart and Dr Murray. The table VI on page 350, Vol.II, shows how these families consume their cereals and it is surprising how few – only 12 families – eat oatmeal as porridge and, of those 12 families, 2 as oatcakes. Sir John Orr is on very strong ground when he remarks about the falling off in Scottish homes in the consumption of so cheap a source of good food. No doubt the trouble required in the preparing of this food is one of the main reasons for its lack of consumption.

A very similar state of affairs is seen in the other cereals and I feel that laziness of the housewife is very evident in this outline of dietetics.

LEGUMINES. Here 25 families consume peas, beans, or lentils and I have demonstrated the proportions of each. I noted with horror that in the A investigation the number of families quoted as consuming peas all consumed these in tinned form, and as regards beans 4 families out of 10 consumed tinned beans. In the B investigation, or summer investigation, there were the same families consuming those foods and only one half consumed them as fresh peas or beans, the other/
other half preferring tinned peas or beans. Considering their high food content and their cheapness I regret to say I expected the amount of those commodities - peas, beans and lentils - to have been greater.

SUGAR. This requires very little comment as every family consumed it and yet in 7 families one member of each family did not consume it. The average amount of 1.2 lbs. per man value is above the \( \frac{3}{2} \) lb. per person at present being allowed in War time by our Food Controller.

VEGETABLES. While 48 families consume vegetables in some form or other as shown on table VI, page 350, Vol.II, and tables on page 340 and 341, Vol.II, my impression after careful scrutiny of the diets was that more vegetable should be consumed by the households. Vegetables were not eaten every day and in a large number of cases - 33 families out of 48 families - they had been cooked for over 20 minutes which must have destroyed all their vitamin content.

I have kept the potato statistics separate from the vegetables and earlier I remarked on the increased amount eaten in certain families. As I pointed out earlier, due to this separation of vegetables into vegetables and potatoes I did not draw any comparisons in/
in this Edinburgh survey and the surveys which I have often referred to.

**FRUIT.** 48 families consumed fruit in some form or other, giving an average of 1.3 lbs. per week per man value over the whole investigation. I feel this is greatly below what our Food Ministers and Advisers desire and I was left with the feeling that all our propaganda as regards fruit has not yet made a deep enough impression on the lay public. I also noted that in 32 families out of the 48 the fruit eaten had lain over one week in the home before it was consumed.

Further reference to table VI, page 350, Vol.II, and tables on page 340 and 341, Vol.II, will show the consumption of tea, coffee, cocoa, etc., which require no further criticism.

**CREAM.** Only 9 families out of the 50 in Edinburgh consume cream, and one-fifth of the families investigated use condensed milk - 10 families.
ANALYSIS OF DIETS IN RELATION TO THEIR CALCIUM,  
PHOSPHORUS AND IRON CONTENT.

The analysis of results was now carried a stage further and the investigation of the 50 families, both A and B schedules, studied in regard to calcium, phosphorus and iron content of their diets. Earlier in this survey tables have been drawn up showing the quantitative analysis of the individual articles composing the diets and from each of those tables for each member of each family a further series of tables was drawn up and the equivalent amount of calcium, phosphorus and iron present in each weekly diet estimated. It was necessary to have definite tables as a basis for this calculation and on page 351–354, Vol.II, a list of tables of the foods found in this dietetic survey and their calcium, phosphorus and iron equivalents is shown. These figures are compiled by Sherman who is considered the authority in the field of mineral requirement of the body. The actual tables are taken from his book - "Chemistry of Food and Nutrition".

After the equivalents have been tabulated and calculated appropriately the totals were added up for each member and then for each family per week and then
the A and B investigations added together. These totals are shown on page 355, Vol.II, Column 1. Next the man value average for each family was worked out (see page 355, Vol.II, Column 2) and then by division by 7 the daily average per man value (see page 355, Vol.II, Column 3).

Observation of these last findings shows as regards calcium that taken all over the 50 families the average is .82 grammes. The Phosphorus average is 1.789 and the Iron average is .0215 grammes. At first sight this would indicate that the general standard of dietetics is such that all the average readings are above the necessary requirements of food intake per man value as generally laid down. I fear this is rather misleading as I will bring out later on in this section.

