A study of the diet of the labouring classes in Edinburgh / carried out under the auspices of the Town Council of the City of Edinburgh ; by D. Noël Paton ... J. Craufurd Dunlop ... and E. Inglis.

With the Authors' Compliments

A

STUDY OF THE DIET

OF THE

LABOURING CLASSES IN EDINBURGH.

CARRIED OUT

UNDER THE AUSPICES OF THE TOWN COUNCIL OF THE CITY OF EDINBURGH.

BY

D. NOËL PATON, M.D., B.Sc., F.R.C.P. Ed.;
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20 SOUTH FREDERICK STREET,
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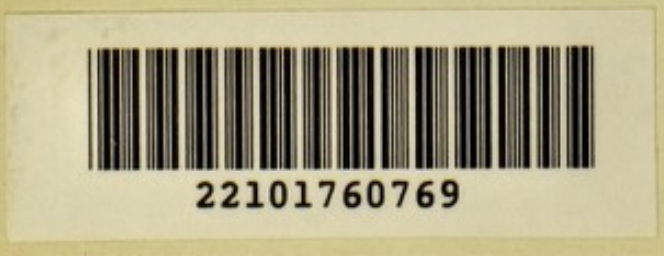

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PREFACE.

THE authors desire to record their indebtedness to the Town Council of the City of Edinburgh who, upon the recommendation of the Committee of Public Health, granted the sum of fifty pounds towards the expenses of these investigations. They believe that this is the first occasion upon which a Municipal Authority has in such an enlightened manner manifested its interest in the well-being of the poorer citizens, and they venture to hope that the example of Edinburgh will be followed by other Urban and Rural Authorities, and that in this way a wider knowledge will be gained of that most important factor in the prosperity of a community, the food supply of its labouring classes.

The authors also tender their thanks to the ladies who so ably supervised that portion of the research which was conducted in the houses of the labouring classes. Mrs. Shaw MacLaren, Miss H. Bell, Miss Isabel Simson, Miss May Simson, Miss Pringle, Miss Cunningham, Miss Robertson, Miss H. MacLaren, and Miss Colly, all deserve special credit for having brought to successful issue the studies in which they were engaged.

The analytic and other work in connection with these studies was carried out in the Laboratory of the Royal College of Physicians.

DIARMID NOËL PATON.
JAMES CRAUFORD DUNLOP.
ELSIE MAUD INGLIS.

CONTENTS.

ON THE

DIETARIES OF THE LABOURING CLASSES

OF THE

CITY OF EDINBURGH.

EVERYONE who is accustomed to pass through the slums of our city must have been struck by the large proportion of puny children and of poorly-developed, undersized adults, and the question has doubtless presented itself:—"How far are these conditions due to insufficient food supply and how far to general unhygienic surroundings?"

In the present inquiry we have attempted to study whether the food supply is sufficient, and whether after the cost of food has been defrayed an adequate surplus is left to meet other necessary expenses, and as a result of our studies we venture to make some suggestions as to the manner in which these diets might be improved without increased expenditure.

The investigations will be considered under the following heads:—

1. Preliminary Considerations.
2. Methods of Investigation.
3. The Social Condition of the Families Studied.
4. Tables of the Results of the Dietary Studies.
5. Critical Study of the Dietaries and Suggested Improvements.
6. Comparison of Present Studies with Previous Investigations.
7. Consideration of the Surplus left after Expenditure on Diet.
8. Conclusions.
9. Appendices.
   A. Tables of Studies.
   B. Food Analyses.

I. PRELIMINARY CONSIDERATIONS.

Since food is the sole source of the energy required (*a*) for building up the body, (*b*) doing work, and (*c*) maintaining the temperature, it is obvious that the working capacity and well-being of a community must be largely influenced by the food supply of the individuals.

(*a*) Without an adequate supply of food proper growth and development of the body are impossible, and not only is the working capacity of the individual diminished, but a predisposition to disease is induced. Well nourished tissues are the greatest safeguards against all diseases, and especially against the infective diseases.

(*b*) Just as a steam engine is a machine for liberating and using the energy stored up in coal, so the human body may be considered a machine for liberating and using the energy stored up in the food; and just as the amount of work which may be got from an engine depends upon the amount of coal burned, so the working capacity of a man is conditioned by the amount of food he consumes and uses. We say "working capacity," because just as coal may burn in the furnace and no work be got out of the engine unless its parts are all in working order, so food may be consumed by a man and no proportionate amount of work be produced.

Thus an insufficient supply of food diminishes the work-doing power of the body in two ways. First, by preventing the full development of muscle, the great energy liberating tissue, and secondly, by not affording the potential energy required for the work to be done.

(*c*) Lastly, a sufficient diet is essential for the maintenance of the bodily heat. In this respect food may be compared to the coals in a furnace.

To secure this supply of energy in food implies a knowledge of what is a suitable and adequate diet, and this can be ascertained only by careful scientific study. By such study it is possible to find what may be called a Standard Diet—*i.e.*, a diet from which the necessary supply of energy may be obtained. By comparing the diet of a community, or any part of a community, with such a standard, we may ascertain if it is deficient and in what its deficiency consists.

In dealing with masses of people making only a mere subsistence wage—with an income no more than sufficient to supply the necessities of life—the question of whether an adequate supply

of food can be purchased becomes a matter of prime importance A certain amount of the income must be allocated to rent, clothing, taxes, heating, &c., and the first problem to be solved is, what is the smallest proportion of the income which *must* be expended on food to give ample energy for work, growth, and heat production in order to set free the largest possible proportion for the other necessities of life. It must be borne in mind that an adequate supply of food is *the* first essential—expenditure on all other matters must take a secondary place. In fact the solution of the question of what is a "living wage" hinges upon this, since the determination of the amounts which should be spent on rent and taxes, clothing, &c., is really secondary to it. The problem is also one of importance to those engaged in attempts to improve the condition of the poor, for without a clear knowledge of this subject, sure guidance cannot be given as to thrift in this matter.

The first point which has to be determined is, What is an adequate diet?

A. Supply of Energy.

We may begin with the fundamental axiom that the diet must yield enough energy, and so we must first decide what amount of energy is requisite. To do this some means of measuring energy, and some method of expressing these measurements, must be adopted. Energy manifests itself in various forms, as light, heat, mechanical work, &c., and it may be measured by the light, heat, or mechanical work produced. Thus if the energy has heated a pound of water through one degree of temperature, the energy used may be expressed as a *pound degree.* If a weight of a pound has been raised one foot, a *foot pound* of energy has been expended. It is more convenient to use the metric system of weights and measures, and to take as the unit of energy used in producing heat the kilogramme-degree, or Calorie, *i.e.*, the energy required to heat one kilogramme of water through one degree centigrade,* and as the unit for mechanical work the energy required to raise one kilogramme through one metre, the kilogramme metre, or Kgm. as it is conveniently written. But energy manifesting itself in one way may be converted into energy manifesting itself in another. Thus energy as heat is converted into energy for mechanical work as in the steam engine. A given amount of energy in one form can be converted into an equivalent amount of energy in another, and so it does not matter whether we ascertain the amount of energy used in heat units or in work

* Throughout this Report a "Calorie" indicates the heat required to raise a kilogramme of water through one degree centigrade.

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units—knowing the one we can calculate the other with exactness, since one Calorie is equal to ~~2364~~ kilogramme metres.

We are now in a position to consider and to define the energy requirements of an individual. As we have already seen this is determined by the following :—

1*st. The Heat to be developed.*—Enough heat must constantly be developed to keep the temperature of the body at about 38° C. If this is not done the chemical processes upon which the life of the individual depends cease and death ensues ; now the heat required varies with the external temperature, with the clothing of the individual, and with the amount of work which is being done. During hard mechanical work, a larger and larger amount of energy goes to heat production, just as in driving an engine hard, more and more energy is lost as heat.

The labouring classes, with their greater exposure to low temperature, with their often insufficient clothing, and with the necessity for continued mechanical work, probably require a greater supply of energy for the maintenance of their temperature, than those in easy circumstances.

Various observers have attempted to investigate the amount of energy given off from the body as heat, and their results give, under average conditions, about 2600 Calories per diem (Stewart's "Manual of Physiology," p. 497).

But some of this energy which ultimately leaves the body as heat, has produced mechanical work inside the body in driving the blood through the tissues, in producing the movements of breathing and the activity of the digestive system. To estimate the energy used in this "*Internal work*" is not easy, since it necessarily varies very greatly, but for our present purpose it is unnecessary to consider it further since it is included in the energy lost as heat.

2*nd. External Work.*—Everyone uses a certain amount of energy in performing movements and in doing mechanical work, and the amount of this varies in different individuals, and in the same individual at different times. While well trained muscles can for a short period set free enormous amounts of energy, if the work is to be sustained the expenditure must be more moderate ; and, for our purpose, what we require to know is the average amount of energy daily given off in this external work.

Raising 150,000 kilogrammes to the height of 1 metre or 150,000 kgm., may be considered a fair day's work for a labourer. This is equivalent to 350 Calories.

Of course the proportion between energy used for heat and that used for mechanical work is not a fixed one ; but taking

together the energy given off as heat, 2600 Calories, and that given off as mechanical work, as 350, it is obvious that for a man doing moderate work the diet must yield about 3000 Calories of energy per diem. That is, the food *digested and absorbed* must yield this amount of energy, but, as a matter of fact, all the food purchased is not consumed. It contains a certain proportion of unedible matter or *refuse*, and is not all utilised, and hence the diet should contain a considerably higher proportion of energy than that actually required by the body. This is illustrated by comparing the above figures with the results obtained by Dunlop in his recent studies of the dietary requirements of convicts doing what may be described as moderate work. The diet before he commenced his investigation yielded 3928 Calories of energy per diem, and the waste was great. When the diet was modified so as to yield 3517 Calories, the waste disappeared, but the prisoners complained of hunger, and a large number lost weight. By adding 74 grammes of bread to the ration, an energy value of 3707 Calories was secured. Complaints practically ceased, loss of weight became rare, while the waste was small.

Atwater, as a result of his American investigation, adopts the following standard :—

	Calories.
Man without muscular work, . . .	2700
Man with light muscular work, . . .	3000
Man with moderate muscular work, . .	3500
Man with severe muscular work, . . .	4500

These figures do not materially differ from the standards determined by Lyon Playfair in 1865 ("On Food of Man in Relation to his Useful Work"), which, calculated in Calories, show :—

	Calories.
Subsistence Diet, ...	2102
Soldier (Peace), light work, ...	3029
Soldier (War), moderate work, . . .	3146
Royal Engineers, moderate work, . . .	3818
Labourers, moderate work, ...	3611
Average for moderate work, . .	3525

They are somewhat higher than those given by Voit :—

	Calories.
Man with moderate work, ...	3055
Man with severe work, ...	3370

But it will be at once apparent that such terms as "moderate" and "severe" muscular work are vague, and it is quite possible that work which in America and in this country would be called moderate, in South Germany would be called severe.

This does not represent the energy requirements of exceptionally large individuals, or of individuals doing exceptionally arduous work, nor, on the other hand, does it represent the energy requirements of those engaged in more sedentary occupations, or of women and children.

In fact, the energy requirements vary with the mode of life, and with the size of the individual.

Mode of Life.—The influence of the mode of life is well illustrated by Dunlop's studies of the dietaries of prisoners. While he found that a diet yielding 3700 kilo. Calories was required for convicts doing moderate work, he found that for ordinary prisoners engaged in picking oakum and such sedentary work, a diet yielding 3115 kilo. Calories was sufficient.

Size of Individual.—It is obvious that a young child does not require so much food as an adult man. But, nevertheless, during childhood the chemical processes are all so active, and so much energy is required for growth, that bulk for bulk a child requires more food than an adult. The following table of the average weight at different ages, will help to show the influence of size on the food requirements at different ages, while Table I., which gives the results of Cameron's investigation on the *energy requirements* per unit of weight at different ages, will show how the first table requires modification before applying it to the determination of dietary requirements:—

TABLE I.

*Average Weights in Kilos. at different Ages.**

Age.	Males.	Females.
2	11	11
5	16	15
10	25	23
13	33	32–5
20	59	53
30	66	55

Average Energy Requirement per unit of weight at different ages:—

* Vierordt's "Daten und Tabellen," 1888, p. 7.

TABLE II.

Age.	Weight in Kilos.	Energy used per Kilo.	Total.
4 . .	14	91·3	1280
12 . .	30	57·7	1730
30 . .	66	42·4	2800

Various other studies of the diet of children have been made in Germany and America, and give confirmatory results.

From these considerations Atwater concludes that the dietary requirements of different ages and sexes may be stated as follows :—

TABLE III.

Woman	equivalent to	0·8	of a man at	moderate labour.
Boy 14–16	,,	0·8	,,	,,
Girl 14–16	,,	0·7	,,	,,
Child 10–13	,,	0·6	,,	,,
Child 6–9	,,	0·5	,,	,,
Child 2–5	,,	0·4	,,	,,
Child under 2	,,	0·3	,,	,,

B. SUPPLY OF PROTEID.

But in the diet another factor has to be considered. The working tissues of the body waste, and this waste is the more rapid the greater the amount of work to be done. The great working tissue is muscle, and muscle is simply a machine for setting free the energy of the food for mechanical work and for heat production. The greater the amount of muscle the greater will be the energy evolved. The first essential then in a working man is a good muscular development.

The muscles consist chiefly of a complex material called proteid, which is characterised by containing the chemical element nitrogen. These proteids are not only the material from which muscles and other living tissues are built up, but they are also a source of energy. Hence every dietary must contain a sufficient amount of proteid food; and hence, within certain limits, the better the supply of nitrogenous food the better will be the muscular development of the individual. It is for this reason that in athletic training the supply of proteids must be liberal, as the great object of such training is to build up the energy liberating machinery of the body. For this reason too, in

childhood while growth is active, the supply of proteid should be abundant.

But, having secured in a diet the necessary amount of proteid, the additional supply of energy may be taken in other substances. In the animal body the materials yielding this energy are fats and carbohydrate-sugary materials. They are taken into the muscle as coals are taken into an engine, and there burned to give off their energy.

The first question to be decided is the amount of proteid which should be present daily in the diet to secure the full working capacity of the individual. On the subject of what is the smallest amount of proteid on which health can be maintained, a number of observations have been made which show that while it is possible for a short time to cut down the proteids of the diet to a very low limit, after a time the health suffers and the amount has to be increased. But at present we are not concerned with the question of the lowest possible limit, but with that of the most suitable amount. A very extended examination of the diets of our northern races shows that something over 100 grm. of proteids is daily consumed. In the better diets the amount is larger, and it is probable that, if a vigorous muscular system is desired, the amount of proteid should approach 130 grm. per diem. Playfair (*loc. cit.*) found that in persons doing moderate work about 150 grm. of proteid were consumed.

It is possible to ascertain the potential energy contained in proteids, fats, and carbohydrates, by finding the amount of heat which is given off in the combustion of a definite quantity of the substance. Rubner has carefully investigated this, and he finds that one gramme of these substances, as it is burned in the body, yields the following amount of heat :—

Proteid, ...	4·1 Calories.
Carbohydrate, ...	4·1 ,,
Fat, ...	9·3 ,,

Thus 130 grms. of proteid will yield 533 Calories, and to make up the 3500 Calories required by the body, no less than 2967 Calories must be supplied in fats and carbohydrates.

In determining the proportionate amount of these, two factors have to be considered—first, their relative cost ; secondly, the limitations in the power of digesting each of them.

Fats are much more expensive than carbohydrates, both per unit of bulk and also per unit of energy. Taking one of the cheapest fats—margarine—and one of the cheapest carbohydrates—sugar—we find the following :—

	Price per lb.	Calories for one penny.
Margarine,. . . .	8d.	435
Sugar, ...	2½d.	1860

For this reason in the dietaries of the poorer classes the fats should be cut down as much as possible, and the energy should, as far as the digestion will allow, be supplied in carbohydrates.

It is generally found that when the amount of carbohydrates exceeds about 500 or 600 grms., the digestive organs begin to be disturbed. Now 500 grms. of carbohydrate yield 2050 Calories of energy, and this, added to the energy from 130 grms. of proteid—533 kilo. Calories, leaves 917 Calories to be supplied by the fats. Ninety-eight grms.—say 100—of fat will yield this.

The requirements of an economical dietary to maintain an average man in good muscular vigour, may be represented in this table :—

Total energy value, 3500 kilo. Calories.

Yielded by—		Calories.
Proteids, . . .	130 grms.	533
Carbohydrates, . .	500 grms.	2050
Fats, ...	100 grms.	930
		3513

Taking Atwater's recent figures of the proportion of a mixed diet digested, absorbed, and made available, this would yield about 3300 Calories of energy.

The amount of proteid supplied should not fall much below this figure, but the proportion of fats to carbohydrates may be varied, to a certain extent, without modifying the nutritive value of the diet.

But such an abstract knowledge of the requirements of a standard diet is in itself of little practical use. Proteids, carbohydrates, and fats are not bought and sold as such, but are contained in different proportions in the various food stuffs used by the community. They constitute what are called the proximate principles of such food stuffs.

The practical part of the problem is thus—From what combinations of food stuffs may the adequate supply of these proximate principles be most cheaply secured?

In dealing with this element of cost two considerations must be kept in view. First, the initial price of the food; and second, the amount of waste material it contains. This waste is of two kinds, first, the non-nutrient material contained, such as bone,

gristle, skin, bran, &c.; and second, nutrient material, material which, on account of its being unpalatable, or for any other reason, is not eaten.

A cheap food is one which contains a large amount of nutrient material at a low price, which contains, therefore, a small amount of non-nutrient waste, and which is so palatable that it will not be rejected.

Upon these matters there is the greatest ignorance among all classes in this country, and in fact in all countries. Atwater commences his account of the Dietary Studies made in New York in 1895 by saying: "The average person selects the different food materials offered in the market with less knowledge of their actual value (as a source of nourishment) than is found in almost any other line of purchases."

In considering the results of the present studies we shall have to indicate how a better and cheaper diet might be secured.

II. METHODS OF INVESTIGATION.

1. Selection of Families typical of the various Conditions of the Labouring Classes.

The Labouring Classes may be divided into :—

A. The well-to-do who are free of anxiety about the necessities of life.

B. The actually poor—who find it difficult to secure the necessities of life.

The second class may be sub-divided into two groups :—

B^1. Those with permanent employment earning a wage of about 22s. per week.

B^2. Those not in permanent employment and earning less than 20s. a-week.

In the present study we have endeavoured to select families illustrating these three classes while we have directed more special attention to the actually poor.

The question to be considered about members of the first class is whether their diet is suitable and whether the expenditure upon it leaves as large as possible a surplus for the amenities of life.

With the latter two classes the problem to be solved is whether it is possible to provide an adequate diet upon the income, and if so how far it is possible to provide sufficiently for the other necessities of life—house, fire, clothing, &c., and to leave anything for recreation.

Fifteen families, including ninety-five individuals, were investigated.

The object of the investigation was in every case explained to the wife whose co-operation had to be enlisted, and many of them manifested a lively interest in the investigation.

2. Collection of Information.

Families representing these classes having been selected, the method adopted in the present series of studies was that developed

by Atwater in his American Dietary Studies. We have to thank him for providing us with specimens of his schedules which, with some small modifications, we have found it convenient to adopt. One great advantage of using the same method as that employed in America is that it makes the results comparable with one another. This seemed to us a matter of no little importance, since one of the questions which we want to answer is, "Whether our poorer classes are or are not as well fed as the same class in the United States."

In carrying out these investigations a daily study of the food consumed by representative families of these various classes had to be made.

The work was sub-divided as follows: For the general arrangement of the investigations Dr. Noël Paton is responsible. The selection of the families, the study of the social conditions, &c., and the examination of the diets was undertaken by Dr. Elsie Inglis, who organised and superintended a staff of workers—for the most part medical students. These, under her direction, daily visited the families during the period of the study, took all necessary notes, and weighed the food in the manner afterwards to be described. Dr. Elsie Inglis is also responsible for the description of the social condition of the people and for the consideration of their marketing as brought out in our studies. Our thanks are due to those ladies who undertook the arduous work of making the necessary observations, since to the admirable manner in which they carried out their work our success is largely due.

Dr. J. C. Dunlop's chief share of the investigation is in giving a scientific criticism of the dietaries, and in suggesting improvements.

Each study lasted a week. While it was felt that more prolonged investigations were desirable, it was found inexpedient to attempt them as the constant weighing of everything purchased naturally proved troublesome to the housewife.

Full particulars of the number, age, and sexes of the various members of the family were noted. The income earned by the father and by other members, and details of the social conditions and surroundings were also noted.

The method of ascertaining the food consumed was as follows:—

(*a.*) An inventory was taken of all the food in the house at the commencement of the study, each article being weighed by the lady in charge of the study on a tested spring balance sent from the Laboratory.

(*b.*) During the week every article of food purchased was weighed and noted, along with the price paid for it.

(*c.*) At the end of the week another inventory was made of all the food in the house. By subtracting this from the food at the commencement of the study and the food purchased, the amount of food used was ascertained.

(*d.*) But some of the food was not consumed. Nearly every article contains a certain amount of unedible material, the refuse, while in many cases edible material is not used but wasted. The refuse and waste were throughout the study collected in a covered can supplied from the Laboratory and two or three times during the week the contents of these cans were sorted out, and the *waste* separated from the *refuse*. The former is entered in the schedules, but the latter is allowed for in the analysis used, as is described in a subsequent paragraph.

As was to be expected, among those with barely enough to live upon the amount of waste was very small.

The number of meals at which each one of the family was present and the presence of guests was noted. Three meals—breakfast, dinner, supper—are taken as one day.

Composition of Foods.—The composition of many of the foods used, which are similar in America and in this country, is taken from Atwater and Bryant's "American Food Stuffs," Bulletin 28 (Revised Edition), U.S. Department of Agriculture, 1899.

The analyses of most materials "*as purchased*," were selected, since in these analyses the *refuse* is allowed for.

When it was necessary, special analyses were made of any characteristic food material, or of food materials not included in the American analyses. The composition of the various foods is given in Appendix B.

When the study was completed the book was sent to the Laboratory, and the results were worked out, as is shown in Appendix A., and from this the food used per man per diem, and its cost, were calculated.

But the various families differ in the number, age, and sex of their members, and in order to compare the food consumption of one family with that of another, it is necessary to reduce them to terms of some common factor.

As before stated, Atwater expresses it in terms of per man per diem, and we have adopted this method, each woman and child being considered a definite fraction of a man (see p. 7).

An example may make this clearer. A family consists of a husband and wife and two children of 7 and 4 years.

The man is expressed as 1·0.
„ wife „ „ 0·8.
„ seven-year child „ 0·5.
„ four-year child „ 0·4.

So that the whole family corresponds to 2·7 men.

The man was present at 18 meals during the week, which is equivalent to one man for six days.

The woman and children were present at 21 meals each, which is equivalent to 1·7 men for seven days. So that the whole study corresponds to the food consumption of 2·7 men for 13 days, or one man for 35 days.

General Statistics of Families Studied.

Study.	Occupation.	Number in Family.						Expended on Food.		Energy of Food per Man per Diem.	Proteid of Food per Man per Diem.	Expended in Rent per Week.	Income.
		Adults.		Children.		Total.	Equivalent to Men.	Total.	Per Man per Diem, in Pence.				
		M.	F.	Under 10.	Over 10.								
								£ s. d.				s. d.	s. d.
1	Signal Fitter.....	1	1	5	...	7	3·8	0 17 10¾	7·59	2797	80·72	3 5	22 0
2	Coalman	1	1	1	1	4	2·9	0 13 6¾	8·36	3152	104·11	3 3	23 0
3	Labourer.....	1	1	2	2	6	3·8	0 17 0	7·51	3454	117·51	3 6	21 0
4	Coal Carter.....	1	1	3	...	5	3·0	0 14 3¾	7·86	3288	104·6	3 5	22 0
5	Coalman	1	1	4	...	6	3·6	0 12 7¼	6·05	2978	106 23	4 7¼	23 0
6	Labourer.....	1	1	4	...	6	3·6	0 9 11	4·71	1828	65·16	...	...
7	Scavenger.....	1	2	4	2	9	5·7	1 9 7¾	9·50	4766	153·27	2 10½	35 0
8	Two Females.....	...	1	...	1	2	1·5	0 4 11	5·88	2492	101·05	2 0	8 4
10	Miller	2	1	4	2	9	5·6	1 8 0¼	8·34	2661	80·21	4 7	36 0
11	Porter.....	1	1	3	...	5	2·8	0 12 5½	7·43	3646	111·20	1 3	...
12	Plater's Labourer.....	1	1	6	...	8	4·2	0 11 9¾	4·41	3043	117·88	2 3	17 6
13	Brewer's Labourer...	1	2	4	1	9	5·9	1 5 8¼	8·11	3508	121·66	4 0	18 0
14	Mason's Labourer....	1	1	7	2	11	6·1	0 14 1½	4·10	2125	69·20	2 10	...
15	Lathsplitter.....	2	1	3	1	7	4·2	1 4 0¾	8·29	3189	105·79	3 3	49 0
16	Single Woman.....	...	1	...	...	...	·8	0 1 2¼	2·52	1123	46·10	...	...

III. SOCIAL CONDITION OF THE FAMILIES STUDIED.

As already indicated, the subject of our dietary studies may be divided into three broad classes :—

A. Workmen's families with irregular wages of under 20s. a-week.

B. Workmen's families with regular wages of 20s. to 23s. a-week.

C. Workmen's families with incomes of from 28s. to 40s. These last are men in good trades—lath-splitters, masons, &c., and families where, though the head of the house is only earning £1 a-week, yet the children's wages bring the income up to the standard of comfort.

These classes can, however, be only roughly divided in this way, so much depends where the wage is small on the capacity of the wife, and even on her health. Also a great deal depends on the amount the father thinks it right to spend on his personal enjoyment. In one family his whole wage, with the exception of a shilling or so, goes to his wife for the household expenses. In another case the mother may get only eight or nine shillings, and the rest goes on drink and betting. These differences in idea as to how money should be spent exist in all classes.

As examples of Class A., Studies VI., VIII., XI., XII., and XIV. may be taken. Here the wages are low and irregular. For instance, Study XIV. has to do with a mason's labourer—out of work for three months in the year, while Study XII. deals with the family of a plater's labourer, where the work is irregular owing to the impossibility of counting on the time the ships come in. Studies I., II., III., IV., and V., represent Class B.—the poor with regular wages. The income here is from £1, 1s. to £1, 3s. a-week—the families for the most part large, and the children young.

Studies VII., X., XIII., and XV., are examples of families in comfortable circumstances.

To begin Class I.—Workmen's Families, with irregular wages. No. VI.—Labourer—wages unknown.

This is a study which should be carefully considered, because it represents a class about which it is exceedingly difficult to get facts. The wages are irregular, the father and mother drink, and the house is poor and ill-kept. There are only too many such families in Edinburgh, and they resist any efforts at investigation. At least a dozen of them were approached with a view to these studies, but they all refused. "Sure, there 's no food at all in this house, and no waste at all, at all," said one woman. Another resolutely refused. "I just put over Friday and Saturday as I can till the wage comes in," she said, and she did not think it would help the common weal at all if she told how she put over Friday and Saturday. In another house the husband advised the wife to have "nothing to do with they folk." Under the circumstances Mrs. O. deserves great credit for allowing the study to be carried on, and for helping so willingly as she did.

She does not know what wage her husband gets. During the week of the Study she fed a household of six on 9s. 11d., or rather less than 3d. a head a-day. As will be seen from the dietary sheets, the result is not satisfactory as regards the amount of nourishment obtained.

The household consists of the father, an Irishman, age unknown, the mother also Irish, age twenty-seven, and four children, ages ten, six, three, and two. The whole family are pale and thin, and the bigger children are not well developed.

The house has two rooms. It is dirty and ill-kept. The table is always littered with crumbs, and tea, and dirty crockery, and the furniture consists of table, chairs, two boxes, and a large bed. Besides the kitchen there is an inner room, and this probably would be found overcrowded with lodgers at night. The rent per annum is £7, 18s., paid quarterly. There is no object in calculating this by the week, for it is quite certain that no effort whatever is made to meet it in advance. No information could be got about taxes, which are probably remitted on the score of poverty. One is not surprised to learn that they subscribe to no sick society. To a funeral society they pay 1s. a-week.

The meals are irregular. The children drink tea five or six times a-day, and get a piece of bread whenever they ask for it. The mother owns to living on tea and potatoes, but the father has his plate of butcher meat when he comes home in the evening. Things are bought in small quantities—1 lb. of potatoes, ¼ lb. of tea, 3 eggs, &c. On Saturday some things were bought in larger quantities, for instance, 16 lbs. of bread (4 loaves).

The stair leading to this house is airy, but neither stairs nor passages could, by an unprejudiced person, be called clean (Dietary Study, p. 49).

No. XI.—Income during week of study, 17s. 6d.

The income in this house is variable. The father used to make little wooden screens at home, and sell them in the streets. The income from this source was very irregular, but always small. At the time of the study he was acting as porter in an upholsterer's shop. His wage was 17s. 6d., but he was able to make more, especially at the term-time, which was just over. He had to give this up, however, as the work, sudden lifts, was too hard for him. He twice fainted. He then tried for ten days canvassing for an insurance society, but the long stairs brought on the breathlessness and distress again. He has now returned to making screens. It is self-evident that this man is not made for heavy manual labour. He is slightly built, and nervous. He is intelligent, interested in social questions, and anxious to help in solving them. His wife is a bright, cheery little woman, and evidently a clever manager. She feeds her family on 12s. 5½d. (3s. 1⅜d. a-head) a-week, which is below the average, and gives them good and sufficient food. Besides herself and her husband there are two children, four and two years, and a baby of four weeks, still being nursed.

The house is a small attic, about twelve feet by twelve feet, a low sloping roof, with a flat window. It is a sublet from the woman next door. The rent is 1s. 3d. a-week. It is up five flights of a circular stair. The result is that the children hardly ever go out, and Mrs. Q. as seldom as possible.

Last year the Q.'s went to the country. They had a nice house, where the children could run in and out at the door, and they were not badly off for work, but the country did "not do with them," so they returned to Edinburgh. They are both Edinburgh born and bred, he having been born in Whitehorse Close and she in New Street. Their present abode is also in the Canongate Ward.

At present, besides their food and rent, their expenses include coals, a sewing-machine, which they are buying on the instalment system, and for which they are paying one shilling a-week, and they are paying off debts, contracted while he was out of work, at the rate of 2s. a-week.

The room is clean and cosy. The furniture consists of a bed, a shakedown for the children, a table, chairs, one of which is a low comfortable one, and the sewing-machine. Also the things with which Mr. Q. makes the little wooden screens.

Provisions here are bought for the most part by the day, and everything is bought for cash. There is, however, a "big buying" on Saturday. The diet is nutritious, and not monotonous. Bread and potatoes are the staples. There is a fair amount of butcher meat, plenty of fresh eggs (thirty), and some oatmeal. Mrs. Q.'s speciality is rhubarb jam, which she makes at the cost of about 2d. a lb.

The children in this house look well and fat. They are still quite tiny, the eldest only four years old. It is noticeable that children of this age are often chubby and rosy, when their elder brothers and sisters are beginning to show the effects of their surroundings by becoming thin and ill-developed (Dietary Study, p. 53).

No. XII.—Wages irregular, average 18s.

In this house there are eight persons—father, mother, and six children, the youngest six weeks old. The other children's ages are nine, seven, five, and three years and fifteen months. The mother is a woman of twenty-seven, but looks about ten years older.

The husband is a healthy-looking young man of twenty-eight. He is a plater's labourer; wages 5½d. an hour—7½d. for overtime. The income is irregular, as it depends on how the ships come in. Some weeks he has made as much as 25s. At other times he only makes 12s. Some weeks he is out of work altogether. Once, when there was a rush, they worked from 6 A.M. to 3 P.M. He takes "his dram with the rest." He and his wife also were born in the Canongate Ward, where they still live.

They had a small dark room in the same stair on which they now live, but on the arrival of the last baby they were moved by the sanitary authority to their present house. Its cubic capacity is 1450. The room is an airy one, with two good-sized windows. It is not too choked up with furniture, and is fairly clean, though there is not any air of comfort about it. The rent is 2s. 3d. a-week. Mrs. M. feeds the household on 11s. 9¾d. The meals are not at all regular. Mr. M. gets himself breakfast before starting for work in the morning, and carries his dinner—meat and bread—with him. The staple commodities in this house are bread and butcher meat—12½ lbs. of beef and 5 lbs. of ham. The youngest children drink milk, but there is only 1d. worth got in daily. The other children drink tea with condensed milk in it, and butter-milk. There is no oatmeal bought.

A funeral society is subscribed to—1s. a-week for the whole family.

The younger children here are rosy and plump, but the older

ones are not so healthy. The baby of six weeks is a delicate little creature (Dietary Study, p. 54).

No. XIV.—Mason's labourer. Average wage 18s. + 8s. earned by the wife.

The father is a mason's labourer earning 5d. to 5½d. an hour. In full work, in good weather, he can make from 22s. to 23s. a-week; but in rainy weather it may be 17s. to 20s., or even less, and in frosty weather he is out of work altogether. At such times he makes what he can by sweeping snow and putting on skates. His wife makes a regular income of 7s. to 8s. a-week by making paper bags. There are no fewer than nine children, of all ages from seventeen years to nine weeks. The eldest girl died of consumption last year. They still keep little frames and bits of fancy-work she was doing. They gave her a grand funeral, that cost, with the price of the ground, £10, 13s. It is true they got £7 from the funeral society, but black suits had to be bought for the father and the eldest boy, and the mother wanted some little things, so that they paid only £3, 10s. at the time, and have since been paying off at the rate of 2s. 6d. a-week. The ground they bought will hold three more, but they have been obliged to give up paying funeral money for the whole family as they used to do. Now they only pay 1s. a-week for the younger ones. Mr. T. is a genial and friendly Irishman, born in the Canongate ward, where he has lived since. His wife is a tired-looking woman of thirty-eight, dressed in the Canongate fashion of a loose blouse, and thick skirt. They both get on well with their neighbours, and spend the evenings at the close-head, or in the street, hearing the news and talking. They never buy a paper. Mr. T. is not a teetotaler, and he smokes.

The house is kept by the eldest daughter, a girl of seventeen, as Mrs. T. goes daily, about 10 A.M., to her bag-making. Mrs. T. has breakfast at home, and takes with her for dinner "a piece" and some tea, which she makes at the works, where they get boiling water. Mr. T. comes in to dinner, which is bought at the cook-house opposite. It consists always of a pint of broth or soup, and he eats bread with it, and has tea. The children have bread and tea at all meals.

The children are small and ill-developed. The eldest girl is only about 4 ft. 10 in. in height, but is a sturdy well-set young woman. One child is in hospital with tuberculosis.

The house consists of two rooms, the larger is the kitchen and living-room. The house is clean, but bare-looking. There is a sink in the window. The inner room is only 12 ft. by 6, and contains a double-bed only. It has a window of its own. The

rent is 11s. 3d. a-month. There is no attempt to lay by for it. The T.'s tell you quite frankly that they are much worse off the week the rent has to be paid.

They subscribe to no sick society.

They can probably only really count, as regular income, on the 8s. made by the mother (Dietary Study, p. 56).

No. VIII.—Under the head of these families with irregular and small wage, it is interesting to find what two women living together can exist on. In this family there are only the mother, a woman of fifty-one, and her daughter, a girl of fifteen.

The weekly income is 8s. 4d.—Mrs. C. gets 2s. 6d. from the Soldiers' and Sailors' Families' Association, her son being at the war, and her pretty rosy-cheeked daughter 5s. 10d. on an average by selling papers in the street. They spend about 5s. a-week on food, and 2s. goes to pay the rent. The only point to be noticed about their marketing is that they get their fish cheaply through the kindness of friends; for instance, they got nearly $\frac{1}{2}$ lb. of salmon for $1\frac{1}{2}$d., and $2\frac{1}{2}$ lbs. of halibut for 4d. They do not drink much tea, and their diet is varied, though not up to the standard it should be.

The room they live in has a cubic capacity of 1200 cubic feet, and two large windows, with the cheery outlook over the Canongate, and a good view towards the Calton Hill and the Firth. The room is rather crowded with furniture, and is not very tidy, but its inhabitants are evidently quite comfortable (Dietary Study, p. 51).

No. XVI.—The subject of this study was a very poor small old woman, who lived alone, was chiefly occupied in sewing, and rarely went out. Her husband is in a lunatic asylum. She is very weak and unable for work. For the facts of this case and for notes of the diet we are indebted to Miss G. Miller. It hardly forms a part of our series, but it is of interest when taken along with Study (Dietary Study, p. 58).

Summary.

In looking over these six studies, one notices that there are at least three different causes for the irregularity of the wage. Irregularity of the work is the cause in three cases. The wages of masons' labourers and platers' labourers vary according to the number of hours they work, and the hours vary, in the case of a mason's labourer, from nine or more on a fine day to five or six on a rainy day, and employment ceases altogether for about three months in the year. A plater's labourer is dependent on the

way the ships come in. In Study VI., however, the irregularity is evidently due to the fact that the man will only work when obliged by the spur of dire necessity, while in Study XI. the head of the house is not physically fit for a workman's life. In all these cases, except perhaps No. XI., drink has a great deal to do with the state of the wages; in No. VI. it is probably the main factor. The irregularity of the wage, there is no doubt, however, reacts. A man who makes 25s. one week and 12s. the next, gets into the state of mind of a gambler, and is ready to spend his money lightly. Also in houses where the work and wage are more regular, the wife expects her £1 a-week for the daily necessities, and explanations are due if it is not forthcoming; whereas in these houses she never knows what to expect, and probably never sees the whole wage.

The average spent on food a head per day in these houses is 3½d. The average is considerably raised by Mrs. Q. (Study XI.), who spends 5½d. a head per day. Study VI. and Study XII. spend nearly 3d. a head, while Study XIV. spends 2¾d.

As regards the marketing, the first thing noticed in these books is the fact that, except in Study XI., everything is bought in small quantities—1 lb. of potatoes, ¼ lb. of jam, and so on. The result is that while Study II. gets 13 lbs. of potatoes for 7d., Study VI. pays 3½d. for only 4 lbs. (This will be further brought out under marketing.) The only house in this class where things are bought in comparatively large quantities is Study XI., which shows in this, as in other points, what a clever woman can achieve even with a small irregular wage. In the other houses, though more is bought at the end of the week than at other times, there is nothing like a "big buying" on Saturday night, no planning out before-hand for the necessities of the week. Things are bought by the day, one might almost say by the hour in some houses, and if more is bought on a Saturday, it is probably only because there happens to be more money in hand, and because Sunday with its closed shops has to be considered.

Class B.—Workmen's Families, with Regular Wages.

We come now to Class B., a pleasant change from Class A. The men are all working hard. The women are spending the earnings carefully. They live in clean stairs, their houses are well kept, and their children well cared for.

To begin with Study No. I.

No. I.—Wage £1, 2s.

The father is a railway worker earning £1, 2s. a-week.

The family consists of father, mother, and five children—three boys aged seven, five, and three and a-half years, and two girls aged two years, and eight months respectively.

The house is in a good street, and consists of two rooms. Both rooms face north, but are bright and cheerful, as they look on to a railway bridge, and there are no buildings opposite. The house has its own water tap and sink, placed in the little dark lobby between the two rooms. The stair is always clean.

The rent is £9, paid quarterly.

There is an air of comfort and cleanliness about the house, and, considering the fact that three sturdy boys live in it, it is wonderfully neat. The kitchen contains a bed, table, and chairs; and the other room, a bed, large table, chest of drawers, and comfortable sofa.

Everything is paid for in cash—bread and potatoes are paid for in advance—3s. 9d. a-week. For the most part the shopping is done at the co-operative store, but some things are bought at shops. The half-yearly 4s. in the £1 dividend goes to pay the rent.

The meals in this house are arranged as follows:—The father has his *breakfast* at 6.30, and takes with him for his lunch four pieces of bread and butter with cheese, and a flask of tea. The mother and children have breakfast at 8.30. *Lunch*—The mother and children, bread and syrup and cocoa. *Dinner* is at 5.30, when the father comes home, and the meal always ends with tea. For *supper* the children have bread and syrup before they go to bed, and the mother has cocoa and bread and butter later. The father has nothing more after his dinner.

The children drink tea and cocoa, and have milk only with their porridge. The baby is on the bottle.

All the weekly wage is given over to Mrs. X., but she spends 6d. on tobacco for Mr. X., and returns him 6d. for pocket money; out of this 6d. he pays 2d. a-week into a sick society for her, so that she may get 5s. a-week when she is ill.

Out of 21s., therefore, Mrs. X. has to feed a family of seven, pay rent, £9 a-year; taxes, £1, 0s. $6\frac{3}{4}$d a-year; coal; gas; sick society; funeral society, and extras, such as newspapers. The evening and weekly newspapers are bought regularly.

The study was carried on in the end of February. At that time coal was being got in at the rate of a bag and a half a-week (two bags one week and one the next). Coals, however, were got very cheaply from the Church and Sunday School. Gas for the November quarter came to 7s. 4d. Societies came to 1s. 6d. a-week—1s. for funeral money for the entire family, and 6d. into a sick society for Mr. X., which enables him to get 10s. a-week when ill.

Notwithstanding the most careful management, ends do not meet in this house (Dietary Study, p. 44).

No. II.—Coalman. Wage £1, 3s.

The father drives a coal lorry, and earns 23s. a-week, 22s. of which are made over to the house-wife. The father does not smoke, and though he is not a teetotaler, does not "drink."

In this house the ends do meet, but the family consists only of four—father, mother, and two children, a girl aged twelve and a boy nine.

During the week of the Study, which was carried on in the end of February, 13s. 6¾d. was spent on food.

Here also evening and weekly newspapers are bought regularly.

The yearly dividend from the co-operative store amounted last year to £4.

The house consists of two rooms in a good locality. The rent is so low because the back room is dark, the wall of the opposite house, which is white-washed, being only about six feet off, owing to the fact that another street makes an acute angle here. Unfortunately this dark room is the kitchen and living room. The front room looks on to the street and faces north, so that it gets also no sun all the year round, but it is bright and cheerful. The lamp in the kitchen has to be almost constantly lit. There is a tap and sink in the kitchen.

The house is scrupulously clean and neat, the steel about the grate always shining, and floors as spotless as constant scrubbing can make them.

The father is a healthy-looking man of medium height. The mother a clever, nervous little woman, and the children rosy and strong. Except that the whole family suffer from bronchitis, they have nothing to complain of in the way of health.

The money mentioned above as being paid to societies includes 9d. a-week for the entire family into a funeral society, and 7d. a-week into a sick society for the father (ten shillings a-week in case of illness, and medical attendance free).

The coals are bought during the winter at the rate of two bags one week and one the next. Mrs. W. also twice during the winter got cheap coal from the mothers' meeting which she attends.

As regards food, everything in this house is paid for in cash, and almost everything is bought at a co-operative store.

The meals are arranged as follows:—*Breakfast* (at which the whole family are present)—Porridge, bread and butter, tea. *Dinner* (all present)—Broth usually. The meat is boiled in the

broth and eaten afterwards with potatoes. Sometimes instead of broth there is meat, potatoes, and pudding. *Tea*—Mrs. W. and the children have tea and bread and butter at 3.30 or 4, after school. Mr. W. has his at 6.30 when he comes in, with "something to it." He has no other meal after this. *Supper*—Mrs. W. and the children have coffee and bread and butter at 8 P.M.

The W.'s do not often buy clothes, but when they do they buy on the instalment system—deposit £1 and then pay so much a-week.

It should be noticed that in this house, in addition to the fact that there are only two children, Mrs. W. is well and strong, and able to help by taking a few days' charing when extra things are needed (Dietary Study, p. 45).