In their report No.218 Professor Cathcart and Dr Murray on page 19 lay down that Sherman considers 0.68 grammes of calcium as providing a safety margin for calcium in the diet and that M.S. Rose (1935) has confirmed this finding and considers it to be quite liberal for the individual. As regards phosphorus Sherman suggests 1.2 to 1.5 grammes of phosphorus as being necessary to afford a safety margin. When we come to consider iron, 15 milligrammes daily is given as the minimum figure required. Returning again to our average figures indicated above, we exceed these basic/
basic figures with a good safety margin, but in actual practice the individual families do not maintain this throughout. This is a misleading result at first sight but very interesting when a general survey is made. I have considered each family more particularly in regard to those three salts and in the case of calcium I find there are 33 families who satisfy the 0.68 grammes of calcium in this investigation whereas 17 families fail to reach this minimal level. If we look into the 17 families who failed to come up to this standard we see that, considering the families in the "social grouping", there are -

<table>
<thead>
<tr>
<th>Group</th>
<th>Failures</th>
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<tbody>
<tr>
<td>1</td>
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<td>5</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

This shows that as regards calcium requirement even those in the higher social groups are quite as prone to impoverished calcium intake as those in the lower social grouping, and that group 5, or the unskilled workers, are the worst offenders in this respect. I have not retabulated all the 50 families to show further tables of calcium phosphorus or iron content as/
as I feel at this stage it is quite sufficient to mention, as I have done above, which groups those families belong to, feeling it would not serve any useful purpose to do so now. Passing from the calcium intake to that of phosphorus I have remarked on the apparent average fulfilment of the phosphorus requirement as laid down by Sherman, viz. 1.2 grammes to 1.5 grammes of the 50 families. Now let us study this requirement in more detail. On page 555, Vol.II, Section 3, Column 2, these figures are shown and if we take the 1.2 grammes of phosphorus as the figure we find that 47 families fulfil this basic requirement and that 3 families fail to do so. I find that the Phosphorus requirement in most cases far surpasses this figure of 1.2 grammes. If, however, we take the higher figure of 1.5 grammes of phosphorus as being the necessary basic figure for intake per man value, then only 34 families fulfil this requirement and 16 families fail to fulfil this basic figure. I was interested to know what social groups those families fell into and so I have tabulated them as follows:

- Group 1 - two families - 2
- Group 2 - one family - 1
- Group 3 - three families 3
- Group 4 - five families 5
- Group 5 - four families 4
- Group 6 - one family - 1

16
This shows very strikingly that as we descend the social scale there is an increasing failure to fulfil the basic requirement in the diet as regards phosphorus intake, although there is a lessened tendency to fail in this phosphorus intake generally.

In the case of the iron intake, I mentioned earlier that the average figures for the 50 families more than meet the 15 milligrammes laid down by Sherman. I find my average figure here is 21.5 milligrammes. I again returned to the findings on page 355, Vol.II, Section 3, and this is what I found. There are 38 families whose diets meet the basic requirement of Sherman of 15 milligrammes or over and 12 families who fail to do so. This is very encouraging - i.e. almost $\frac{3}{4}$ of the diets investigated were sufficient in iron. Of the 12 families who failed to reach this standard I find in -

- Group 1 - two families
- Group 2 - one family
- Group 3 - one family
- Group 4 - four families
- Group 5 - three families
- Group 6 - one family

12

Again it is noticed that when iron is deficient there is/
is a greater tendency for it to be deficient in the
diets of the lower "social groups".

Before we leave the analysis of the calcium,
phosphorus and iron of the diets I find that there are
4 families whose diet fails to meet the basic require-
ment considered necessary by Sherman in calcium,
phosphorus, and iron. These are families 1, 7, 26
and 45, and, in their social grouping -

Group 1 - two families
Group 2 - one family
Group 6 - one family

The latter one, No.45, in group 6, is one of the
unemployed families and I expected to find this as the
whole family, although they are not undernourished,
show a very poor degree of general health and are
always under treatment for colds, chest catarrh and
lassitude or under-par conditions, including anaemia.

In the case of the two families in group 1, No.1
is a Civil Servant with a good annual salary but the
general health of the family is not too good -
constant colds and short periods off school, troubles
with anaemia and run-down conditions, which I now
know to be due to lack of mineral requirements in the
diet.

No.7 family are only prone to recurrent colds
and,
and, apart from High Blood Pressure in the mother of the family, are not much under treatment. No.26 family, in group 2, again all have chest complaints in the winter months. Father, mother, and children all suffer from bronchitis practically every year.