No. III.—Labourer in town employ. Wage £1, 1s.

This family consists of six persons, father and mother and four children, ages 13, 11, 5, and 3 years.

Mr. A. being in town employ is in regular work. He is engaged chiefly in road-making, repairing, &c. He is a tall well-made man, over 6 ft. in height, and strong and healthy. To quote from the Dietary Study Book, "The children all look well. The mother suffers much from headache and does not look strong." As a matter of fact she is on the verge of nervous break-down. From the analysis of the food it is seen that this is one of the most liberal diets in the series, but it must be remembered that the father, from his height and work, needs a great deal. The children, though it is true they look fairly well, are not strong or well-developed.

The house (rental £9, paid quarterly) consists of two rooms, both facing west. The larger is the kitchen. It contains a bed and the usual furniture. The walls are covered with pictures, and the shelves with crockery. The inner room, which opens off it, contains bed, chest of drawers, &c. The house is always clean. Being in blind street with no traffic, the children are out playing the whole day.

As regards meals, the whole family have breakfast and supper together. The father takes his dinner out with him. It consists of bread and cheese one day, and bread and ham the next. The children have dinner in the middle of the day. They do not appear to get much butcher meat. The father and mother have butcher meat daily; for their supper, sausages, or mutton, or haggis, which Mrs. T. makes every week from tripe, suet and meal. She gets bread cheaper by sending the children late on a Saturday evening to a bakery where three half loaves can be had at that time for 6d.

In this house it takes 17s. to feed the inhabitants. The balance, which is much the same as in other houses of this description, coal, gas, societies, rent, taxes, &c., has to be met by Mrs. T. going out to work. For some time she cleaned a school, which meant two hours' work every morning, and a regular addition to the income.

No less than 2s. 8d. a-week is paid into societies—9d. for funeral money, 6d. into the Gardeners for Mr. T. (10s. a-week when sick), 1s. 2d. into the yearly society, 1s. being a deposit which is returned at the end of the year (giving 5s. a-week when Mr. T. is ill), and 3d. funeral money for Mr. T.'s mother.

Though the weekly expenditure in this house seems large, a good deal of it is really money put by, which goes to pay the rent. Thus the dividend received from the store in November and May pays the rent for those two quarters. The yearly society mentioned above "breaks" in February, and the 1s. a-week deposit is returned then, £2, 12s. in all (also a dividend averaging about 5s.), and this pays the February, rent. The only rent troublesome to meet is the August rent, and this is met by money put into the children's savings bank at Sunday School—sometimes 1s. 6d. a-week, sometimes more (Dietary Study, p. 46)

No. IV.—Another coal-carter. Wages 22s.

Mrs. N. gets £1, on which to keep the house, pay funeral money, rent, &c. Off the 2s. Mr. N. keeps he buys his own tobacco and pays 6d. funeral money for his mother. The whole family here belong to Order of Good Templars, so that nothing whatever is spent on spirits—the only family in this whole series of whom this can be asserted. There are three children, the eldest eight years old the youngest eleven months.

The house is in a side street, dingy and rather gloomy, but as it is closed at the end there is no traffic, and the children play out of doors practically the whole day in perfect safety.

The amount in this house spent on food is 14s. 3¾d., and the rent is £9 a-year, paid half-yearly. There are two rooms, facing east and west. There is plenty of sunlight on the living room, which faces west.

In this family coals are bought by the bag, and they belong to a clothing club into which they pay 1s. a-week. The meals here are breakfast, dinner, and supper. The children have breakfast and dinner with their parents, and a "piece" and a drink of milk before going to bed at night. Nestle's milk is used for the tea. Every day except Tuesday, Saturday, and Sunday, 1½d. worth of skimmed milk is got in for the porridge. During the week of the Study 7½d. worth of sweet milk was also bought, most of this

being used by the baby, who is partly on the bottle. The rest was drunk by the other two children. The children drink tea at breakfast. There is a good deal of variety in the diet in this house. A considerable amount of jam is eaten. The whole household are particularly healthy, father, mother, and children (Dietary Study, p. 47).

No. V.—Coal-carter. Wage 23s. a-week.

Here the family consists of six people, two adults and four children (the baby, eight months old, still on the breast, the others aged ten, eight, and five years). Of the weekly wage of 23s. Mrs. Y. gets £1, but the husband pays for his own society, newspapers, and tobacco.

This is another well-managed house. The rent is high, £12 a-year, paid quarterly, but the house is worth it. There are two good-sized rooms, facing the one north and the other south. The kitchen and living-room faces south, and gets all the sunshine there is. There are two beds in this room and the usual furniture. The room is clean and well-kept. The stair is a respectable one. There is a sink and water-tap in the kitchen.

Here, also, things are chiefly bought from a co-operative store, and last year Mrs. T., having £25 worth of checks, received a dividend of £5.

Another point where she economises is on the butcher-meat. About 1½ lbs. is got in every day, for which only 6d. is paid. This is because she takes the trouble to send down early every day to the butcher, and gets what is being cut off when "a face" is being put on the meat. In this house they live to a great extent on porridge and broth. The children drink cocoa chiefly, and about ½d. worth of milk each a-day. The meals are breakfast, dinner, and supper, the children taking a piece of bread and butter to school and getting dinner when they come in.

Mrs. T. occasionally helps by taking a lodger, and sometimes by going out cleaning.

The health of the family is good (Dietary Study, p. 48).

Summary.

These five Studies may be taken together, as examples of the best that, in the present state of knowledge, can be done with small incomes of from 21s. to 23s. All these families live in respectable streets; their houses are airy and not over-crowded. It should be noticed that the men are all teetotalers or "steady," or their drinking does not interfere with their regular work.

Almost the entire wage goes in keeping the house, and is handed over at once to the house-wife. All that the man keeps for his own amusement is 1s., and in one case 6d. of this goes to paying funeral money for his mother. In one house the husband keeps 3s., but then he pays the societies and buys the evening paper. It should also be noticed that in every case the woman is thrifty and a good manager. Stores are laid in by the week, which shows that thought is taken beforehand as regards what will be needed. In one instance checks are bought beforehand for bread and potatoes. Ways and means of getting good value for their money are devised. The average spent on food for adults and children running about in these houses is 5¼d. per head a-day, or 3s. 0¾d. a-week for each person. The average, however, is lower than it should by rights be, Study No. V., where the weekly rate is 2s. 6½d. per head, bringing it down. This is the house where butcher-meat is bought at the rate of 4d. a lb., and this rate is not possible to everyone. A truer average is got by taking Studies No. I. to No. IV., which gives 3s. 2½d. per head a-week; about 5½d. a-day. In all these five houses the wife helps, when able, to add to the family income, in some cases by taking in lodgers in others by going out cleaning. The hardest years are those when the children are young. The moment the children begin to earn wages it becomes comparatively easy to live well and make ends meet. This will be seen when we come to Studies VII. and XIV. The rents run from £8, 9s. 6d. a-year to £12 a-year.

Study No. 2, where there are only two children, and both of them big, was made in the house where things are easiest. Here the house is managed on the weekly wage with comfort. In the other houses ends just meet, and in Study No. 1, where there are five children, they do not meet, and this family are fortunate in having generous friends and relations. The father works nine hours a-day, and does overtime whenever he can get it. The mother, with her hands so full, cannot take in lodgers or go out cleaning, but she uses the money with so much care that she spends 2s. a-head on food, getting a good diet for her family on that.

All these five families depend for their children's country holiday on such good institutions as Holiday House, and the Children's Holiday Fund. The mothers and younger children sometimes get a fortnight at the Mothers' Rest. The fathers get no holidays except the Trades, and no change at all.

Clothes are always bought out of "overtime" or from the mother's earnings.

As regards medical attendance, the fathers have their Club

doctors, the mothers and children go to the Hospitals and Dispensaries. All these five families get medical attendance free, but pay for their own medicines; a heavy item when there are so many little children.

Class C.—Workmen's Families.

The first family in this class a very few years ago would have come under Class B., but now the two eldest children are earning money, and the regular income of the house is £1, 15s. a week.

No. VII.—Scavenger. Wage 22s., 13s. from children—making total of 35s. a-week.

The household is a large one, nine persons—father, mother, and seven children, whose ages range from 18 to 1½ years. The two eldest children, a girl of 18 and a boy of 15, are earning 8s. and 5s. respectively. The girl makes paper bags. The boy is apprenticed to a paper-ruler. The family live in the Canongate Ward. The house consists of two large rooms. The kitchen looks south-east over the street, is cheerful and sunny, and has two windows. The other room opens off it, and faces north-west with a magnificent view across the Firth. There is thus a "through-draught." The house is well ventilated, in the day-time at least. The furniture consists mainly of three huge four-poster beds. For the rest, it is the usual furniture of a workman's house in the Canongate Ward. The style of living approximates to the same standard.

The house is moderately clean, and quite comfortable. As regards meals, to quote from the Dietary Study, "The meals are not eaten together. Husband takes breakfast about 9.30 on return from first round, dinner at 4, light supper about 8. Eldest daughter has a little breakfast about 7 A.M., takes a piece of bread with her for mid-day meal (supplements by cocoa bought out), has dinner on return in the evening (6.30). Son has breakfast in the morning, comes home to dinner at mid-day, has supper at 6 P.M. School children have breakfast before going to school, take 'pieces' with them for their dinner hour, and come home to dinner about 3.30, having some tea-supper later on." The family live thus, partly owing to the exigences of their work, but mainly because they like it. The house is eminently a comfortable one, its members are happy and contented, no one more so than the house-mother, who is wrapped up in her children. The children "have 'pieces' whenever they ask for them," says the Dietary Study-book, and Mrs. B. "would be ashamed to have it otherwise." They spend £1, 9s. 7¾d. a-week on food, leaving about 3s. to

meet other expenses—for Mr. B. keeps 2s. off his wages for tobacco, papers, &c. For their two nice airy rooms they pay 2s. 10½d. a-week (£7, 10s. a-year, paid half-yearly). Coals, Mrs. B. calculates must cost about 3s. a-week. Then the funeral society and the Scavengers' Sick Society come to 1s. 4½d. a-week. Taxes come to about 17s. But we must remember that taxes are paid only once a-year, and rent only twice, and this being a Canongate house, no one would think of preparing to meet them long beforehand. Probably as term day draws near, the table is not quite so luxurious, and the working members of the family work over-time to make up the rent.

The chief point to notice as regards the marketing is that Mrs. B. buys such large quantities of bread, no less than 87 lbs. a week, that she gets it at 4½d. a loaf instead of 5d. Milk also is bought in large quantities, 7 quarts of fresh milk, and 4 quarts of butter-milk during the week of the Study. Apart from bread the great standby is potatoes, no less than 26½ lbs. having been eaten. There is, however, no oatmeal bought.

The children in this house are really healthy. They live out-of-doors, as all Canongate children live, except when they are at school or in bed. They get plenty of food, and they are lovingly cared for when they are ill.

The stair is an ordinary Canongate stair, rather dirty than otherwise (Dietary Study, p. 50).

No. XIII.—Brewery labourer. Wages 23s., 17s. earned by children—total, £2, 5s. Total for house-keeping—£1, 17s.

This is another family whose circumstances have improved as the children grew up. From a little white-washed cottage, left standing in the midst of modern Edinburgh, they have moved to a house of three rooms on Social Union property. The house is a little dark, and does not get much sun, but the rooms are good. There is a large kitchen, and two smaller bed-rooms opening off it. To the back there is a scullery, and the house has its own w.-c.

The family consists of nine persons, father, mother, and seven children, ages ranging from twenty years to two. The father earns 23s. a-week, 21s. of which he makes over to his wife, but off the balance he buys his tobacco and the evening papers regularly. The mother earns 5s. a-week by cleaning a school. The two eldest children are also earning money. The eldest daughter gets 11s. a-week for keeping a shop, 6s. of which she gives to her mother; and the eldest son, who is apprenticed to a joiner, makes 6s. a-week, 5s. of which he gives to his mother. Mrs. K., therefore, can count on 37s. a-week, but she saves out of this to buy the more

expensive joiner's tools for her son. The smaller tools the boy buys for himself out of the shilling he keeps. The third child, a girl, is apprenticed to a dressmaker, but as yet is earning nothing.

Mrs K., who is a first-rate manager and a hard worker, keeps a clean and cosy house. She feeds her family of nine persons well on 25s. 8¼d.—2s. 10¼d., a-head a-week, or very nearly 5d. a-head each day; and for this gives them a sufficient and varied diet. They used 7 lbs. of oatmeal in the week, and very nearly 14 lbs. of butcher meat. Only 9 lbs. of potatoes are used. The amount of bread is over 38 lbs. Provisions are bought for the most part by the week, and they are bought at shops.

The rent of their nice house is £10, 10s. a-year (or 4s. a-week), including taxes. Gas may be put down at 15s. a-year. Mr. K. belongs to no sick society, but 2s. a-week is paid for the whole family into a funeral society.

Mrs. K. does not believe in clothing clubs, and buys what clothes are necessary (and she says she does not spend much on that item) at the sales.

Coals are bought at the rate of two bags one week, and one the next during winter—1s. 9d. a-week during last winter (Dietary Study, p. 55).

No. X.—Miller. Wages 28s. a-week, eldest son 8s. a-week—total 36s. a-week.

The family here also consists of nine persons, father, mother, and seven children, ages from seventeen years to seven months.

The father is earning a good income as a miller. The eldest son is apprenticed to a baker. They both make over their entire earnings to the house-wife, and she regularly spends 7d. a-week on tobacco for her husband, and 5d. for evening and weekly newspapers. In addition she pays 1s. 3d. a-week to a funeral society, to which the whole family belong, including Mrs. E.'s father, who is an old soldier and who makes his headquarters in his daughter's house.

The E.'s live in a good house of three rooms, at the top of a clean stair. Each house on the stair has its own bell. The E.'s house faces south, and all the three rooms are bright and sunny. They have a kitchen, a sitting-room, and a small room between the two. All the rooms contain beds. There is a sink in the kitchen, and they have their own w.-c. For this house they pay a rent of £11, 15s., towards which Mr. E. leaves 5s. every week with his employer, who is his cautioner. The balance is returned to him on term days.

The house is clean, but does not give one an impression of comfort.

The bread is paid for weekly in advance, and is delivered three times a-week. They use a fair amount of butcher meat, as many as 4½ doz. of eggs, and a very large quantity of bread. On the other hand they only use 7 lbs. of potatoes. Porridge is made daily. Mrs. E. spends 28s. a-week on food—3s. 6d. per head per week, or 6d. per head per day, but does not get so good a food value for this as do some of her neighbours.

It will be seen that this is rather more than the income during the week of the Study, but Mrs. E. can practically count on her father's pension—5s. 3d. every week in the year. He was absent the week the Study was done, and therefore it was not included. Her coal bill is high, because she always puts on a fire in "the room" of an evening for the old man. The taxes come to £1, 13s. 5½d., which is about met by the surplus from the rent left weekly with Mr. E.'s employer. Clothes are bought at auction sales (Dietary Study, p. 52).

No. XV.—Lathsplitter. Wages £1, 18s., 11s. a-week received from children—total £2, 9s.

At the first glance this family does not give one the impression of being well off. They live in a two-roomed house, in not what one would call a good street. The rooms are clean and comfortable, but the standard of comfort is not high. It is only when one comes to inquire, that one realises that this is a household which may be considered well-to-do. If having desires well within the compass of their income constitutes riches, they are rich. Their yearly income should not be reckoned at more than £100, however, as the son is always out of work for some months in winter, and the father often, through illness.

The household consists of father, mother, a son of twenty who is a plasterer, and who contributes 10s. a-week to the daily expenses, two daughters aged thirteen and eight, one of whom earns 1s. a week by running messages, and two little grandchildren, whose mother has to go out working. The two latter, however, go home at night.

The children are bright and healthy. The whole family is intelligent. They take an interest in current questions, and buy the newspapers regularly. The mother is a genial, homely woman, who tells you quite frankly that "she kept a far better house when she had less money to do it on." The father is not a teetotaler, but is in steady work.

The family are not ambitious. They are quite content to live as their neighbours, to get coals from the mothers' meeting, and to send the children to Holiday House for their summer change. The only luxuries in which they indulge in the way of food, are

beer (4½d. a-week) and lemonade (6d. a-week). (Dietary Study, p. 57.)

Summary.

These four families all have incomes which cover their necessities, in one case leaving a good balance. From this, however, it must not be gathered that the standard of comfort among them is higher than that of their neighbours. They live among the people they have always lived among, their food is the same, only perhaps a little more abundant (5¾d. a-head a-day), cooked and served in the same style. Their kitchens are still used, in Scottish working-class custom, as living-rooms and bedrooms ; and even when they make an attempt at having a parlour, it also is used as a bedroom. In No. VII., with a steady income of £1, 15s. a-week all the year round, the menage conforms to the ordinary Canongate style—no regular meals, and the staple commodities bread and potatoes.

They are all comfortable, however. The struggle to make ends meet is not wearing, as it is in Class B. Only in No. XIII. does the wife go out cleaning (two hours every morning), but this, apparently, because she has always done it, and there is always something needed which her extra 5s. will buy.

Marketing.

As regards marketing the women in these houses fall into two broad classes—the women who have a " big buying " on Saturday night, and the women who do not. In other words, there are the women who make provision beforehand, and the women who live from hand to mouth. Naturally the first class get best value for their money. Thus No. VI., who buys her potatoes by the lb., pays at the rate of 1s. 2d. for 14 lbs., while the average price is 8d.

It is not, however, always safe to judge of the marketing by the price paid for commodities, and to imagine that the least spent represents the best housekeeping. It is quite the contrary. For instance, No. III. pays 1s. 2d. a dozen for her eggs, while No. VI. pays 8d. (buying them at 3 for 2d.), but we are quite certain that the higher price represents the better economy. Some of the housekeepers do, nevertheless, make marvellous bargains. For instance, No. V., one of the best managers in the series, gets her butcher meat at 4d. a lb., by sending to the butchers early and getting what is cut off when " the face " is put on the meat. The

meat is of the best, and the price is the lowest possible. Other women send to first-class butchers on Saturday night, and get meat (which they must take cut as it stands) at about 6d. a lb. In the same way No. III. gets bread at 2d. a half-loaf, instead of 2¾d., by sending to a bakery on Saturday night. No. VII. also gets her bread cheap from an ordinary baker—4½d. a loaf—but this because she uses such large quantities—over 87 lbs. a-week. Fish, however, No. VIII. gets as a veritable bargain—a bargain only possible to those who have friends at court. During the week of the study she got cod at 1d. the lb., halibut at 2d. a lb., and salmon at 1½d. for ½ lb. One of the cleverest managers is the housewife in No. XI., because she has to manage on an uncertain wage. It is true she makes some mistakes, for instance, buying her eggs at 6d. a dozen. On the other hand, she is the only woman who seems to be aware that any vegetables beyond carrots, turnips, and leeks exist, and she makes rhubarb jam, which is really good, at about 2d. a lb. Only two families in this series buy margarine instead of butter. The price of butter varies from 8d. a lb. to 1s. 3d., and again the higher price may represent a better article.

In all the houses, except Nos. VII., XII., and XIV., oatmeal is bought regularly.

The people in this series buy either at shops or at the Co-operative Stores. Those buying at the Stores have this advantage, that they have the half-yearly dividend in May and November to fall back upon. Judging from the Dietary Sheets, the price of provisions is about equal.

Beyond this dividend, and in one case a deposit of a shilling a-week in the yearly society, and in the children's savings bank, there is no effort at saving. As will be seen by a glance at the sheet of Weekly Budgets, in the majority of cases there is no possibility of doing so. Such savings as there are are swallowed up by such big calls as rent and taxes.

In most of the houses the father is in a sick society, so that he gets 10s. a-week when ill.

TABLE SHOWING COST OF VARIOUS COMMON ARTICLES OF FOOD TO THE DIFFERENT FAMILIES.

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	X.	XI.	XII.	XIII.	XIV.	XV.
Bread, per 4 lb. .	5½d.	5½d.	5d. & 4d.	5½d.	5½d.	5d.	4½d.	4d.	5½d.	5½d. & 4½d.	4d.	5d.	5d.	5½d.
Potatoes, per 14 lbs.	7d.	8d.	8d.	8d.	8d.	1/2 (Bought in lbs.)	7d.	7d.	9d.	8d.	8d.	1/	7d.	8d.
Oatmeal, per 7 lbs.	6d.	8d.	7d.	6d.	6d.	8d.	...	5d.	6d.	8d.	...	6½d.	...	6d.
Eggs, per dozen .	10d.	1/	1/2	9d.	1/3	3 for 2d. (8d. Dozen)	1/	2 for 1d. (6d. Dozen)	10d.	6d.	8d.	8d.	10d.	1/4
Beef, per lb. .	8d.	8d.	6d.	6d.	4d.	3d.	8d.	6d.	1/	8d.	6d. (With Bones, 2d.)	8d.	8d.	8d.
Mutton, per lb. .	8d.	...	7d.	8d.	4d.	8d.	...	...	...	...	...	6d.	...	7d.
Ham, per lb. .	9d.	10d.	8d.	1/	11d.	10d.	8d.	6d.	11d.	6d.	6d.	5d.	...	1/
Butter, per lb. .	1/3	1/3	1/	1/1	(Margarine)	1/	8d.	(Margarine)	1/2	8d.	4d.	1/2	10d.	1/3
Herrings, per doz. .	...	...	9d.	8d.	6d.	...	...	6d.	...	...	...	...	...	4d.
Cod, per lb. . .	...	...	...	6d.	...	3d.	3d. (Salt)	1d.	...	3½d.	...	2½d.	...	...
Sugar, per lb. .	1¾d.	1¾d.	1¾d.	1½d.	1¾d.	1½d.	1½d.	1½d.	1¾d.	1½d.	1½d.	1½d.	1½d.	1¾d.

IIIa.—FAMILY BUDGETS.

Dietary Study No. 1.