I find from my observations into calcium, phosphorus and iron that only 4 families are markedly deficient in all three factors and of those 4 families three are constantly under my medical care each winter and will require a good deal of further dietetic advice regarding those three essentials.

Before leaving the study of calcium, phosphorus and iron I found that the greater proportion of the calcium in the diets came from milk and dairy produce and to a limited extent from vegetable products. In regard to phosphorus, a great amount came from dairy produce, although a surprising amount also came from meat. In the lower "social group" families a large proportion of their phosphorus was derived from bread and cereals, as is a great amount of their available iron. A certain proportion of iron also came from the vegetable and fruit parts of the diet.
CONSIDERATIONS OF VITAMIN CONTENT.

Within the last 10 years more work has been done, both in the laboratory and in the clinics of hospitals, on vitamins in food and their relationship to health than on any other single factor of dietetics. The lay public nowadays talk quite fluently about the vitamins A, B, C, D and E, although I must say the practical side of the application of these vitamins to dietetics has been less conspicuously mastered. R.H.A. Plimmer and Violet G. Plimmer have written a great deal about Health and Vitamins, and about the "Square Meal" but still to-day, in 1940, the standard findings of vitamin content in diets is that there is a very great shortage of the amount required, to correct some very common ailments. I have gone over the diets of the 50 families as regards their vitamin content and I can safely say here that the results were very disappointing. I find a very great deficiency in all vitamins in the diets of those 50 families.

I did not elaborate tables of vitamin contents for each of the family diets in summer and winter as I found it practically impossible to obtain from the housewife how long a period of time had elapsed since the/
the particular product being examined for its vitamin content had been in the house before its consumption. I found it also very difficult to obtain accurate measurements on the length of time each food item had been cooked, but as I remarked earlier in a large number of families such food as vegetables and fruit had been cooked for over 20 minutes at a great heat, destroying most if not all of the vitamin content.

One other factor governs this also and that is the impossibility of determining the lengths of time the various foods had lain in the shop before they were purchased.

If the tables on the amounts of food eaten by the families referred to on page 340 and 341, Vol.II, are re-examined it will be seen that only 3 families show a gross lack of vitamins as evidenced by their not purchasing fresh fruits and vegetables in some form or other. In other 30 families I would say the total amount consumed is representative of a definite shortage of vitamins which in the long run must lead to vitamin under-feeding and if continued over a number of years it will be impossible to rectify harmful changes in the bodily health of the individual. I would say here that only about 5 families out of the 50 in Edinburgh would show, had tables of vitamin values been worked out, a sufficient supply/
supply of vitamins in their diets.

I have not re-copied and typed here the tables of vitamin contents of foods as prepared by Margaret A. Boas Fixsen, D.Sc., and Margaret H. Roscoe, Ph.D., who are at present considered authorities on vitamin contents, nor have I indicated or shown the tables of vitamin content of food affected by cooking and canning as demonstrated by Margaret A. Boas Fixsen, D.Sc. I have studied these tables very carefully, however, and after very careful consideration I decided that with the evidence available to me in this investigation I could not with any degree of accuracy obtain results which I could confidently place on record here in terms of vitamin content, whether measured in milligramme vitamins per gramme of food stuff or as colour units per milligramme, etc. It is with great regret that I was unable to make and tabulate such an analysis as I feel it would have brought out in detail those very deficiencies which I have outlined in these pages on the discussion of vitamin content of the 50 family diets.
FURTHER COMMENTS ON TWO DIETS IN THIS SURVEY.

I have at an earlier stage in this survey shown the diet sheet of a family of 4 B 2. in detail (page 56-72 Vol. II) and shown how the calculations have been worked out (pages 72-76 Vol. II). Reference to pages 83-86 Vol. II will show the actual calorific value of these diets and the averages are shown on page 279 Vol. II. These diets are very average diets for this investigation.

I now pass to an individual in family 36 who can be regarded as a glutton. He is a young healthy lad of 24 years, height 6 ft. 3, weight 14 st. 6 lbs, who never has a day's illness but who indulges in very constant and fairly strenuous exercise. Referring to the tables of values on page 228 Vol. II it will be seen that his calorie totals average 4789.6 to 5341.6 - over two times the standard amount set down by the League of Nations Food Commission. Reference to page 228 Vol. II will give figure details of his calorie and other values. I have, however, illustrated a typical day's menu for this lad (see page 356 Vol. II, A 36, 2nd day). I have also shown the detailed working of this menu. It will be seen that this is a very excessive diet and reference to the monetary values of the family shown on page 26 Vol. II and pages 308 and 309 Vol. II shows the very high amount of money spent/
spent on food.

By contrast with this diet, I will now illustrate a poor diet as shown by an unemployed family, No. 45. Reference to the calorie findings (see pages 252 - 254 Vol. II) will show the very low food value as none of the diet averages reach 2,000 calories, and the total averages work out at 1600 calories in A investigation and 1767 calories in B investigation (see page 301. Vol. II. Reference to the percentage contents of this diet shows - carbohydrate 55%, protein 14%, fat 30%, in A investigation and in B investigation carbohydrate 61%, protein 15%, fat 23%. Thus we see the relatively high carbohydrate content of the diet and the lower fat content in the A investigation, and even higher carbohydrate content and lower fat content in the B investigation.

Later reference was made to the lack of calcium, phosphorus and iron content of this family which is below Sherman's standard in all three essentials, and the almost complete absence of vitamin in the diet as evidenced by the low milk and egg totals and absence of green vegetables and fruits (see tables III and IV pages 340 and 341 Vol. II.) As illustrative of the typical diet of this family I have taken the diet of the grandfather, aged 62 years, in very poor health with constantly recurring chest colds and chronic ill-health. The diet is the third day's of the A, or winter, investigation and on page 357 Vol. II this is/
is illustrated with details of the working out of the diet. These are two excellent contrasts in a most interesting series of diets.
CONCLUSIONS.

I have outlined and discussed in the preceding pages my interpretation of the findings of the diets of 50 families in Edinburgh. These findings are based on one week's survey of those fifty families in winter and one week in summer.

I now conclude my remarks on those 50 families by briefly summarising the results I obtained.

In Edinburgh the average calorific value of the diets examined is 2528 calories in winter and 2610 calories in summer. These figures correspond very closely to the 2400 calories at present considered sufficient by the League of Nations Food Commission. The calories so obtained are derived from diets in which the carbohydrate percentage is 52 in the winter and 53 in the summer. The protein is found to be present in the proportion of 15 per cent in both winter and summer, and the fat percentage is 32 in winter and 31 in the summer.

I have compared these results with the figures of Prof. Cathcart and Dr. Murray and have pointed out the similarity in the results and also the differences where those differences occur.

In relation to these earlier findings I have introduced tables showing the return of these food values for money spent and showing the necessary economy/
economy in some families and the more lavish expense in other families without in any way improving the results so attained.

I have explained the mineral findings of the diets and shown where deficiencies have arisen and I have generalised also on the vitamin content of the same diets. Very few of the diets examined can be regarded as poor diets when considered in the light of examination of energy, carbohydrate, protein, fat and mineral salts, and I have illustrated those diets when they were discussed under each heading. I must again say that I find the diets are strikingly deficient in vitamin content when they are examined and more especially in foodstuffs such as milk, green food, fruit and eggs. I sincerely hope that these deficiencies will be rectified shortly as the exigencies of war are bound to further deplete the diets of the population.

I have remarked earlier on the tendency to over-cook food which I hope will be rectified by propaganda from various sources and I have noted with a great deal of regret that there is a great deal of laziness on the part of the housewife in preparing and cooking certain foods which are of great benefit to the individual. I am pleased to remark on the relatively small amount of tinned foods consumed but in certain families it is still too high.

Earlier in this survey I raised the question - "Is/
"Is there a dietetic problem?" and in concluding my remarks I say there is a very definite dietetic problem in the City of Edinburgh. As long as there is the present apathy on the part of the housewife regarding the preparation of food for consumption and until it is possible to organise a large scale campaign in this country encouraging and educating the housewife to her important duties this problem will remain. The cost of living, and the amount now spent on better houses, long journeys from the suburbs to town, and on luxuries such as picture houses, betting, etc. have contributed to the limiting of the amount of money spent on food by each household and in the time available to the housewife in studying the food problems. Even so, one factor which impresses me now is the inability of many families to get out of the rut of eating the same foods day in, day out, and also the ignorance, or shall I say the inability to balance the purchase of good food in relation to the money available.

I end this survey by stating that I hope in the post-war years not only will European problems be solved but dietetic problems too. I hope the dietetic problems will receive as much consideration and that intensive propaganda and educational means will be brought to bear on their solution.
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16./


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