Income, ...				£1	2 0
Weekly Expenditure :—					
Societies, ...	£0	1	6		
Coals, ...	0	1	9		
Tobacco and Pocket-money, . .	0	1	0		
Black-lead, Soap, Emery Paper, &c.,	0	0	6		
	£0	4	9		
Food during week of Study, . .	0	17	$10\frac{3}{4}$		
	£1	2	$7\frac{3}{4}$		
Deficit, .	0	0	$7\frac{3}{4}$		
				£1	2 0

Rent, £9 per annum, paid quarterly.

Taxes, £1, 0s. $6\frac{3}{4}$d. per annum.

Gas, 12s. 6d. per annum.

These three items are met by the dividend from the Co-operative Association, by overtime, and by help from generous friends and relatives.

Dietary Study No. 2.

Income,					£1	3	0
Weekly Expenditure:—							
Societies,	£0	1	4			
Coals,	0	1	9			
Oil,	0	0	4½			
Black-lead, Soap, &c.,	0	0	6			
Pocket money,	0	1	0			
	£0	4	11½			
Food during week of Study,	0	13	6¾			
	£0	18	6¼			
Surplus,	0	4	5¾		£1	3	0

Rent, £8, 9s. 6d. per annum, paid quarterly.
Taxes, £1, 0s. 6½d. per annum.
Gas, 12s. 6d. per annum.

These last three items are easily covered by the dividend from the Co-operative Association (£4 last year), and by the weekly balance.

Dietary Study No. 3.

Income,					£1	1	0
Weekly Expenditure:—							
Societies (1s. per week to the yearly society is only a deposit, and is returned in February, £2, 12s.),	£0	2	8			
Coals,	0	1	9			
Black-lead, Soap, &c.,	0	0	6			
	£0	4	11			
Food during week of Study,	0	17	0			
	£1	1	11			
Deficit,	0	0	11		£1	1	0

Rent, £9, per annum, paid quarterly.
Taxes, £1, 0s. 6½d. per annum.
Gas, 12s. 6d. per annum.

Note.—In this house income and expenditure balance in the long run. The dividend from the Co-operative Association meets the rent in November and May. The deposit in the yearly society pays the rent in February. The August rent is met by the money the children put in their Sunday-school savings bank. Any deficit is met by the mother going out cleaning, when she is able. They get no help, except occasional cheap coals, from outside.

Dietary Study No. 4.

Income,				£1 2 0
Weekly Expenditure:—				
Societies,	£0	0	6	
Coals,	0	1	9	
Black-lead, Soap, &c.,	0	0	6	
Clothing Club,	0	1	0	
Pocket money,	0	2	0	
	£0	5	9	
Food during week of Study (14s. 5¾d.),	0	14	5¾	
	£1	0	2¾	
Surplus,	0	1	9¼	
				£1 2 0

Rent, £9 per annum, paid quarterly.
Taxes, £1, 0s. 6¾d. per annum.
Gas, 12s. 6d. per annum.
In this house income and expenditure balance in the year. No dividends or deposits to fall back on.

Dietary Study No. 5.

Income,				£1 3 0
Weekly Expenditure:—				
Pocket money (out of which is paid 1s. 4d. to Societies),	£0	3	0	
Coal,	0	1	9	
Black-lead, Soap, &c.,	0	0	6	
	£0	5	3	
Food during week of Study,	0	12	7¼	
	£0	17	10¼	
Surplus,	0	5	11¾	
				£1 3 0

Rent, £12 per annum, paid quarterly.
Taxes, £1, 13s. 5½d.
Gas, 12s. 6d. per annum.
Dividend of £5 last year from Co-operative Association. Lets a room when possible at 4s. 6d. a-week.

Dietary Study No. 7.

Income, ...				£1 15 0
Weekly Expenditure :—				
Societies, ...	£0	1	$4\frac{1}{2}$	
Coal, ...	0	2	0	
Soap, Black-lead, &c., . . .	0	0	6	
Pocket money, ...	0	2	0	
	£0	5	$10\frac{1}{2}$	
Food during week of Study, . .	1	9	$7\frac{3}{4}$	
	£1	15	$6\frac{1}{4}$	
Deficit, .	0	0	$6\frac{1}{4}$	
				£1 15 0

Rent, £7, 10s. per annum, paid quarterly.
Taxes, 17s. per annum.
Gas, about 12s. 6d. per annum.
These three items met by overtime.

Dietary Study No. 8.

Income (Irregular), ...				£0 8 4
Expenditure :—				
Coal, ...	£0	1	6	
Soap, &c., ...	0	0	6	
	£0	2	0	
Food during week of Study, . .	0	4	11	
	£0	6	11	
Surplus, .	0	1	5	
				£0 8 4

Rent, 2s. a-week, paid quarterly.
Taxes, 17s. per annum.

Dietary Study No. 10.

Income,				£1 16 0
Weekly Expenditure:—				
Rent (£11, 15s. per annum, paid weekly to employer),	£0	4	7	
Taxes (£1, 13s. 5½d. per annum, paid weekly to employer),	0	0	7¾	
Societies,	0	1	3	
Coal,	0	2	4	
Oil,	0	0	8	
Soap, Black-lead, &c.,	0	0	6	
Tobacco,	0	0	7	
Papers,	0	0	5	
	£0	10	11¾	
Food during week of Study,	1	8	0¼	
	£1	19	0	
Deficit,	0	3	0	
				£1 16 0

Note.—Gets her father's pension of 5s. 3d. per week when he lives with them. He was absent during week of Study.

Dietary Study No. 11.

Income,				£0 17 6
Expenditure:—				
Rent,	£0	1	3	
Food during week of Study,	0	12	5½	

Note.—All other items of expenditure uncertain.

Dietary Study No. 12.

Income (average), ...				£0 18 0
Expenditure :—				
Societies, ...	£0	1	7	
Coal, ...	0	1	9	
Soap, Black-lead, &c., . . .	0	0	6	
	£0	3	10	
Food during week of Study, . .	0	11	$9\frac{3}{4}$	
	£0	15	$7\frac{3}{4}$	
Surplus, .	0	2	$4\frac{1}{4}$	
				£0 18 0

Rent, 2s. 3d. a-week paid quarterly.
Taxes, 17s. per annum.
Gas, about 12s. 6d. a-year.
Note.—Tobacco, Drink, &c., have also to be paid for.

Dietary Study No. 13.

Income, ...				£1 17 0
Expenditure :—				
Rent, including Taxes (paid weekly),	£0	4	0	
Societies, ...	0	2	0	
Coal, ...	0	1	9	
Gas (" penny-in-the-slot meter") .	0	0	$3\frac{1}{2}$	
Soap, Black-lead, &c., . . .	0	0	8	
Pocket money, ...	0	2	0	
	£0	10	$8\frac{1}{2}$	
Food during week of Study, . .	1	5	$8\frac{1}{4}$	
	£1	16	$4\frac{3}{4}$	
Surplus, .	0	0	$7\frac{1}{4}$	
				£1 17 0

Dietary Study No. 14.

Income (averages)				£1 6 0
Expenditure :—				
Funeral Society, ...	£0	1	0	
Debt, ...	0	2	6	
Food during week of Study, . .	0	14	$1\frac{1}{2}$	
	£0	17	$7\frac{1}{2}$	

Note.—There is no attempt in this house to meet expenses by the week. The rent is paid monthly, 11s. 3d., and they tell you frankly that they are very badly off that week. Probably the 8s. earned by the mother is the only regular income.

Dietary Study No. 15.

Income, ...				£2 9 0
Expenditure :—				
Societies, ...	£0	1	4	
Coal, ...	0	1	9	
Soap, Black-lead, &c., . . .	0	0	6	
	£0	3	7	
Food during week of Study, . .	1	4	$0\frac{3}{4}$	
	£1	7	$7\frac{3}{4}$	
Surplus, .	1	1	$4\frac{1}{4}$	
				£2 9 0

Rent, £8, 10s. per annum, paid quarterly.
Taxes, £1, 0s. $6\frac{3}{4}$d. per annum.
Gas, about 12s. 6d. per annum.

Dietary Study No. 16.

Details of income and expenditure are not available.

IV.—RESULTS OF DIETARY STUDIES.

Having described the social conditions of the families upon which our studies were made, we now proceed to consider the character and value of the food used by them.

This may best be shown in the following series of tables. In the succeeding parts these will be considered critically and in detail.

The tables are calculated as per man per diem, from the actual amounts of food used as given in Appendix A.

In these tables the number after the designation of the individual is the age; the next number the number of meals at which he or she was present; the multiplier is the fraction of a man to which the individual corresponds; and the result the equivalent in meals per adult man. Lastly this is expressed as for one man for so many days.

I.—SIGNAL FITTER.

Man, 43 = 21·0; Woman, 33 (21 × ·8) = 16·8; Boy, 7 (21 × ·5) = 10·5; Boy, 5 (21 × ·4) = 8·4; Boy, 3½ (21 × ·4) = 8·4; Girl, 2 (21 × ·4) = 8·4; Girl, 8 months (21 × 3) = 6·3; Guest (Woman), (4 × ·8) = 3·2—Total, 83·0. Equivalent to 1 man 27·6.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 1.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	38·50	6·63	9·56	..	·60	2·5	7·5	12·9	..	8·9
Pork, lard, &c.	21·35	1·76	13·31	..	·25	1·4	2·0	17·7	..	3·5
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	33·32	5·98	·64	..	·30	2·4	6·8	·8	..	4·3
Eggs	50·89	6·05	4·73	..	·71	3·3	6·8	6·2	..	10·3
Butter	23·13	·23	19·66	..	·75	1·5	·2	25·8	..	10·7
Cheese	7·12	1·97	2·62	·29	·14	·4	2·2	3·4	·5	1·9
Milk	390·00	12·87	15·60	19·50	1·34	25·9	14·6	20·5	4·3	19·8
Total animal food	564·31	35·49	66·12	19·79	4·09	37·4	40·1	87·3	4·8	59·4
Cereals	441·83	42·14	7·69	246·64	1·47	28·6	47·9	10·1	52·4	21·2
Sugars and starches	145·61	..	..	134·42	·61	9·0	..	..	28·5	8·7
Vegetables	361·26	10·06	1·94	52·77	·52	23·5	11·4	2·0	10·5	7·5
Fruits	24·27	·57	·52	17·54	·23	1·5	·6	·6	3·8	3·2
Total vegetable food....	972·97	52·77	10·15	451·37	2·83	62·6	59·9	12·7	95·2	40·6
Total food	1537·28	88·26	76·27	471·16	6·92	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	31·87	..	..	..	·67	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 1.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel value.		Protein.	Fat.	Carbo-hydrates	Fuel value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food purchased:										
Animal	35·49	66·12	19·79	841·55	4·09	40·1	87·3	4·8	28·0	59·4
Vegetable	52·77	10·15	451·37	2161·36	2·83	59·9	12·7	95·2	72·0	40·6
Total	88·26	76·27	471·16	3002·91	6·92	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·67	..	..	..	..	..
Waste:										
Animal	..	..	..	..	..	..	..	..	..	..
Vegetable	7·54	1·51	39·12	205·34	·44	8·7	1·9	8·2	6·6	6·3
Total	7·54	1·51	39·12	205·34	·44	8·7	1·9	8·2	6·6	6·3
Food actually eaten:										
Animal	35·49	66·12	19·79	841·55	4·09	42·3	88·3	4·1	28·2	59·4
Vegetable	45·23	8·64	412·25	1956·02	2·39	49·0	9·8	87·7	65·2	34·3
Total	80·72	74·76	432·04	2797·57	6·48	91·3	98·1	91·8	93·4	93·7

II.—COALMAN.

Man, 33=21·0; Woman, 34 (21 × ·8)=16·8; Girl, 12 (21 × ·6)=12·6; Boy, 9 (21 × ·5)=10·5—Total, 60·9. 1 Man for 20·3 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 2.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton ...	132·95	22·95	29·67	..	2·12	8·0	22·9	32·1	..	26·1
Pork, lard, &c.	26·72	3·28	11·50	..	·65	1·8	2·8	13·0	..	8·0
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	22·60	4·23	..	..	·41	1·4	3·9	..	..	5·0
Eggs	34·20	4·10	3·18	..	·60	2·0	3·4	3·5	..	7·4
Butter	27·60	·25	23·46	..	·60	1·9	·1	25·5	..	7·4
Cheese	12·68	3·50	4·66	·52	·41	·8	3·2	4·5	·1	5·0
Milk	193·32	6·37	7·73	9·66	·68	12·0	5·9	8·1	2·1	8·4
Milk, Condensed (Nestlé's)..	14·07	1·27	1·90	7·24	·02	·9	1·2	1·1	1·6	·2
Total animal food	464·14	45·95	82·10	17·42	5·49	28·8	43·4	87·8	3·8	67 5
Cereals	489·91	49·59	11·54	276·95	1·65	32·5	48·7	11·9	62·3	20·2
Sugars and starches	103·28	..	..	103·28	·40	6·0	..	..	22·8	4·8
Vegetables	491·73	8·57	·68	53·04	·62	32·7	7·9	·3	11·1	7·5
Fruits	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	1084·92	58·16	12·22	433·27	2·67	71·2	56·6	12·2	96·2	32·5
Total food	1549·06	104·11	94·32	450·69	8·16	100·0	100 0	100·0	100·0	100·0
Beverages, condiments, &c..	27·8	..	..	..	·2	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 2.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel value.		Protein.	Fat.	Carbo-hydrates	Fuel value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food purchased and Eaten :										
Animal	45·95	82·10	17·42	1023·34	5·49	43·4	87·8	3·8	32·4	67·5
Vegetable.....	58·16	12·22	433·27	2128·50	2·67	56·6	12·2	96·2	67·6	32·5
Total	104·11	94·32	450·69	3151·84	8·16	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·2	..	..	..	..	..

III.— LABOURER.

Man, =21·0; Woman, 35 (21 × ·8)=16·8; Boy, 13 (21 × ·6)=12·6; Girl, 11 (21 × ·6)=12·6; Girl, 5 (21 × ·4)=8·4; Girl, 3 (21 × ·4)=8·4—Total 79·8.
1 Man for 26·6 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 3.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	123·82	20·19	25·21	..	1·55	7·5	16·10	29·7	..	25·1
Pork, lard, &c.	25·16	3·23	10·39	..	·44	1·5	2·50	11·1	..	7·4
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	12·57	2·37	1·83	..	·04	·7	1·90	2·1	..	·6
Eggs	12·66	1·50	1·17	..	·26	·8	·14	1·2	..	3·8
Butter	24·16	·24	20·53	..	·50	1·5	·04	23·5	..	8·1
Cheese	12·57	3·48	4·63	·51	·22	·7	2·70	5·3	·1	3·2
Milk	165·92	6·14	6·63	8·29	·60	10·5	4·80	7·6	1·3	·8
Total animal food	376·86	37·15	70·39	8·80	3·61	23·2	28·18	80·5	1·4	49·0
Cereals	768·75	78·79	16·49	425·01	2·24	47·6	64·20	18·7	73·6	36·4
Sugars and starches	62·91	..	..	62·91	·22	3·9	..	..	11·0	3·2
Vegetables	374·37	8·59	·46	57·31	·56	23·5	7·60	·5	10·0	9·2
Fruits.....	29·36	·17	·29	22·95	·18	1·8	·02	·3	4·0	2·2
Total vegetable food....	1235·39	87·55	17·24	568·18	3·20	76·8	71·82	19·5	98·6	51·0
Total food.....	1612·25	124·70	87·63	576·98	6·81	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	35·7	..	..	..	·7	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 3.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food Purchased :										
Animal	37·15	70·39	8·80	843·01	3·61	28·18	80·5	1·4	22·9	49·0
Vegetable.....	87·55	17·24	568·18	2848·82	3·20	71·82	19·5	98·6	77·1	51·0
Total	124·70	87·63	576·98	3691·83	6·81	100·00	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·7	..	..	..	..	..
Waste :										
Animal	·39	·74	·09	8·84	·03	·3	·3	·1	·2	·1
Vegetable	6·80	1·20	44·60	228·41	·50	5·3	1·3	7·7	6·1	7·7
Total	7·19	1·94	44·69	237·25	·53	5·6	1·6	7·8	6·3	7·8
Food actually eaten :										
Animal	36·76	69·65	8·71	834·17	3·58	29·2	80·0	1·4	22·8	52·6
Vegetable	80·75	16·04	523·58	2620·41	2·70	65·2	18·4	90·8	70·9	39·6
Total	117·51	85·69	532·29	3454·58	6·28	94·4	98·4	92·2	93·7	92·2

IV.—COAL CARTER.

Man, 29=21·0; Woman, 28 (21 × ·8)=16·8; Girl, 8 (21 × ·5)=10·5; Girl, 4 (21 × ·4)=8·4; Boy, 11 months (21 × ·3)=6·3; Guest (female), 31 (3 × ·8)=1·8 —Total 64·8. 1 Man for 21·6 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 4.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and mutton	102·98	17·27	25·27	·28	1·84	6·6	16·6	35·1	·1	25·2
Pork, lard, &c.	14·22	1·17	9·11	..	·22	·9	1·1	12·5	..	3·0
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	73·37	12·02	·57	..	·80	4·9	11·5	·8	..	10·4
Eggs	18·13	2·15	1·68	..	·31	1·2	2·0	2·4	..	4·4
Butter	21·37	·21	18·54	..	·61	1·3	·2	25·5	..	8·4
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	248·18	8·34	4·27	12·37	·61	16·1	8·0	5·8	2·3	8·4
,, (Nestlé's)	12·04	1·16	1·74	6·66	·20	·7	1·1	2·6	1·2	2·7
Total animal food	490·26	42·32	61·18	19·31	4·59	31·7	40·5	85·4	3·6	62·5
Cereals	562·44	53·81	9·94	326·32	1·43	36·4	51·4	13·9	61·3	19·4
Sugars and starches	68·15	..	..	68·15	·28	4·3	..	..	12·8	4·0
Vegetables	340·73	7·95	·52	45·08	·40	21·9	7·6	·6	8·5	5·8
Fruits.....	87·50	·52	·90	73·94	·60	5·7	·5	·1	13·8	8·3
Total vegetable food....	1058·82	62·28	11·36	513·49	2·71	68·3	59·5	14·6	96·4	37·5
Total food	1549·08	104·60	72·54	532·80	7·30	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	35·21	..	..	..	·56	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 4.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food Purchased and Eaten :										
Animal	42·32	61·18	19·31	821·65	4·59	40·5	85·4	3·6	33·3	62·5
Vegetable.....	62·28	11·36	513·49	2466·29	2·71	59·5	14·6	96·4	66·7	37·5
Total	104·60	72·54	532·80	3287·94	7·30	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·56	..	..	..	..	..

V. — COALMAN.

Man, 34=21·0; Woman, 30 (21 × ·8)=16·8; Boy, 10 (21 × ·6)=12·6; Girl, 8 (21 × ·5)=10·5; Girl, 5 (21 × ·4)=8·4; Girl, 8 months (21 × ·3)=6·3—Total 75·6. 1 Man for 25·2 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 5.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	117·30	19·58	23·32	..	1·04	8·3	15·9	28·7	..	17·3
Pork, lard, &c.	23·73	1·31	17·34	..	·34	1·6	1·2	21·4	..	5·9
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	66·69	9·46	1·29	..	·24	4·3	9·1	1·5	..	4·6
Eggs	13·70	1·62	1·27	..	·30	·9	1·5	1·4	..	5·5
Butter	19·20	·19	16·32	..	·40	1·3	·2	20·1	..	6·9
Cheese	13·58	3·76	4·96	·55	·24	·9	3·6	6·1	·1	4·6
Milk	156·80	5·17	5·87	7·84	·56	11·1	5·1	7·2	1·5	9·9
Total animal food	411·00	41·09	70·37	8·39	3·12	28·4	36·6	86·4	1·6	54·7
Cereals	567·32	55·19	10·39	313·21	1·91	40·6	53·8	12·8	73·2	32·9
Sugars and starches	72·50	..	..	72·50	·08	5·1	..	..	16·1	1·6
Vegetables	360·40	9·95	·73	41·71	·62	25·9	9·6	·8	9·1	10·8
Fruits	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	1000·22	65·14	11·12	427·42	2·61	71·6	63·4	13·6	98·4	45·3
Total food.....	1411·22	106·23	81·49	435·81	5·73	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	49·27	..	..	..	·32	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 5.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food Purchased and Eaten:										
Animal	41·09	70·37	8·39	855·3	3·12	36·6	86·4	1·6	28·7	54·7
Vegetable	65·14	11·12	427·42	2122·9	2·61	63·4	13·6	98·4	71·3	45·3
Total	106·23	81·49	435·81	2978·2	5·73	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·32	..	..	..	..	..

VI. — LABOURER.

Man, =21·0; Woman, 27 (21 × ·8)=16·8; Girl, 10 (21 × ·6)=12·6; Boy, 6 (21 × ·5)=10·5; Boy, 3 (21 × ·4)=8·4; Girl, 2 (21 × ·3)=6·6—Total 75·9.
1 Man for 25·3 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 6.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and Mutton	138·08	22·86	33·71	..	1·36	15·6	28·50	57·5	..	30·4
Pork, lard, &c.	15·94	2·30	5·29	..	·34	1·8	2·80	8·8	..	7·7
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	41·31	6·47	·11	..	·30	4·7	8·00	·2	..	6·8
Eggs	31·92	3·79	2·97	..	·48	3·6	4·70	5·1	..	10·8
Butter	6·70	·06	5·69	..	·18	·8	·07	9·6	..	4·1
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	44·80	1·47	1·79	2·24	·16	5·0	1·80	3·0	·8	3·6
Cream	1·12	·03	·21	·05	·04	·1	·03	·3	·3	·9
Total animal food	279·87	36·98	49·78	2·29	2·86	31·6	45·90	84·5	1·1	64·3
Cereals	382·87	39·62	8·85	212·65	1·08	43·2	50·7	15·0	76·9	24·0
Sugars and starches	45·80	..	..	45·80	·16	5·3	..	..	16·5	3·6
Vegetables	176·67	2·76	·28	15·65	·36	19·9	3·4	·5	5·5	8·1
Fruits	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	605·34	42·38	9·13	274·10	1·60	68·4	54·1	15·5	98·9	35·7
Total food	885·21	79·36	58·91	276·39	4·46	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	30·62	..	..	..	·25	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 6.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food Purchased :										
Animal	36·98	49·78	2·29	624·55	2·86	45·9	84·5	1·1	31·1	64·3
Vegetable	42·38	9·13	274·10	1382·46	1·60	54·1	15·5	98·9	68·9	35·7
Total	79·36	58·91	276·39	2007·01	4·46	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c...	..	..	..	..	·25	..	..	..	..	..
Waste :										
Animal	4·9	8·11	·38	97·06	·39	6·2	12·4	·1	4·7	9·7
Vegetable	9·3	1·99	6·08	81·55	·34	11·8	3·0	2·1	3·9	8·5
Total	14·2	10·10	6·46	178·61	·73	18·0	15·4	2·2	8·6	18·2
Food actually eaten :										
Animal	32·08	41·67	1·91	527·49	2·47	40·6	73·3	·8	28·2	54·2
Vegetable	33·08	7·14	268·02	1300·91	1·26	41·4	10·8	97·0	63·2	27·6
Total	65·16	48·81	269·93	1828·40	3·73	82·0	84·6	97·8	91·4	81·8

VII.—SCAVENGER.

Man, 46=21·0; Woman, 43 (21 × ·8)=16·8; Girl, 18 (21 × ·8)=16·8; Boy, 15 (21 × ·8)=16·8; Girl, 11 (21 × ·6)=12·6; Girl, 9 (21 × ·5)=10·5; Boy, 7 (21 × ·5)=10·5; Boy, 3 (21 × ·4)=8·4; Boy, 1½ (21 × ·3)=6·3—Total 119·7.
1 Man for 39·9 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 7.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and mutton	138·84	26·50	27·89	·30	2·53	6·4	17·3	31·4	·1	29·2
Pork, lard, &c.	11·98	1·90	6·27	..	·20	·5	1·2	7·1	..	2·2
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	45·30	8·13	·59	..	·36	2·0	5·3	·7	..	4·2
Eggs	25·60	3·05	2·38	..	·45	1·1	1·9	2·6	..	5·2
Butter	33·97	·33	28·88	..	·60	1·5	·3	32·3	..	6·6
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	196·00	6·54	7·84	9·80	·70	9·1	4·3	8·8	1·2	8·6
Buttermilk	113·40	3·40	·56	5·44	·05	5·0	2·2	·6	·6	·6
Corned beef	2·83	·40	·67	..	·05	·1	·1	·8	..	·6
Total animal food	567·92	50·25	75·08	15·54	4·94	25·7	32·6	84·3	1·9	57·2
Cereals	1041·90	96·64	13·40	557·63	2·70	48·5	63·2	15·3	69·0	30·6
Sugars and starches	186·80	..	..	186·86	·62	8·5	..	..	23·3	6·9
Vegetables	372·21	6·38	·43	47·59	·44	17·3	4·2	·4	5·8	5·3
Fruits.....	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	1600·91	103·02	13·83	792·08	3·76	74·3	67·4	15·7	98·1	42·8
Total food.....	2168·83	153·27	88·91	807·62	8·70	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	39·63	..	..	..	·80	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 7.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food Purchased and Eaten :										
Animal	50·25	75·08	15·54	967·97	4·94	32·6	84·3	1·9	20·3	57·2
Vegetable	103·02	13·83	792·08	3798·52	3·76	67·4	15·7	98·1	79·7	42·8
Total	153·27	88·91	807·62	4766·49	8·70	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·80	..	..	..	..	..

VIII.—TWO FEMALES.

Woman, 51 (21 × ·8) = 16·8 ; Girl, 15 (21 × ·7) = 14·7—Total 31·5.
1 Man for 10·5 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 8.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent
Beef, veal, and mutton	101·38	9·19	8·35	4·09	2·00	6·2	9·1	14·8	1·1	35·5
Pork, lard, &c.	51·47	7·10	16·26	..	·50	3·2	7·2	28·5	..	9·0
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	308·86	26·26	3·00	..	·95	18·8	26·2	5·2	..	16·8
Eggs	10·36	1·23	·90	..	·09	·6	1·2	1·5	..	1·6
Butter	15·23	·15	14·76	..	·13	·9	·1	25·9	..	2·3
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	63·63	2·10	2·54	3·18	·22	3·9	2·0	4·5	·9	3·8
Buttermilk	103·00	3·09	·51	4·94	·01	6·3	3·1	1·1	1·0	·1
Total animal food	653·93	49·12	46·32	12·21	3·90	39·9	48·9	81·5	3·0	69·1
Cereals	400·08	42·12	9·77	228·82	·90	24·5	42·1	17·2	60·8	16·0
Sugars and starches	78·24	..	..	78·24	·25	4·7	..	..	20·7	4·5
Vegetables	506·83	9·81	·75	58·70	·59	30·9	9·0	1·3	15·5	10·4
Fruits	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	985·15	51·93	10·52	365·76	1·74	60·1	51·1	18·5	97·0	30·9
Total food	1639·08	101·05	56·84	377·97	5·64	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	47·77	..	..	..	·24	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 8.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food Purchased and Eaten :										
Animal	49·12	46·32	12·21	682·22	3·90	48·9	81·5	3·0	27·4	69·
Vegetable	51·93	10·52	365·76	1810·35	1·74	51·1	18·5	97·0	72·6	30·9
Total	101·05	56·84	377·97	2492·57	5·64	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·24	..	..	..	..	..

X. — MILLER.

Man, 43=21·0; Woman, 36 (21 × ·8)=16·8; Boy, 17 (21 × ·8)=16·8; Boy, 16 (21 × ·8)=16·8; Girl, 13 (21 × ·6)=12·6; Boy, 9 (21 × ·5)=10·5; Boy, 5 (21 × ·4)=8·4; Boy, 3 (21 × ·4)=8·4; Girl, 7 months (21 × ·3)=6·3; Guest (woman), (1 × ·8)=·8—Total 118·4. 1 Man for 39·5 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 10.

Kind of Food Material.	Weights.					Percentages of Total Food.				
	Food Material	Nutrients.			Cost.	Food Material	Nutrients.			Cost.
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	128·88	19·24	29·28	·42	2·52	11·8	24·1	31·2	·1	31·9
Pork, lard, &c.	19·81	1·47	13·67	..	·27	1·8	1·8	14·5	..	3·7
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	..	..	..	..	..	..	..	..	..	..
Eggs	76·92	9·15	7·15	..	1·00	7·3	11·3	7·5	..	12·9
Butter	24·00	·23	20·40	..	·80	1·9	·4	22·2	..	10·3
Cheese	5·66	1·67	2·16	..	·08	·5	2·1	2·3	..	1·1
Milk	217·00	7·15	8·68	10·85	·77	18·9	8·9	9·3	3·0	9·8
Total animal food	472·27	38·91	81·34	11·27	5·44	42·2	48·6	87·0	3·1	69·7
Cereals	404·98	39·13	11·52	232·06	1·43	37·8	48·7	12·3	65·1	17·9
Sugars and starches	60·79	..	..	60·79	·24	5·5	..	..	17·1	3·7
Vegetables	113·22	1·91	·16	14·49	·21	10·3	2·4	·2	4·0	2·8
Fruits	45·30	·26	·45	38·27	·46	4·2	·3	·5	10·7	5·9
Total vegetable food....	624·29	41·30	12·13	345·61	2·34	57·8	51·4	13·0	96·9	30·3
Total food.....	1096·56	80·21	93·47	356·88	7·78	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	14·15	..	..	..	·56	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 10.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food purchased and eaten :										
Animal	38·91	81·34	11·27	962·19	5·44	48·6	87·0	3·1	36·1	69·7
Vegetable	41·30	12·13	345·61	1699·13	2·34	51·4	13·0	96·9	63·9	30·3
Total	80·21	93·47	356·88	2661·32	7·78	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·56	..	..	..	..	..

XI.—PORTER.

Man, 26=21·0; Woman, 23 (21 × ·8)=16·8; Boy, 4 (21 × ·4)=8·4; Girl, 2 (21 × ·3)=6·3; Girl, 4 weeks (21 × ·3)=6·3—Total 58·8. 1 Man for 19·6 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 11.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and mutton	56·62	11·48	6·26	·84	·65	3·6	10·3	6·2	·1	9·5
Pork, lard, &c.	39·63	4·35	20·04	..	·52	2·5	3·9	20·8	..	7·3
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	22·65	1·90	·04	..	·17	1·5	1·7	·1	..	2·2
Eggs	85·50	10·67	7·95	..	·75	5·5	9·6	7·9	..	11·7
Butter	40·99	·40	34·84	..	·65	2·8	·4	34·8	..	9·6
Cheese	33·97	10·05	13·01	..	·37	2·2	9·0	13·0	..	5·4
Milk	68·50	4·50	5·46	6·82	·48	4·4	4·0	5·4	1·2	7·5
Total animal food	347·86	43·35	87·60	7·66	3·59	22·5	38·9	88·2	1·3	53·2
Cereals	685·16	62·85	11·12	369·00	2·13	44·8	56·6	11·1	66·8	32·6
Sugars and starches	136·59	..	..	136·59	·55	8·9	..	..	24·7	7·9
Vegetables	362·40	5·00	·71	39·21	·45	23·8	4·5	·7	7·2	6·3
Fruits.....	..	..	..	..	..	..	..	..	..	..
Total vegetable food	1184·15	67·85	11·83	544·80	3·13	77·5	61·1	11·8	98·7	46·8
Total food	1532·01	111·20	99·43	552·46	6·72	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	4·98	..	..	..	·71	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 11.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food purchased and eaten :										
Animal	43·35	87·60	7·66	1023·82	3·59	38·9	88·2	1·3	28·1	53·2
Vegetable.....	67·85	11·83	544·80	2621·87	3·13	61·1	11·8	98·7	71·9	46·8
Total	111·20	99·43	552·46	3645·69	6·72	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·71	..	..	..	..	..

XII.—PLATER'S LABOURER.

Man, 28=21·0 ; Woman, 27 (21 × ·8)=16·8 ; Boy, 9 (21 × ·5)=10·5 ; Boy, 7 (21 × ·5)=10·5 ; Girl, 5 (21 × ·4)=8·4 ; Girl 3 (21 × ·4)=8·4 ; Girl, 1 year 3 months (21 × ·3)=6·3 ; Boy, 6 weeks (21 × ·3)=6·3—Total 88·2. 1 man for 29·4 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 12.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	188·75	35·34	38·05	..	·96	13·4	29·9	37·6	..	22·0
Pork, lard, &c.	80·79	11·71	26·82	..	·60	5·7	9·9	26·6	..	14·0
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	..	..	..	..	..	..	..	..	..	..
Eggs	16·13	1·92	1·50	..	·23	1·1	1·6	1·5	..	5·4
Butter	22·85	·24	19·25	..	·20	1·6	·1	19·0	..	5·0
Cheese	7·55	2·23	2·89	..	·11	·5	1·8	2·8	..	2·6
Milk	65·33	2·15	2·61	3·26	·23	4·6	1·7	2·7	·8	5·4
Milk, Condensed	8·17	·73	1·10	4·21	·10	·6	·1	1·0	1·0	2·4
Buttermilk	226·80	6·80	1·13	10·88	·16	16·2	5·7	1·1	2·8	4·0
Total animal food	616·37	61·12	93·35	18·35	2·59	43·7	50·8	92·3	4·6	60·8
Cereals	592·67	54·34	7·55	318·62	1·34	43·1	47·3	7·6	80·7	30·5
Sugars and starches	38·65	..	..	38·65	·13	2·8	..	..	9·8	3·2
Vegetables	143·45	2·40	·18	16·60	·23	10·2	1·9	·1	4·1	5·4
Fruits	3·77	·02	..	3·17	·06	·2	..	..	·8	·1
Total vegetable food....	778·54	56·76	7·73	377·04	1·76	56·3	49·2	7·7	95·4	39·2
Total food	1394·91	117·88	101·08	395·39	4·35	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	·52	..	..	..	·06	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 12.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel value.		Protein.	Fat.	Carbo-hydrates	Fuel value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food purchased and eaten :										
Animal	61·12	93·35	18·35	1193·97	2·59	50·8	92·3	4·6	39·2	60·8
Vegetable.....	56·76	7·73	377·04	1849·46	1·76	49·2	7·7	95·4	60·8	39·2
Total	117·88	101·08	395·39	3043·43	4·35	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·06	..	..	..	..	..

XIII.—BREWERY LABOURER.

Man, 42=21·0; Woman, 41 (21 × ·8)=16·8; Girl, 20 (9 × ·8)=7·2; Boy, 17 (21 × ·8)=16·8; Girl, 14 (21 × ·7)=14·7; Girl, 8 (21 × ·5)=10·5; Boy, 6 (21 × ·5)=10·5; Boy, 5 (21 × ·4)=8·4; Girl, 2 (21 × ·4)=8·4—Total, 114·3. 1 Man for 38·1 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 13.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	156·52	23·70	40·89	..	2·22	10·7	19·8	42·0	..	28·9
Pork, lard, &c.	31·35	4·26	11·85	..	·34	2·1	3·4	12·1	..	4·2
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	80·46	12·28	1·08	..	·55	5·5	10·5	1·2	..	4·7
Eggs	21·00	2·49	1·95	..	·32	1·3	1·9	1·9	..	4·0
Butter	22·41	·22	19·05	..	·68	1·5	·1	19·9	..	8·5
Cheese	14·90	4·41	5·70	..	·24	1·0	3·8	5·8	..	3·0
Milk	196·30	6·62	1·40	9·93	·69	13·2	5·3	1·5	1·9	8·7
Total animal food	522·94	53·98	81·92	9·93	5·04	35·3	44·8	84·4	1·9	62·0
Cereals	606·54	60·99	14·69	337·55	1·75	41·6	49·9	15·0	65·8	21·9
Sugars and starches	96·79	·28	..	93·13	·35	6·5	·2	..	18·1	4·4
Vegetables	189·77	5·97	·37	25·96	·59	12·8	4·8	·4	5·0	7·4
Fruits	56·62	·44	·19	47·03	·34	3·8	·3	·2	9·2	4·3
Total vegetable food....	949·72	67·68	15·25	503·67	3·03	64·7	55·2	15·6	98·1	38·0
Total food	1472·66	121·66	97·17	513·60	8·07	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	1·36	..	..	..	·04	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 13.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel value.		Protein.	Fat.	Carbo-hydrates	Fuel value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food purchased and eaten :										
Animal	53·98	81·92	9·93	1023·88	5·04	44·8	84·4	1·9	29·2	62·0
Vegetable	67·68	15·25	503·67	2484·35	3·03	55·2	15·6	98·1	70·8	38·0
Total	121·66	97·17	513·60	3508·23	8·07	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·04	..	..	..	..	..

XIV.—MASON'S LABOURER.

Man, =21·0 ; Woman, 38 (16 × ·8) = 12·8 ; Girl, 16 (21 × ·7) = 14·7 ; Girl, 12 (21 × ·6) = 12·6 ; Girl, 10 (21 × ·6) = 12·6 ; Girl, 8 (21 × ·5) = 10·5 ; Girl, 7 (21 × ·5) = 10·5 ; Boy, 5 (21 × ·4) = 8·4 ; Boy, 3 (21 × ·4) = 8·4 ; Girl, 1 year 5 months (21 × ·3) = 6·3 ; Boy, 9 weeks (21 × ·3) = 6·3—Total 124·1. 1 Man for 41·3 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 14.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Beef, veal, and mutton	52·48	9·76	10·44	..	·90	5·4	12·6	35·8	..	22·6
Pork, lard, &c.	..	..	..	..	..	..	..	..	..	..
Soup	82·97	·91	·08	6·47	·12	8·6	1·2	·2	1·7	3·1
Fish, &c.	..	..	..	..	..	..	..	..	..	..
Eggs	12·51	1·49	1·16	..	·22	1·2	2·2	3·9	..	6·0
Butter	7·07	·07	5·57	..	·23	·7	1·1	19·8	..	6·3
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	87·07	2·87	3·48	4·35	·31	9·0	4·2	11·8	1·1	8·3
Total animal food	242·10	15·10	20·73	10·82	1·78	24·9	21·3	71·5	2·8	46·3
Cereals	582·82	53·62	7·57	309·48	1·62	60·7	76·7	25·7	79·5	43·8
Sugars and starches	58·00	..	..	58·00	·20	6·2	..	..	14·8	5·4
Vegetables	77·34	1·39	·77	11·36	·17	8·2	2·0	2·8	2·9	4·5
Fruits.....	..	..	..	..	..	..	..	..	..	..
Total vegetable food....	718·16	55·01	8·34	378·84	1·99	75·1	78·7	28·5	97·2	53·7
Total food.....	960·26	70·11	29·07	389·66	3·77	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	13·16	..	..	..	·33	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 14.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Food Purchased :										
Animal	15·10	20·73	10·82	299·05	1·78	21·3	71·5	2·8	14·4	46·3
Vegetable.....	55·01	8·34	378·84	1856·34	1·99	78·7	28·5	97·2	85·6	53·7
Total	70·11	29·07	389·66	2155·39	3·77	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·33	..	..	..	..	..
Waste :										
Animal	..	..	..	..	..	..	..	..	..	..
Vegetable	·91	·14	6·32	30·22	·03	1·3	·6	1·7	1·4	1·0
Total	·91	·14	6·32	30·22	·03	1·3	·6	1·7	1·4	1·0
Food actually eaten :										
Animal	15·10	20·73	10·82	299·05	1·78	22·4	71·6	2·7	14·1	46·3
Vegetable	54·10	8·20	372·52	1826·12	1·96	76·3	27·8	95·6	84·5	52·7
Total	69·20	28·93	383·34	2125·17	3·74	98·7	99·4	98·3	98·6	99·0

XV.—LATHE SPLITTER.

Man, 52 = 21·0 ; Woman, 52 (21 × ·8) = 16·8 ; Boy, 20 (16 × ·1) = 16·0 ; Girl, 14 (21 × ·7) = 14·7 ; Girl, 8 (21 × ·5) = 10·5 ; Girl, 2½ (21 × ·4) = 8·4 ; Girl, 13 months (21 × ·3) = 6·3 ; Guest, Female (3 × ·8) = 2·4—Total 96·1. 1 Man for 32 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 15.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost.
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and mutton	113·25	18·61	26·02	..	1·53	7·9	17·6	28·8	..	19·9
Pork, lard, &c.	47·85	7·25	15·88	..	1·03	3·4	6·8	17·5	..	12·9
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	21·23	2·38	·82	..	·06	1·6	2·3	·9	..	·7
Eggs	19·59	2·33	1·82	..	·47	1·4	2·2	2·0	..	6·2
Butter	20·38	·20	17·32	..	·48	1·5	·2	19·4	..	6·2
Cheese	21·23	6·28	8·13	..	·37	1·6	5·8	9·2	..	4·8
Milk	198·23	6·99	8·68	13·59	·68	13·9	6·6	9·8	2·9	8·6
Total animal food	441·76	44·04	78·67	13·59	4·62	31·3	41·5	87·6	2·9	59·3
Cereals	561·01	53·07	10·20	306·09	2·14	39·5	50·3	11·7	65·3	26·9
Sugars and starches	82·24	..	..	82·24	·32	5·8	..	..	17·5	4·1
Vegetables	305·35	8·51	·55	43·22	·50	21·5	8·1	·6	9·2	6·2
Fruits.....	28·31	·17	·03	23·92	·28	1·9	·1	·1	5·1	3·5
Total vegetable food....	976·91	61·75	10·78	455·47	3·24	68·7	58·5	12·4	97·1	40·7
Total food.....	1418·67	105·79	89·45	469·06	7·86	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	10·61	..	..	..	·43	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 15.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food purchased and eaten :										
Animal	44·04	78·67	13·59	967·91	4·62	41·5	87·6	2·9	30·3	59·3
Vegetable.....	61·75	10·78	455·47	2220·93	3·24	58·5	12·4	97·1	69·7	40·7
Total	105·79	89·45	469·06	3188·84	7·86	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	·43	..	..	..	..	..

XVI.—OLD WOMAN.

Woman, 21 × ·8 = 16·8. Equivalent to 1 Man 5·6 days.

Weights and Percentages of Food Materials and Nutritive Ingredients used per Man per Diem in Dietary Study No. 16.

Kind of Food Material.	Weights.				Cost.	Percentages of Total Food.				Cost
	Food Material	Nutrients.				Food Material	Nutrients.			
		Protein.	Fat.	Carbo-hydrates			Protein.	Fat.	Carbo-hydrates	
	Grams.	Grams.	Grams.	Grams.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Beef, veal, and mutton	56·0	10·41	11·14	..	·76	10·8	22·6	33·2	..	30·1
Pork, lard, &c.	..	..	..	..	..	..	..	..	..	..
Poultry	..	..	..	..	..	..	..	..	..	..
Fish, &c.	..	..	..	..	..	..	..	..	..	..
Eggs	..	..	..	..	..	..	..	..	..	..
Butter	16·0	·16	13·60	..	·38	29·1	10·8	17·8	..	16·2
Cheese	..	..	..	..	..	..	..	..	..	..
Milk	150·0	4·95	6·00	7·5	·51	3·1	·3	41·9	4·9	19·9
Total animal food	222·0	15·52	30·74	7·5	1·65	43·0	33·7	92·0	4·9	66·2
Barley	35·0	2·97	·38	27·23	·29	6·8	6·4	·9	18·0	8·1
Leek	28·0	·28	·11	1·40	·05	5·4	·6	·2	·9	2·1
Carrot	28·0	·25	·05	2·07	·05	5·4	·5	..	1·3	2·1
Bread	150·0	13·80	1·95	79·65	·50	29·1	30·0	5·4	52·7	19·1
Pease Meal	54·0	13·28	·54	33·48	·07	10·3	28·8	1·5	22·2	2·4
Total vegetable food....	295·0	30·58	3·03	143·83	·87	57·0	66·3	8·0	95·1	33·8
Total food	517·0	46·10	33·77	151·33	2·52	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	..	..	..	..	..	..

Nutrients and Potential Energy in Food Purchased, Rejected, and Eaten per Man per Diem in Dietary Study No. 16.

Kind of Food.	Weights and Fuel Value.				Cost.	Percentages of Total Food.				
	Protein.	Fat.	Carbo-hydrates	Fuel Value.		Protein.	Fat.	Carbo-hydrates	Fuel Value.	Cost.
	Grams.	Grams.	Grams.	Calories.	Pence.	Percent.	Percent.	Percent.	Percent.	Percent.
Food purchased and eaten :										
Animal	15·52	30·74	7·50	380·26	1·65	33·7	92·0	4·9	33·7	66·2
Vegetable	30·58	3·03	143·83	743·25	·87	66·3	8·0	95·1	66·3	33·8
Total	46·10	33·77	151·33	1123·51	2·52	100·0	100·0	100·0	100·0	100·0
Beverages, condiments, &c..	..	..	..	..	..	..	..	..	..	..

V.—CRITICAL STUDY OF THE DIETARIES.

A. Classification of Diets.

In this section of the report the diets will, in the first instance, be classified in the same manner as in the other sections, into their groups according to the income of the household—(1) labourer's families with irregular income, under 20s. a-week; (2) those with regular but small income, about 22s. a-week; and (3) those with regular and larger income. Of these three classes, the second, that is the class of family where a small but regular income is received, will be considered first, it being the most typical of the section of the population whose diet is under study.

Table I., showing composition, &c., of Dietaries of Class II.—Labourers' families with small but regular income.

Study No.	Proteid. Grms.	Fat. Grms.	Carbohydrate. Grms.	Energy Value. Calories.	Cost. Pence.
1.	80·72	74·76	432·04	2797	7·59
2.	104·11	94·32	450·69	3151	8·36
3.	117·51	85·69	532·29	3454	7·51
4.	104·60	72·54	532·80	3288	7·86
5.	106·23	81·49	453·81	2978	6·05
Average,	102·63	81·76	480·30	3133	7·47

Table I. shows that the quantity, the quality, and the price of the diets of this class of family are fairly constant. Only one of the five differs to any material amount from the average. Hence, by describing the average a fair idea of the individual diets will be given.

It will be shown in the tables which follow that in each of the other classes there are diets which also closely resemble this average. For convenience these will be afterwards grouped along with the present series, and all will be considered together.

Table II., showing composition, &c., of Dietaries of Class I.—Labourers' families with small irregular income.

Study No.	Proteid. Grms.	Fat. Grms.	Carbohydrate. Grms.	Energy Value. Calories.	Cost. Pence.
6.	65·1	48·81	269·9	1828	4·71
8.	101·0	56·80	377·9	2492	5·88
11.	111·2	99·40	552·5	3646	7·43
12.	117·9	101·10	395·4	3043	4·41
14.	69·2	28·90	383·3	2125	4·10
16.	46·1	33·70	151·3	1123	...

In this table it will be seen that there is a marked contrast between this class of family and that with small regular income. The variations here are great, so great that from the comparatively small number of studies a fair average cannot be struck.

The dietaries of Class I. arrange themselves in two groups —the one, where the diets are found to closely resemble the average diet of Class II., the other, where the diets differ widely from that average. The former group contains 11 and 12, and these will be discussed along with the dietaries of Class II. The latter group contains Studies 6, 8, 14, and 16, and these will be considered later, along with other atypical diets.

Table III., showing composition, &c., of Dietaries of Class III.—Labourers' families with ample income.

Study No.	Proteid. Grms.	Fat. Grms.	Carbohydrate. Grms.	Energy Value. Calories.	Cost. Pence.
7.	153·27	88·91	807·62	4766	9·50
10.	80·21	93·47	356·88	2661	8·34
13.	121·66	97·17	513·60	3508	8·11
15.	105·79	89·45	469·06	3189	8·29

The dietaries of Class III. as may be seen in Table III., resemble those of Class I., in that they vary greatly. The variations are so marked that here again a fair average cannot be struck. Studies 13 and 15, resemble the average diet of Class II., and will be discussed along with the dietaries of that class. Studies 7 and 10 differ widely from the average of Class II., and will be considered along with the other atypical diets.

B. The Typical Family Diet of the Edinburgh Labouring Classes.

From what has been said, it is evident that the majority of the labourer's family dietaries resemble the average diet of Class II. All the dietaries found in these studies to resemble that average are grouped together, and the collective average may be taken as representing the typical Edinburgh labourer's family diet. In this class nine out of the fifteen studies are included, the reason for excluding the remaining six will be evident when their special points are considered. Details of these nine studies are shown in Table IV.

Table IV., showing detail of typical Labourer's family diet.

Study No.	Proteid. Grms.	Fat. Grms.	Carbohydrate. Grms.	Energy Value. Calories.	Cost. Pence.
1.	80·72	74·76	432·04	2797	7·59
2.	104·11	94·32	450·69	3151	8·36
3.	117·51	85·69	532·39	3454	7·51
4.	104·60	72·54	532·80	3288	7·86
5.	106·23	81·49	435·81	2978	6·05
11.	111·20	99·43	552·46	3646	7·43
12.	117·88	101·10	395·40	3043	4·41
13.	121·66	97·17	513·60	3508	8·11
15.	105·79	89·45	469·06	3188	8·29
Average,	107·74	88·44	479·42	3228	7·29

1. *Energy Value.*—3228 Calories. The energy value being the most essential point of a diet is the first to be considered. The most striking feature of the series is the constancy of the energy value. The average is 3228 Calories, the extremes are 3646 Calories and 2797 Calories. The smallest diet of this group is No. 1, from the detail of it, as shown on page 44, it may be seen that its smallness is due, not so much to an insufficient supply of food, as to a large waste of food.

Whether 3228 Calories may be considered as a sufficient amount of food energy to properly supply the wants of the labouring classes is a question which cannot be answered dogmatically. As pointed out earlier in this report, food or energy requirement is influenced by several factors, including more especially muscular

work, and varies within wide limits. Atwater assesses the energy value of a diet for an idle man at 2700 Calories, for a man at light labour 3000 Calories, at moderate labour at 3500, and at severe labour at 4500 or more. These figures are simple enough, but the great difficulty lies in estimating the severity of the labour of an individual or of a class. The terms light, moderate, and severe are necessarily ambiguous. Looking at the surroundings of the families under study, it may be stated that the average work may be considered as at least moderate labour, and that consequently the energy value of the food should be at least 3500 Calories. The typical family may be taken as consisting of father, mother, and four or five children. The father in most of these studies works as an unskilled labourer on a railway, or as a coal porter, or as a dock labourer. All these occupations are moderately active, and consequently the father requires a diet at least as full as the standard of moderate labour. The mother in the class of family studied performs moderately active labour, her day's work is necessarily long, and she also requires the diet of moderate labour. That the mother requires a full allowance of food is emphasised by taking into account the great calls on her system by repeated pregnancies. Similarly in the case of children, their active muscular habits and rapid growth entitle them to a diet adapted for moderate labour. These conclusions point to a diet sufficient to support moderate labour being required for the labourer's family, and the diet of the typical Edinburgh labourer's family must therefore be considered as decidedly too small. Nos. 11 and 13, only two out of this series of nine, have the energy value of the standard.

The source of the energy is a matter known to be of no very great importance, provided that a sufficient proportion of energy is provided by proteid or albuminous food, and that carbohydrates are not used in excess. In none of the nine dietaries was there any marked excess of carbohydrate, in one diet only, No. 11, was the maximum of 550 grammes daily exceeded, and that by only a trivial amount. The amount of proteid will be considered later. It may here be noted that in these diets of the total energy 13·6 per cent. is yielded by proteid, 26·2 per cent. by fat, and 60·2 per cent. by carbohydrate, also that of the total energy 28 per cent. is yielded by animal food, and 72 per cent. by vegetable food.

2. *Proteid*—107·7 *grammes.*—The amount of proteid in these diets is found to be less than that usually considered necessary for the maintenance of health in moderate labour. As already explained (page 8) the labourer's diet should not contain less than 118 grammes of proteid, and it is desirable that

considerably more of these materials should be taken, especially if much is taken as vegetable proteid. The minimum adequate amount is reached in three studies only, Nos. 3, 12, and 13. In five studies, 2, 4, 6, 11, and 15, the shortage varies from 6 to 12 per cent.; and in one study, No. 1, the proteid is 24 per cent. under the minimum standard. It is of interest to note in what respects the three better diets, 3, 12, and 13, differ from the rest. In study No. 3, where the proteid amounts to 117·5 grammes per man per day, the diet differs from all the others by containing a fairly large, though not excessive, quantity of oatmeal, a cereal food stuff which is rich in proteid. In this study the use of animal food and animal proteid is less than the average, but the judicious use of oatmeal more than compensates for that. It is the only one of the typical diets which satisfies both the proteid and the energy standards.

Study 12, the second diet where the proteid value is sufficient, is a great contrast to Study 3, for here the good proteid value is not due to the use of proteid rich vegetable food, but to the plentiful use of animal food. The housewife responsible for this diet had found out how to buy animal food at a low price, and by doing so was able to procure a diet both better and cheaper than the average. It also is an excellent example of how with careful management and marketing a satisfactory diet can be got for a small sum of money.

The diet of Study 13, the third which has a full proteid value, owes that good proteid value partly to the use of oatmeal and partly to a comparatively free use of animal foods—beef, veal, and fish. It may be considered a compromise between Studies 3 and 12.

The diet of the series included in Table IV., which shows the smallest amount of proteid, is No. 1. The deficit there is not due to any want of animal food, but to bad selection of vegetable food. In it the animal food is of average quantity, and has an average proteid value, but the vegetable food is of very small proteid value, and is so because of the preponderance of the non-nitrogenous materials —sugar and syrup.

In Table V. is shown the actual amounts of animal and vegetable proteid per man per day used in the nine more typical dietaries.

Table V., showing amount of Animal and Vegetable Proteid in typical Edinburgh Labourer's family diet.

Study No.	Animal proteid. Grms.	Vegetable proteid. Grms.	Total proteid. Grms.
1.	35·49	45·23	80·72
2.	45·95	58·16	104·11
3.	36·76	80·75	117·51
4.	42·32	62·28	104·60
5.	41·09	65·14	106·23
11.	43·35	67·85	111·20
12.	61.12	56·76	117·88
13.	53·98	67·68	121·66
15.	44·04	61·75	105·79
Average,	44·90	62·84	107·74

The average may be taken as typical of the Edinburgh labourer's family diet. In both the average diet and each individual dietary. No. 12 excepted, there is less animal than vegetable proteid, The relative proportions of animal and vegetable proteid in a healthy diet has been studied by Rübner ;* and his conclusion was that animal proteid should exceed the vegetable proteid. He stated, as a proper proportion, that the animal proteid should be 60 per cent. of the total. These studies, with the one exception already named, all show the reverse of Rübner's conclusion. On an average these diets contain only 41 per cent. of animal proteid, and nearly 60 per cent. of vegetable proteid. It is a well-established fact that, after absorption, animal and vegetable proteids have similar food values, but that they differ in one essential, and that is that vegetable proteid is less readily absorbed, and is consequently not so completely used as animal proteid. In the dietaries under consideration the fact that the less absorbable vegetable proteid is found in excess of the more absorbable animal proteid, emphasises the criticism already given, that the proteid value of the typical Edinburgh labourer's family diet is too small.

3. *Cost—7·29 pence per man per day.*—In Table VI. the cost of each of the typical diets is shown, and this is then analysed into the amount spent on animal food, on vegetable food, and on condiments.

* Rubner Zeitschrift f. Biologie. N.F. Band 111, 1885, page 374.

Table VI.—Cost of typical Edinburgh Labourer's diet per man per day.

Study No.	On Animal food.	On Vegetable food.	On Condiments.	Total.
	Pence.	Pence.	Pence.	Pence.
1.	4·09	2·83	·67	7·59
2.	5·49	2·67	·20	8·36
3.	3·61	3·20	·70	7·51
4.	4·59	2·71	·56	7·86
5.	3·12	2·61	·32	6·05
11.	3·59	3·13	·71	7·43
12.	2·59	1·76	·06	4·41
13.	5·04	3·03	·04	8·11
15.	4·62	3·24	·43	8·29
Average,	4·08	2·79	·42	7·29

The cost of the typical Edinburgh labourer's family diet per man per day is 7·29 pence, and of that sum 4·08 pence is spent on animal food, 2·79 pence on vegetable food, and ·42 pence on condiments. In Table VII. the quantities of food principles and energy bought for these sums is shown.

Table VII.—Animal and Vegetable food per man per day.

	Proteid.	Fat.	Carbohydrate.	Energy Value.	Cost.
	Grms.	Grms.	Grms.	Calories.	Pence.
Animal food, .	44·9	76·7	13·6	953	4·08
Vegetable food, .	62·8	11·6	465·6	2274	2·79
Condiments, .	...	...	...	...	·42
Total, .	107·7	88·3	479·2	3227	7·29

Thus, although more money is spent on animal than on vegetable food, more nourishment is got from the vegetable than from the animal food. The energy value, the carbohydrate, and the proteid of the vegetable food are all greater than those of the animal. Fat is exceptional; it is the only food principle found in these diets to be derived from animal food stuffs in greater quantity than from vegetable food stuffs.

The average return per penny spent is 15·2 grammes of proteid and 456 Calories of energy. The average return for each penny spent on animal food is 11 grammes of proteid and 235 Calories

of energy. The corresponding return for each penny spent on vegetable food is 23 grammes of proteid and 836 Calories of energy. The cheapness of vegetable, as compared with animal food, is well shown by these figures. Roughly, it may be stated that the vegetable proteid of these diets is only one-half as expensive as the animal proteid, and that the energy derived from vegetable food is only about one-fourth as expensive as the energy derived from animal food.

Taking 7·29 pence per day as the typical cost of the diet of the Edinburgh labourer, the cost per woman, per child, and per family, work out as shown in the following table. :—

Table VIII., showing cost of typical Edinburgh Labourer's family diet.

	Equivalent of a man.	Per Day. Pence.	Per Week. Shillings.	Per Year. Pounds.
Man, . .	1·0	7·29	4·13	10·7
Woman, .	·8	5·67	3·31	8·6
Child, *aet.* 6,	·5	3·54	2·06	5·4
Family,* .	3·9	27·65	16·13	41·9

Thus among the labouring classes the expenditure on food amounts on an average to about 4s. 2d. per man per week, 3s. 3½d per woman per week, and 16s. 2d. per family per week. The feeding of the average family costs £42 per year.

4. *Two Best Diets.*—An account of the expenditure would not be complete without drawing attention to that of the two best diets. Nos. 3 and 13 may be selected as such, they both combine good proteid and good energy values.

In Study No. 3 this good result appears to have been brought about by a judicious expenditure on vegetable food. The money spent on animal food was less than the average, 3·61 pence as against 4·08 pence, while that on vegetable food was rather more than the average, 3·2 pence against 2·79 pence, the total expense was nearly the average amount. In Study 13 the expenditure on both vegetable food and on animal food is more than the average. It is interesting to note that these two good diets are not the most expensive of the series.

In Study 12, which is prominent by having an exceptionally large amount of animal food and by having a proteid value greater than the average, the expenditure on both animal food and vegetable food is considerably under the average. This diet was

* Average found in studies, it allows for man, wife and four or five children according to age.

that of a very poor family, and that they obtained sufficient food at the price they did was due to exceptional facilities for buying cheaply. This diet can hardly be taken as a criterion.

5. Consumption of various Food Stuffs.

In the following Tables, Nos. IX. and X., will be seen the consumption of the principal food stuffs by each family and in the average typical diet, and also the relative value of the food stuffs used. In preparing these Tables for clearness some foods have been massed together, for instance all cuts of beef have been grouped under the heading beef, and all jam, syrup, treacle, and marmalade, under the heading of jam. All varieties of milks are entered together; in doing this, allowance has been made for variation, the quantities of skim and butter milk have been halved, those of condensed milk multiplied by three. In both tables the foods are arranged in the order of greatest average use. Owing to the grouping of certain foods, absolute accuracy is impossible, and hence the energy value, proteid value, and cost of average typical diet do not strictly agree with those given in Table

TABLE IX.

Average Consumption of Food Material per Man per Day in Typical Diets in Grms.

	Average.	Study 1.	Study 2.	Study 3.	Study 4.	Study 5.	Study 11.	Study 12.	Study 13.	Study 15.
Bread including Cakes	494·4	386·00	393·6	421·90	517·60	548·2	679·5	577·5	418·7	506·90
Potatoes	214·9	279·00	297·3	352·30	234·20	144·1	237·8	98·1	92·5	199·00
Milk*	207·9	404·40	250·3	165·90	210·60	156·8	68·5	303·2	96·0	214·00
Vegetables	94·7	78·80	194·3	13·50	96·70	244·8	22·6	45·3	64·6	92·10
Sugar	83·6	113·20	103·2	62·90	68·10	72·5	136·5	38·6	75·0	82·20
Beef, including Mince	72·5	24·60	108·9	50·30	45·00	81·6	22·6	188·7	52·6	77·80
Meal, including Rolled Oats	46·4	25·17	69·3	109·00	42·40	62·8	5·6	...	80·3	23·00
Fresh Fish	30·1	34·55	...	12·58	52·70	66·6	22·6	...	60·5	21·20
Eggs	28·6	52·70	34·2	12·60	18·10	...	85·5	16·1	18·5	19·50
Ham	27·8	10·50	22·6	20·90	5·10	9·0	28·3	80·7	25·0	47·80
Syrup and Jam	26·8	37·70	...	29·30	87·50	...	...	3·7	55·3	28·30
Butter and Margarine	24·2	23·90	25·6	24·10	21·30	19·2	40·9	22·8	19·8	20·30
Mutton	16·1	11·50	...	23·10	46·30	36·2	...	...	27·7	...
Cheese	14·6	7·30	12·6	12·50	...	13·5	33·9	7·5	13·1	21·20
Flour and Semolina	14·0	15·70	...	29·30	...	20·5	...	...	36·8	23·90
Liver, Tripe, &c.	9·5	...	...	33·50	11·50	...	33·9	...	...	7·00
Sausages	9·4	...	24·0	16·70	...	...	...	...	15·8	28·30
Peas, Lentils, and Beans	8·9	16·80	...	8·30	9·68	20·5	...	...	10·5	14·16
Rice	6·9	13·50	14·2	...	19·30	...	...	15·1	...	...
Barley	6·8	13·40	12·6	8·30	9·60	10·2	...	...	...	7·00
Suet and Dripping	6·6	11·50	4·0	4·10	9·00	16·6	11·3	...	2·6	...
Veal	4·6	...	...	...	...	...	...	...	42·1	...
Dry Fish	3·9	...	22·6	...	2·50	...	...	...	10·5	...
Sago and Arrowroot	·7	4·10	...	...	...	2·6	...	...	...	...

* Milk, all sorts. Quantities of Buttermilk and Skimmed Milk are halved ; those of Condensed Milk multiplied by 3.

TABLE X.

Averages per Man per Day in Studies 1, 2, 3, 4, 5, 11, 12, 13, *and* 15.

Food Material.	Quantity.	Proteid.	Energy Value.	Cost.	Average p. 1000 Grams. Proteid.	Cost p. 1000 Calories.
	Grams.	Grams.	Calories.	Pence.	Pence.	Pence.
Bread	494·4	45·48	1322·0	1·50	3·12	1·02
Potatoes . . .	214·9	3·87	147·3	·30	8·10	2·05
Milk	207·9	6·86	148·0	·75	11·20	5·19
Vegetables . . .	94·7	1·32	41·6	·12	91·66	5·98
Sugar	83·6	...	342·7	·25	...	·85
Beef	72·5	13·48	189·3	1·75	12·98	9·25
Meal	46·4	7·47	190·0	·19	2·52	1·00
Fresh Fish . . .	30·1	5·02	21·4	·19	4·24	8·88
Eggs	28·6	3·40	38·5	·66	12·43	10·70
Ham	27·8	4·03	102·2	·41	9·94	3·15
Syrup and Jam . .	26·8	·16	95·8	·18	112·50	1·90
Butter . . .	24·2	·24	192·3	·53	223·50	2·81
Mutton . . .	16·1	2·22	64·3	·23	10·36	3·60
Cheese . . .	14·6	4·04	68·8	·23	5·82	3·41
Flour	14·0	1·59	40·5	·04	3·43	1·34
Liver	9·5	1·91	11·4	·04	3·83	6·35
Sausages . . .	9·4	1·05	33·4	·13	13·24	4·17
Peas	8·9	2·18	39·8	·04	2·03	1·37
Rice	6·9	·55	24·8	·03	6·53	1·44
Barley . . .	6·8	·57	30·8	·03	4·99	1·16
Suet	6·6	·31	51·4	·05	22·40	1·35
Veal	4·6	·71	7·2	·05	7·12	8·05
Dry Fish . . .	3·9	·72	2·9	·08	11·11	27·58
Sago	·7	·06	2·4	...	9·61	2·21
	1453·9	107·24	3208·8	7·78		

The main points to be deduced from Tables IX. and X. regarding the principal foods are as follows :—

1. *Bread.*—Average daily consumption 495 grammes ($1\frac{1}{10}$ lbs.), providing 45·5 grammes proteid and 1322 Calories of energy. Cost 1·5 pence. Price per 100 grammes proteid 3·12 pence, per 1000 Calories 1·02. Bread forms the basis of all the diets—it is universally used in greatest quantity, it provides on an average nearly one-third of the total energy and fully one-third of proteid. It is a cheap food, as an energy provider oatmeal and sugar alone being cheaper ; as a proteid provider oatmeal and pease alone are cheaper. That bread is a food well adapted for the basis of a diet there is no doubt, but whether it is used to excess is a matter which will be considered later when the possible improvement of the labourer's diet is taken up.

2. *Potato.*—Average daily use 214 grammes ($\frac{1}{2}$ lb.), providing 3·8 grammes proteid and 147 Calories of energy. Cost, 3d. Price per 100 grammes proteid 8·1d., per 1000 Calories 2·05d. Potato is a more expensive food than bread. As an energy provider it is twice, as a proteid provider more than twice, as expensive. In the average diet it ranks second in actual quantity used, but only seventh as a provider of nutriment both as proteid and energy. The antiscorbutic property of potato is well known, and justifies its large use in these diets.

3. *Milk.*—Average daily use 207 grammes (about 7 oz. or one-third pint), providing 6·9 grammes of proteid and 148 Calories of energy. Cost per 100 grammes proteid 11·2d., per 1000 Calories 5·19d. Next to bread and potato, milk is the article of food found to be most extensively used. It is comparatively expensive; as a source of energy it is five times as expensive as bread, and as a source of proteid it is fully three times as expensive. Milk is an essential food for small children, and consequently the comparatively large use of it in a family diet is to be expected.

4. *Vegetables.*—The use of fresh vegetables varies so widely in these diets that the average is not a reliable figure, the maximum use is in Study 5, where 245 grammes (fully $\frac{1}{2}$ lb.) per man per day is found, the minimum 13 grammes ($\frac{1}{2}$ oz.) in Study 3. The average expenditure on fresh vegetables is a very small item.

5. *Sugar.*—Average daily use 84 grammes (3 oz.), providing no proteid, 343 Calories of energy. Cost $\frac{1}{4}$d. Price per 1000 Calories ·85d. Sugar may be regarded as one of the most important food stuffs of the poor. It is solely an energy producer, but as that it is the cheapest. In the average typical diet as a source of energy it takes a second place only to bread. This large use of a food which provides energy but not proteid, is one of the reasons

why these labourers' diets are badly balanced and contain relatively too little proteid to their energy.

6. *Beef.*—Average daily use 72·5 grammes (2½ oz.), providing 13·5 grammes of proteid and 189 Calories of energy. Cost 1·75d. Price per 100 grammes proteid 12·98d., per 1000 Calories 9·25d. Next to bread, beef is the most important proteid provider in the average typical diet. It ranks fifth as an energy providing food. It will be seen in Table X. that beef is found to be an expensive source of nourishment compared to bread, its proteid being four times as dear and its energy nine times as dear. One important use of beef in a dietary is in virtue of its high proteid value to compensate for the small proteid value of other foods. It is interesting to note that in these diets the use of beef is hardly sufficient to compensate for the large use of the proteid free sugar, and that therefore it cannot compensate the proteid deficiency in the bread. In a good diet 15 per cent. of the energy should be derived from proteid, in bread less than 14 per cent. of the energy is from that source. From the sugar combined with beef in these diets less than 10 per cent. of the energy is from proteid. That beef is a valuable food to compensate for the use of foods which are poor in proteid there is no doubt, but used in the small quantity found in these diets, where this compensation is much wanted, it cannot be said to well fulfil that purpose. Of all the food stuffs used the most money is spent on beef, 16 per cent. more being spent on beef than on bread. This comparatively large expenditure on beef will be referred to later when the possible improvement of the labourer's diet is considered.

7. *Oatmeal.*—Average daily use 46·4 grammes (1½ oz.), providing 7·5 grammes proteid and 190 Calories of energy. Cost ·19d. Price per 100 grammes proteid 2·5d., per 1000 Calories 1d. The cheapness of oatmeal as a food is well shown by these figures, both as a proteid provider and as an energy provider it costs less than bread. Peas are cheaper as proteid providers, but more expensive as energy providers. Sugar is cheaper as an energy provider but contains no proteid. As a food providing cheap energy and having a good proteid value, oatmeal is the best in the entire list. But the use of this valuable food in the dietaries of the labouring classes of this town is small, it is less than that of bread, beef, sugar, and fresh vegetable. At one time it was the basis of the Scottish labourer's diet, but it appears no longer to be so in the City of Edinburgh. It may here be noted that the best diet of the series, No. 3, is the one that contains most oatmeal.

8. *Fish.*—In Tables IX. and X. it will be seen that there is a small quantity of fish in every diet, except No. 12. The

average use of fresh fish is 30·1 grammes (1 oz.) per day, and of dry fish, smoked fish included, 4 grammes ($\frac{1}{7}$ oz.) per day. Dried and smoked fish is found to be an expensive food, both as an energy provider and as a proteid provider; its proteid is as expensive as that of beef, its energy is three times as expensive. Fresh fish as a proteid provider is cheap, but as an energy provider dear, its proteid being a little more expensive than that of bread and much less expensive than that of beef, milk or eggs. Fresh fish is a good, cheap, proteid-rich food, and might with advantage be used more freely in the diets of the labouring classes to augment their proteid value. Dry fish, finnans, kippers, &c., cannot be so highly commended.

9. *Eggs.*—These are almost universally used in the dietaries studied, and the money spent on them is considerable. It is only exceeded by the money spent on bread, milk and beef. The return for this money is, however, small, so small that it hardly affects the daily composition of the diet. Eggs are an expensive food both as energy and as proteid providers. Their large use may be attributed to the small amount of trouble entailed by their cooking and service.

10. *Meats other than beef.*—The most largely used of these is *ham.* This is found to be used in all the typical diets, the quantity varying from 81 grammes a day in Study 12 to 5 grammes in Study 4. The average used was 28 grammes (1 oz.) per man per day. As an energy-producing food ham is decidedly cheaper than beef, and its proteid is also cheaper than that of beef. *Sausage* is another form of meat freely used. It was found in four of the five typical dietaries. As a proteid provider it is more expensive than beef, but as a source of energy it is cheaper than beef. *Mutton* was used in five of the nine dietaries. As a source of energy and as a proteid provider it is found to be a cheaper food than beef. *Veal* was found in only one dietary, it there appears to be a cheap food. The combined quantities of meat other than beef is found to be considerably less than the quantity of beef.

11. *Butter and Margarine.*—The average use of these two combined was found to be 24 grammes, or less than one ounce per man per day. Butter was found to be much more largely used than margarine, only one of the nine typical diets containing the latter substance. Butter and margarine at the average price paid in these dietaries is found to be a comparatively cheap source of energy. They compare favourably with all the other animal foods, but are more expensive than the vegetable foods. As a source of energy they rank third in the average diet, bread and sugar being the only two foods used which yield more.

12. *Suet and Dripping.*—These are found to be used in very small amount, on an average of 6·6 grammes (¼ oz.) daily. They are a very cheap source of energy.

13. *Cheese.*—This is used in small amount in eight of the nine diets. The average consumption is only 14·6 grammes (½ oz.) per day. Both as a proteid provider and as a source of energy it is cheap food.

In addition to the above specially mentioned foods, syrup, jam, flour, peas, rice, barley and sago are found in these dietaries, all in small amount.

General Resumé regarding the Typical Diet of Edinburgh Labourer's Family.

1. The daily energy value is 3228 Calories.
2. It contains 107 grammes of proteid, 88 of fat, and 479 of Carbohydrate.
3. Both the energy value and proteid value, especially the latter, are too small.
4. Of the proteid more than half is vegetable proteid.
5. More money is spent on animal than on vegetable food, but more nutriment is found in vegetable food.
6. The average cost is 4·13 shillings per man per week, or 16·13 shillings per average family per week.
7. The principal food stuffs used are bread, potato, milk, vegetables, sugar, and beef.
8. There is a relatively great use of more expensive foods, such as beef, milk, and eggs, and a relatively small use of some cheaper food, such as oatmeal, peas, and barley.

C. Faulty or Atypical Diets.

The principal points of these diets are shown in Table XI. In that table, for simplicity, decimal fractions have been omitted. Of the six diets included under this head, four are from Class I., labourers with small irregular incomes; none from Class II., labourers with small but regular incomes; and two from Class III., labourers with ample income.

TABLE XI.

Average Use of Foods per Man per Day in Atypical Diets in Grams.

	Average of Typical Diet.	No. 6.	No. 7.	No. 8.	No. 10.	No. 14.	No. 16.
Bread	494	299	991	301	349	597	180
Potato	214	33	301	310	82	79	...
Milk	207	47	252	118	217	89	180
Vegetables	95	104	69	190	31	...	...
Sugar	89	46	187	79	61	59	...
Beef	72	93	124	50	78	54	67
Meal	46	66	...	80	40	...	...
Fish (Fresh)	30	41	17	306	...	...	...
Eggs	28	32	25	10	78	13	...
Ham	28	16	11	49	11	...	...
Syrup and Jam	27	...	...	...	45	...	...
Butter	24	6	34	15	24	7	19
Mutton	16	4	...	...	...	...	...
Cheese	15	...	...	...	5	...	...
Flour	14	8	39	...	8	...	...
Liver, &c.	9	...	12	...	17	...	...
Sausages	9	40	6	...	34	...	...
Peas	9	...	...	6	...	...	65
Rice	7	...	...	13	...	...	...
Barley	7	...	11	6	...	...	42
Suet	7	...	5	2	8	...	...
Veal	5	...	...	...	...	...	...
Fish (Dry)	4	...	28	...	...	...	...
Sago, &c.	1	...	...	...	...	...	...
Soup	...	...	...	51	...	85	...
Cost in Pence	7·29	4·71	9·50	5·88	8·34	4·10	2·52
Energy Calories	3228	1828·40	4766·48	2492·57	2661·32	2125·17	1123·51
Proteid in grams.	107·74	65·16	153·27	101·05	80·21	69·20	46·10

Study 6. — Proteid, 65·2 grammes. Energy value, 1828 Calories. Cost, 4·71d. This dietary is characterised by an all-round shortage. All the chief food stuffs are found to be less than in the typical diet, with the exception of beef, sausage, and oatmeal, and the slight excess of these three is insufficient to compensate for the deficiency of the others. The proteid and energy values are only half what they should be. It is remarkable that this poor diet is one of the few where waste is reported. Proof of underfeeding in this family is to be found on p. 17, where notes of the home are given; the father and mother are reported to be without their normal energy, and the children are all puny. It is the worst family diet included in the series.

Study 7. — Proteid, 153·3 grammes. Energy value, 4766 Calories. This study was made on a family with ample income, the result shows an excessive energy value, which can be traced to excessive use of carbohydrate. In Table XI. it will be seen that the essential feature in which this diet differs from the typical is in the amount of bread it contains. The total weekly consumption of bread in this household was not less than 85 lbs.; the average daily use of that food is twice as large as in the typical diet. It is to this excessive use of bread that the apparent high energy value is due. No waste was recorded, but from the description of the household it may be taken that waste did occur, and that consequently this enormous energy value recorded, while truly expressing the food supply, does not truly express the actual consumption. Had half the amount of bread been used, then this diet would in all respects closely resemble the average typical diet.

Study 8. — Proteid, 101 grammes. Energy value, 2492 Calories. This was the study of the menage of two lightly-worked poor women. It cannot be taken as a fair example of a family diet. The results have been converted and expressed as per man per day; they show that these two women were decidedly underfed, even for very light work.

Study 10.—Proteid, 80·21. Energy value, 2661 Calories. This study was made in the household of a labourer with ample means. There was a large family. The expenditure on food per man per day, 8¼d., was an average amount. The foods used in excess over the average were all more costly ones, eggs, sausages, syrup, and jam. Beef was used in average quantity, other meats in very small amount. The supply of bread was about three-quarters of that of the average typical diet. Potatoes, vegetables, peas, rice, barley, and other foods which are good, but require cooking, were used in small quantity or not at all. It is essentially a bad diet, and that it is so

may be attributed to bad selection of food rather than to any want of means to procure food.

Study 14. — Proteid, 69·2 grammes. Energy value, 2125 Calories. Price, 4·10 pence. This was the study of the diet of a family, where the means were limited, and where there was a large number to provide for. This diet is characterised by there being no attempt made to vary the food. Tea and bread, with hardly a suspicion of butter, was the standing order. Bread is in more than average quantity in this diet, all other foods being in small quantity or absent. There are only six food stuffs used in appreciable quantity. The diet is a very bad one, and that the family have been subjected to partial starvation is clearly shown by the record noted on page 20 of this report.

Study 16. — Proteid, 46 grammes. Energy value, 1123 Calories. This is the study of the diet of an old woman. It cannot be taken as in any way comparable to a family dietary. The results are expressed in terms of per man per day. It is interesting to note on how small an allowance of food this old woman was able to sustain life.

Regarding these atypical or faulty diets considered collectively, it may be noted that out of the fifteen studies made, only six are atypical : that out of these six, two, Nos. 8 and 16, are not genuine family diets ; two, Nos. 7 and 10, are faulty because of bad management ; while two, Nos. 6 and 14, are apparently faulty from want of means to procure sufficient food. Discarding 8 and 16, and including 7 as a sufficient if not a typical diet, the general conclusion is that by ten out of the thirteen dietary studies an average quantity of food is provided, that two out of the thirteen are short through poverty, and that one is short of the average through bad management.

D. How can the Labourers' Diet be Improved ?

Assuming that the average diet of these studies fairly represents the typical labourer's diet of the town, the questions arise—(1) Does it require improvement ? and (2) How can that improvement be effected without increasing the cost ?

(1) That improvement is called for is shown by remarks already made when criticising the diet. The energy value of the diet and the proteid value are too small. The energy value is half-way between Atwater's light and moderate labour diet, and the latter has been shown to be the standard to aim at. The pro-

teid value was found to be only 108 grammes, which is considerably below the standard.

No observers have yet shown that robust health and, more particularly, healthy development can in Europe be for long periods assured without a full allowance of proteid, and until that is done, the only justifiable conclusion is that a diet is faulty if it does not contain the standard amount of proteid. Von Noorden sums up our knowledge of the subject by stating, "Better too little proteid with an otherwise ample diet, than ample proteid with a limited diet; the latter causes a rapid loss of strength, the former may to some, at all events, be for some time harmless." This opinion of Von Noorden's implies that a prolonged deficiency of proteid is necessarily harmful, and with that opinion we have every reason to agree.

(2) *How can the improvement be effected?*—The ideal diet for family use to aim at is one where the energy amounts to at least 3500 Calories, where the proteid amounts to at least 118 grammes, and where the carbohydrate does not much exceed 500 grammes.

Looking over the dietaries studied, and the typical dietary found, the outstanding feature is the great use of bread combined with butter, tea, and sugar. The poverty in proteid of such a combination is shown in the following table, where the composition of a typical tea, bread and butter meal is given. The cost of such a meal would be almost exactly $1\frac{1}{2}$d.

	Proteid.	Fat.	Carbohydrate.
Tea, ...	...	...	...
Sugar, $\frac{1}{2}$ oz., . .	...	...	14·2
Milk, $1\frac{1}{4}$ oz., . .	1·2	1·4	1·7
Bread, 10 oz., . .	26·1	3·7	150·8
Butter, $\frac{1}{2}$ oz., . .	·2	11·5	...
Total, .	27·5	16·6	166·7

Calories= 950·6

Proteid Calories = 112 = 12 per cent. of total.

A combination of food to partly replace or to supplement this faulty diet is what is wanted. The most obvious improvement would be the free use of proteid rich animal food—flesh, fish, eggs, cheese, &c.—but such is impracticable for the labouring classes on account of the cost. All these animal foods are expensive. Failing this, recourse must be had to proteid rich vegetable food, such as is to be found in oatmeal, the cereal with largest proportion of proteid, and in the pulses (or legumes), peas, beans, &c., which all have a large proteid value.

A good substitute for the faulty tea and bread meal is to be found in our national dish of porridge and milk. The composition of a meal of porridge and milk, costing nearly the same as the bread, butter, and tea meal, is shown in the following table :—

	Proteid.	Fat.	Carbohydrate.
Oatmeal, 8 oz., . .	36·6	16·4	153·4
Milk, 10 oz., . .	9·4	11·3	14·2
Total,	46·0	27·7	167·6

Calories = 1133.
Proteid Calories = 188 = 16·5 per cent. of total.

The advantage of the porridge meal over the tea, bread and butter meal is obvious. For the same money more energy and more proteid is got ; in fact, a porridge and milk diet contains the food principles in perfectly correct proportion.

The contrast between an entire day's diet composed of tea, bread, and butter, and one of porridge and milk is shown in the following table :—

	Proteid.	Fat.	Carb.	Calories.	Cost.
Tea, bread, butter,	106·	51	579	3279	5·2d.
Porridge and milk,	128·	83	506	3375	4·5d.
In favour of Porridge,	+22	+32	−73	+100	−·7d.

The advantage of the latter is obvious. For less money a diet of greater energy, containing more proteid, and without any excess of carbohydrate is obtained.

It would be unreasonable to suggest that the labouring classes should live entirely on porridge and milk, such a diet would on account of its monotony be faulty, but a desirable change in the labourer's diet is the substitution of porridge and milk for some of the tea and bread meals. Were one meal of porridge and milk taken daily in place of one tea and bread meal, let it be a breakfast or let it be a supper, the labourer's diet would be vastly improved and its outstanding faults cured ; its daily proteid value would be raised from 108 to 120 grammes, and its energy value from 3227 Calories to 3447 Calories.

The disuse into which porridge has fallen in the dietaries of the labouring classes is to be deplored, the inevitable substitute is tea and bread, and the inevitable result is a reduction of the nutritive value of the diet. The reason of the disuse of porridge

is to be found in the lazy habits of the labouring classes. In old days, when the housewife had to make her bread as well as her porridge, there was not the same inducement to use bread constantly, but now when practically no bread is made by the housewife it comes to be a question of using the ready cooked bread or the uncooked oatmeal, laziness decides which it is to be, and the family suffers.

One other food stuff, or rather class of food stuffs, to be advised for freer use in labourers' families is that of peas and allied foods, lentils and beans. These are cheap foods and contain a large amount of proteid. A meal of pea soup and bread, or one of beans, fat bacon, and bread, instead of a tea, bread and butter meal, would, like the use of porridge, correct the principal fault of the present labourer's diet, and do so without extra cost. But such meals, even more than porridge meals, entail cooking, and consequently will not be readily adopted by the labourers' housewives.

To improve the dietary of the labouring classes the following principles should be instilled into them :—

(1) That a diet of tea and bread or of tea, bread, and butter (the lazy diet), is faulty.

(2) That the faults of the tea and bread diet can be corrected by the free use of meat, eggs, or other animal food, but that this mode of correction is expensive.

(3) That the faults can also be corrected by the free use of oatmeal with milk, or of peas or beans, without extra cost.

(4) That to correct the faults of a tea and bread diet, either money spent on animal food or labour spent on the cooking of vegetable food is necessary; if they have not the former, the money, they must use the latter, the labour of properly cooking more nutritive foods.

VI.—COMPARISON OF THE DIETS OF THE LABOURING CLASSES IN EDINBURGH WITH OTHER DIETARIES.

Although numerous investigations have been made in various countries of the food used by people in different conditions, not many of these are capable of direct comparison with the present investigations, because the diet of individuals rather than of families have been studied, and the food requirements of people living in Southern Europe and in the East are so different from the requirements of our own people that little is to be gained by any attempt at such a comparison.

But the admirable series of studies carried out in America by methods similar to those employed by us, and upon families in much the same social condition as ours, affords a means of contrasting the dietary habits of the poorest classes in these countries.

The following table is taken from Bulletin 21, p. 183, and from Bulletin 46, p. 117, of the U.S. Department of Agriculture.

		Proteid.	Calories.
Chicago,	25 families in poorest part,	119	3425
Philadelphia,	26 „ „ „	109	3235
New York,	19 „ „ „	106	3030

From these figures it would appear that, setting aside that very large class of thriftless poor with uncertain incomes, the labouring classes of Edinburgh manage to secure a diet which compares satisfactorily with the food of similar classes in Philadelphia and New York, but is not so good as that of the poor of Chicago.

But when we compare these diets with those of factory operatives, labourers, &c., in different countries, who are for the most part enjoying fair wages and are above the pinch of poverty, we find that the better income is usually accompanied by a more liberal food supply.

The following figures are taken from Bulletin 21, p. 178, *et seq.*, U.S. Department of Agriculture, 1895 :—

	Lowest.	Highest.	Average.
1. Germany—			
Proteids, . . .	120	192	143
Calories, . . .	3000	6215	4170
2. Sweden—			
Proteids, . . .	134	189	161
Calories, . . .	3435	4725	4080
3. Russia—			
Proteids, . . .	98	132	113
Calories, . . .	2875	3680	3061
4. America—			
A. Factory operatives—			
Proteids, . .	95	182	127
Calories, . .	3590	5810	4415
B. Factory operatives—			
French Canadians—			
Proteids, . .	82	200	123
Calories, . .	3595	6905	4620
C. Labouring Class—			
French Canadians—			
Proteids, . .	73	150	108
Calories, . .	2950	4365	3585

English and Scottish Dietaries published in the *Lancet* in 1895 are not appended in this table, as they are not strictly comparable; they were based on what appears to be very loose observation.

It is also of some interest to contrast these figures with the result of Atwater's studies of the diet of the better classes in America. The average of the studies on fourteen families of well-to-do professional men gave a consumption of—

Proteids, 104 gm. Calories, 3325 gm.

But it is of even greater interest to compare the diets of these Edinburgh families with the food supplied to the inmates of poor-houses, prisons, and pauper lunatic asylums in this country. In an extended investigation of the dietaries of the Scottish prisons, one of us has recently had occasion to make a very full enquiry into the dietaries of such public institutions, and the figures here given are supplied by him.

We give only the dietaries allowed to inmates required to do a moderate day's manual work, as we are of opinion that the families of the free labouring class require a diet sufficient to support at least moderate labour.

	Proteid.	Calories.
Poorhouses—		
Scottish, Class C,* . . .	113	2381
English, Class I.a,† . . .	138	3381
Prisons—		
Scottish, Rate IV.,* . . .	134	3115
„ Convict, Rate VII.,‡ .	173	3717
English, Class B,* . . .	134	3038
„ Convict, Hard Labour,* .	177	4159
Pauper Lunatic Asylums—		
Scottish (Average of ten typical dietaries),§ . . .	136	3455

It will be seen from this that the food supply of our poorer working classes compares unfavourably as a source of energy, and most unfavourably as a source of proteid, with the diets of the inmates of poorhouses, prisons, and pauper lunatic asylyms—with the single exception of the diet allowed to the working inmates of the Scottish poorhouses. This diet yields a fair amount of proteid, but a very small amount of energy, and contrasts unfavourably with the diet of the other institutions. This is not the place to consider the question of how far it is right that the diets of prisons and poorhouses should be better than that of the free labouring classes, but it is certainly a matter of regret that the free labourer fails to secure so good a diet as the inmates of a prison or a poorhouse.

The effect of combination in securing a liberal diet is indicated by the Seamen's Federation diet. Although a sailor on board one of our modern steamers has not to perform anything like the amount of work done by an ordinary labourer on shore, the Federation have secured for its members a very liberal diet, yielding 170 grammes of proteid and 4526 Calories of energy per diem. It is, however, very probable that the constant exposure necessitates a greater development of heat, and that the out-door life enables the digestion to make use of an amount of food which a town-dweller would dispose of with difficulty.

If it were possible to pay for labour by the work done, and not by time, there would then be a direct incentive to better feeding, and it would even be profitable for the employer to supply extra food to his workmen.

At present the energy of food is paid for by our labouring

* Report on Prison Dietaries, C. 9514, 1899.

† Calculated from dietaries named in recent instructions issued by English Local Government Board.

‡ Evidence of Prisons (Scotland) Enquiry Committee, Cd. 916, 1900, page 198.

§ From a report not yet published.

classes at the rate of 2d. per 1000 Calories. The wage of a man consuming food yielding 3000 Calories, is 21s. per week or 3s. per diem—*i.e.*, he is paid at the rate of 1s. per 1000 Calories of energy taken in the food. The money spent on food thus yields a profit of 500 per cent.

This raises a most interesting question, to which we at present can give no answer, whether the inhabitants of cities have generally teeth and other digestive organs in a sufficiently healthy condition to dispose of and utilise larger quantities of food than they at present take, and whether their growth and working capacity is limited not merely by their poverty, but by digestive inadequacy. We know well that in athletic training the first essential is to keep the digestive organs healthy, and that with healthy digestive organs, enormous quantities of food, and therefore of energy, can be made available. This is well illustrated by the studies of the diets of football teams recently made in America.

Food Eaten in Grammes.

	Proteid.	Fat.	Carbohydrate.	Calories.
College Football Team, Connecticut, .	181	292	557	5740
College Football Team, California, .	270	416	710	7885

This food consumption is exceeded by a group of brickmakers at hard work, living in a boarding-house in Middletown, Con. (237 individuals), who consumed per man a diet yielding 8850 Calories of energy and 180 grms. of proteid. In this instance no less than 1150 grms. of carbohydrates were eaten.

This extraordinary diet, we understand, was supplied by the employers, who found that it paid them in the better return of work, to feed their workmen thus liberally.

In only one of our studies (XVI.), which was made upon the diet of a very poor and small old woman, did the value fall below what is usually considered as necessary for bare subsistence. This poor creature lived upon a diet containing 45·8 grms. proteid, 33·6 grms. fat, 149·3 grms. carbohydrate, which is equivalent to 46·1 grms. proteid and 1123·5 Calories per man per diem.

The only diets approaching such a low figure, with which we are acquainted, are the rations served out at Ladysmith before the end of the siege, and the emergency ration of the British Army, which is supposed to contain nourishment for a man for 36 hours.

The composition of these diets is as follows :—

	Proteid.	Calories.
British Army Emergency Ration, to serve 36 hours,* . .	91	1565
British Army Emergency Ration, per diem, ...	60·6	1042
Ladysmith Ration at end of Siege, per diem,† . . .	73·4	1527

* Analysis made by Dr. Dunlop in the Laboratory of the Royal College of Physicians.

† Calculated by Dr. Dunlop.

VII.—CONSIDERATION OF THE SURPLUS OVER EXPENDITURE ON FOOD AND OF THE SOCIAL CONDITION OF THE LABOURING CLASS.

A. The thrifty Labouring Classes with Regular Incomes.

We have seen that the thrifty poor can and do manage to secure something approaching to an adequate diet; but the further questions arise, what amount is left for the other necessaries of life, and can anything be saved and put aside? That money is saved in funeral societies and sick societies, our study of the social conditions clearly show. In some families the income can only be made to meet expenditure by the wife undertaking extra work; in others, where the income is not exceeded, nothing is left over for pocket-money for the father or for amusements for the children, and even the clothes must be procured by this means. To our minds these studies of the menage of the thrifty poor show an amount of self-denial and devotion to the family which is highly creditable, and cannot fail to excite admiration.

A comparison of the income, rent, and food expenditure in our Edinburgh families and in those studied by Atwater in New York, shows that although for a smaller sum a better diet is got in the former city, and although the rent is only about one-third of that paid by the New York families, the sum available for clothing, fire, light, taxes, and amusements is here less than one-fourth of what it is in New York.

Table.

Comparison between the Income, Rent, and Food Expenditure in New York and Edinburgh.

	Averages per Man per Day.	
	*New York. Pence.	Edinburgh. Pence.
Income,	28·39	10·88
Food Expenditure,	10·05	7·29
Rent,	4·60	1·40
For General Expenses,	13·74	2·19

* Calculated from figures given in Bulletin 46.

In Edinburgh	Food	absorbs	62	per cent.	of the Income.
„ New York	„	„	35	„	„
In Edinburgh	Rent	„	13	„	„
„ New York	„	„	15	„	„

B. Labouring Classes with Irregular Incomes.

We have shown under what very hard and trying conditions the thrifty and self-denying poor manage to live, and the study of this class clearly shows how impossible it is for the unthrifty, or for families in which the father is even a moderate drinker, far less a drunkard, to maintain a decent existence. As we have pointed out, the difficulties of making investigations on such families have proved almost insurmountable. Again and again a study was commenced, and was brought to an abrupt termination. But Study VI. gives some idea of the state of things, and of the hopelessness of bringing up a healthy family on the inadequate means which is left, if even a small sum is habitually devoted to drink.

And yet we know that in our town there are hundreds of families, the head or heads of which indulge not moderately, but immoderately, in drink. Can there be any wonder that the children are puny, and that the adults are poorly developed and inefficiently equipped for the struggle for existence?

CONCLUSIONS.

These investigations seem then to show that the craving for the energy in food required for growth, heat production, and for work, must be obeyed, and that at all costs a more or less adequate diet must be secured. They further show that the present rate of expenditure on food leaves an altogether too scanty margin for the other necessities of life, and practically nothing for recreation and amusement.

But our studies indicate what can be done by a really clever housewife who takes pains to select a suitable diet. It has been shown that a fairly good diet can be procured for 4d. per man per diem, while the average price paid is about 7d.

We have no great hopes that the thriftless, drunken, incapable class will be benefited by instruction, nor do we think that the well-to-do labouring class will be amenable to improvements, but our experience has convinced us that the steady, thrifty poor, who feel the difficulty of making both ends meet, would appreciate and would benefit by simple instruction on the rules of dieting.

We would suggest that as a first step simple tables might be published and distributed, showing :—

1st. The amount of work-producing power which can be purchased for 1d. in the more common foods.

2nd. The amount of flesh-forming material which is also got in these foods for the same sum.

If district visitors, and other workers among the poor, could receive some elementary instruction in the principles of dietetics, and could be supplied with such tables, they might assist in diffusing the knowledge of which so many stand in need.

We cannot here discuss the question of whether the establishment of cooking-shops to supply the food at a low price ready for immediate consumption, would be taken advantage of, but we fear the prejudices of the people are against them.

It may be said that these studies but confirm what everyone who has to do with the very poor, knows only too well. But "knowledge" based upon mere opinion, and not upon actual facts,

is no true knowledge, and we are strongly of the opinion that before any suggestions of remedial measures are advanced, definite information and evidence must be forthcoming. This we have attempted to supply in our Studies of the Diets of the Labouring-Classes in Edinburgh, and we hope that similar investigation will be carried out in other towns and in rural districts. Money expended in procuring such information is most soundly invested.

APPENDIX A.

—o—

Food Materials in Dietary Study No. 1.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (flank)	1	1·08	765·57	142·40	152·30	...
Mutton (flank)	5	·33	312·57	43·13	115·34	...
Ham	10	·37	285·39	41·38	94·75	...
Eggs	12	1·66	1,425·00	169·58	132·53	...
Kippered Herring	25	·53	698·18	123·60	18·16	...
Findon Haddock	28	·17	235·00	43·90	...	...
Milk (sweet)	13	3·12	10,920·00	360·36	436·80	546·00
Cheese	19	·33	199·32	55·22	73·45	8·18
Butter	22	1·75	647·79	6·48	550·63	...
Suet	21	·12	172·14	8·10	140·82	...
Dripping	29	·10	140·43	...	137·20	...
Total (Animal)	...	9·56	15,801·39	994·17	1851·98	554·18
Vegetable—						
Oatmeal	53	·25	679·50	109·40	48·92	438·70
Sugar	60	1·00	3,057·75	...	...	3,057·75
Sago	63	·04	113·25	10·20	·50	88·45
Lentils	64	·20	453·00	116·40	4·50	268·20
Barley	58	·12	362·40	30·80	3·10	281·94
Rice	59	·10	366·93	29·35	1·10	289·87
Syrup	62	·41	1,019·25	...	...	706·34
Flour	52	·16	425·82	48·54	4·25	243·14
Currants	65	·33	453·00	10·90	7·70	336·12
Raisins	66	·20	226·50	5·21	6·80	155·15
Potatoes	55	·77	7,533·39	135·60	7·50	1,107·40
Vegetables (as cabbage)	56	·25	2,129·10	29·80	42·58	102·20
Bread	50	2·50	10,138·14	932·71	131·80	5,383·35
Cakes	67	·25	285·39	17·10	25·69	180·65
Total (Vegetable)	...	6·58	27,243·42	1476·01	284·44	12,659·26
Total	...	16·14	43,044·81	2470·18	2136·42	13,213·44

Food Materials in Dietary Study No. 2.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (flank)	1	2·95	2178·93	405·28	433·60	...
Ham	10	1·00	453·00	65·70	150·40	...
Eggs	12	1·00	684·00	81·40	63·61	...
Butter	22	1·00	552·16	5·52	469·33	...
Dripping	29	·08	81·54	...	79·66	...
Milk (sweet)	13	1·12	3866·50	127·59	154·66	193·32
„ (Nestlé's)	15	·50	380·00	34·20	51·30	195·70
Findon Haddock	28	·40	453·00	84·71	...	...
Cheese (Cheddar)	19	·40	253·68	70·26	93·35	10·40
Sausages (beef)	11	·60	480·08	53·76	159·86	...
Total (Animal)	...	9·05	9382·89	928·42	1655·77	399·42
Vegetable—						
Bread	50	2·00	7873·14	724·35	102·35	4180·60
Oatmeal	53	·50	1386·18	223·17	99·80	935·67
Sugar	60	·70	2065·68	...	...	2065·68
Barley	58	·10	253·68	21·56	27·90	197·36
Rice	59	·20	285·39	22·83	·85	225·45
Vegetables (as cabbage)	56	·45	3886·74	54·41	7·70	186·56
Potatoes	55	·60	5947·89	107·06	5·94	874·33
Total (Vegetable)	...	4·55	21,698·70	1153·38	244·54	8665·65
Total	...	13·60	31,081·59	2081·70	1900·31	9065·07

Food Materials in Dietary Study No. 3.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Mutton (flank) . .	5	·87	625·14	86·26	230·67	...
Beef (flank) . . .	1	·75	679·50	126·38	135·22	...
„ (mince) . . .	2	·87	679·50	154·24	135·90	...
Ham	10	·83	566·25	82·10	187·99	...
Sausages (Beef) . .	11	1·00	453·00	50·73	150·84	...
Tripe	18	·50	906·00	127·74	28·08	...
Suet	21	·17	113·25	5·32	92·63	...
Herrings (salt) . .	24	·12	339·75	64·21	49·60	...
Cheese (Cheddar) . .	19	·50	339·75	94·10	125·02	13·92
Eggs (6) . . .	12	·58	342·00	40·69	31·80	...
Milk	13	1·33	4,480·00	147·84	179·20	224·00
Butter	22	1·12	652·32	6·52	554·47	...
Total (Animal) . .	...	8·64	10,176·46	986·13	1901·42	237·92
Vegetable—						
Rolled Oats . . .	54	1·00	2,491·50	416·06	181·87	1,649·37
Oat Meal . . .	53	·16	453·00	72·93	32·61	305·77
Bread (white) . .	50	3·41	16,366·89	1505·74	212·76	8,690·81
„ (brown) . .	51	·08	425·82	22·99	7·66	200·56
Flour	52	·29	792·75	90·37	7·92	452·66
Potatoes	55	1·00	9,513·00	171·23	9·51	1,389·41
Vegetables (as cabbage) .	56	·19	366·93	5·13	·73	17·61
Barley	58	·08	226·50	19·25	2·49	176·21
Peas	57	·08	226·50	55·71	2·26	140·43
Jam	61	·41	792·75	4·75	·79	669·87
Sugar	60	·50	1,698·75	...	...	1,698·75
Total (Vegetable) .	...	7·20	33,354·39	2364·16	458·60	15,391·45
Total	...	15·84	43,530·85	3350·29	2360·02	15,629·37

Food Materials in Dietary Study No. 4.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (flank)	1	·50	339·75	63·19	67·61	...
„ (steak)	3	·83	425·82	77·07	98·36	...
„ (mince)	2	·29	226·50	51·41	45·30	...
Mutton (flank)	5	1·16	792·50	109·36	292·43	...
„ (chops)	7	·33	226·50	27·63	44·39	...
Ham	10	·25	113·25	16·40	37·58	...
Liver	17	·16	254·68	51·42	7·89	6·36
Suet	21	·16	199·32	9·36	163·02	...
Herring	24A	·16	254·68	28·51	9·92	...
Cod	27	1·00	906·00	151·30	2·71	...
Findon Haddock	28	·29	453·00	84·71	...	...
Eggs	12	·58	399·00	47·48	37·10	...
Butter	22	1·12	480·18	4·80	408·08	...
Milk (sweet)	13	·62	2,100·00	69·30	84·00	101·00
„ (skim)	14	·50	3,360·00	114·24	10·08	171·36
„ (condensed)	15	·37	285·00	25·65	38·47	146·77
Total (Animal)	...	8·32	10,816·18	931·83	1346·94	425·49
Vegetable—						
Bread	50	1·33	10,083·78	927·70	131·08	5,354·44
Oatmeal	53	·29	933·18	149·22	67·18	629·84
Sugar	60	·52	1,499·43	...	...	1,499·43
Rice	59	·16	425·82	34·06	1·27	336·39
Barley	58	·08	212·91	18·09	2·34	165·63
Vegetables (as cabbage)	56	·08	1,676·10	23·46	3·35	80·45
Potatoes	55	·50	5,154·14	92·77	5·15	757·65
Jam	61	1·08	1,925·15	11·55	1·92	1,626·70
Peas	57	·08	212·91	52·37	2·12	131·99
Scones	50	·75	1,304·64	54·79	16·95	692·74
Onions	56A	·08	453·00	6·34	·90	21·74
Total (Vegetable)	...	4·95	23,881·06	1370·35	232·26	11,297·00
Total	...	13·27	34,697·24	2302·18	1579·20	11,722·49

Food Materials in Dietary Study No. 5.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Mutton (neck) . . .	7	·66	906·00	110·53	177·50	...
Beef (flank)	1	1·50	2,038·50	379·16	405·60	...
Ham	10	·46	226·50	32·84	75·19	...
Cod	27	·25	906·00	151·30	2·70	...
Herring	23	·25	761·44	85·27	29·69	...
Eggs	12	·62	342·00	40·69	31·80	...
Milk	13	1·16	3,920·00	129·36	146·80	196·00
Cheese	19	·50	339·65	94·06	124·10	13·92
Margarine	22	·83	480·18	4·80	408·17	..
Dripping	29	·25	366·93	...	358·46	...
Total (Animal) . .	...	6·48	10,287·20	1028·01	1760·01	209·92
Vegetable—						
Oatmeal	53	·50	1,383·50	221·36	96·83	933·86
Sugar	60	·16	1,812·00	...	..	1,812·00
Bread	50	3·10	12,061·30	1085·50	156·79	6,404·55
Vegetables	56	·66	5386·20	75·40	10·77	258·53
Lentils	64	·20	453·00	116·42	4·53	318·17
Barley	58	·08	226·50	21·25	1·49	176·21
Potatoes	55	·33	3171·00	57·08	3·17	466·13
Semolina (as flour) . .	52	·29	453·00	51·64	4·53	258·66
Arrowroot („) . .	69	·08	58·90	...	...	57·15
Total (Vegetable) . .	...	5·40	25,005·40	1628·65	278·11	10,685·26
Total	...	11·88	35,292·60	2656·66	2038·12	10,895·18

Food Materials in Dietary Study No. 6.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (mince) . . .	2	·25	253·68	57·60	50·72	...
Mutton	5	·16	113·25	15·62	41·77	...
Beef	1	1·16	1612·68	299·96	320·92	...
„ (ribs)	1	·20	453·00	84·25	90·14	...
Ham	10	·70	398·64	57·80	132·34	...
Haddock	26	·20	126·84	10·65	·25	...
Cod	27	·50	906·00	151·30	2·71	...
Eggs	12	1·00	798·00	94·96	74·21	...
Butter	22	·38	167·61	1·67	142·46	...
Cream	13A	·08	28·00	·70	5·18	1·26
Milk	13	·33	1120·00	36·96	44·80	56·00
Sausages	11	1·04	1019·25	114·15	339·39	...
Total (Animal) . .	...	6·00	6996·95	925·62	1244·89	57·26
Vegetable—						
Bread (white) . . .	50	1·79	7,560·57	695·56	98·28	4014·66
„ (brown) . . .	51	·06	172·14	9·29	3·09	81·05
Sugar	60	·33	1,145·07	...	...	1145·07
Oatmeal	53	·35	1,639·86	263·00	118·06	1106·86
Flour	52	·04	199·32	22·72	1·99	113·80
Potatoes	55	·29	1,812·00	32·61	1·81	266 36
Vegetables	56	·45	2,604·75	36·46	5·20	125·02
Total (Vegetable) . .	...	3·31	15,133·71	1259·64	228·43	6852·82
Total	...	9·31	22,130·66	2185·26	1473·32	6910·08

Food Materials in Dietary Study No. 7.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (stewing steak) . .	3	2·75	1866·36	337·81	431·12	...
,, (flank)	1	2·12	1870·89	347·98	372·30	...
,, (mince) . . .	2	1·00	1109·85	251·93	221·97	...
Corned beef	1A	·16	113·25	16·19	26·95	...
Ham	10	·66	453·00	65·68	150·39	...
Liver	17	·33	480·18	96·99	14·88	12·04
Sausages (beef) . . .	11	·25	226·50	25·68	75·42	...
Suet	21	·00	226·50	10·64	185·27	...
Cod (salt)	27	·37	679·50	113·47	2·38	...
Findon Haddock . . .	28	·83	1132·50	211·77	...	...
Eggs (18)	12	1·50	1026·00	122·09	95·41	...
Milk	13	2·33	7840·00	261·92	313·60	392·00
Butter milk	13B	·16	4536·00	136·08	22·68	217·72
Butter	22	2·00	1359·00	13·59	1155·15	...
Total (Animal) . .	...	14·46	22,919·53	2011·82	3067·52	621·76
Vegetable—						
Bread	50	8·25	39,637·50	3646·65	515·28	21,047·51
Potatoes	55	1·04	12,031·68	216·57	12·03	1,768·65
Sugar	60	2·08	7,474·50	...	...	7,474·50
Flour	52	·58	1,585·50	180·74	15·85	905·32
Barley	58	·16	453·00	38·50	4·98	352·43
Vegetables (as cabbage) .	56	·43	2,776·89	38·76	5·55	133·29
Total (Vegetable) . .	...	12·54	63,959·07	4121·22	553·69	31,681·70
Total	...	27·00	86,878·60	6133·04	3621·21	32,303·46

Food Materials in Dietary Study No. 8.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef (stewing) . . .	1	1·25	226·50	42·12	45·07	...
Mince	2	·25	135·90	30·84	27·18	...
Potted Head . . .	16	·16	185·73	21·91	18·79	...
Rice Soup	32	·16	567·00	6·31	·56	45·00
Ham	10	·25	312·57	45·32	103·75	...
Bacon	10	·20	226·50	32·84	75·19	...
Fish (herring) . . .	23	·08	126·84	14·20	4·94	...
„ (white) . . .	26	·75	3270·66	274·73	6·54	...
Dripping	29	·04	27·18	...	26·55	...
Margarine	22	·12	167·61	1·67	142·46	...
Milk	13	·20	700·00	23·10	28·00	35·00
Butter milk	13B	·04	1134·00	34·02	5·67	54·43
Eggs	12	·08	114·00	13·56	10·60	...
Total (Animal) . .	...	3·91	8553·49	540·62	495·30	134·43
Vegetable—						
Bread	50	·66	3,311·43	304·65	43·04	1758·36
Sugar	60	·23	860·70	...	...	860·70
Potatoes	55	·31	3,416·67	61·50	3·41	502·24
Rice	59	·04	140·43	11·23	·42	110·93
Vegetables	56	·20	2,088·33	29·23	4·17	100·03
Oatmeal	53	·10	878·82	141·48	63·27	593·20
Peas	57	·02	70·20	17·26	·70	43·52
Barley	58	·02	70·23	5·96	·77	54·63
Total (Vegetable) . .	...	1·58	10,836·81	571·31	115·78	4023·61
Total	...	5·49	19,390·30	1111·93	611·08	4158·04

Food Materials in Dietary Study No. 10.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
		Shillings.	Grams.	Grams.	Grams.	Grams.
Animal—						
Steak (stewing)	1	4·58	2,038·50	368·96	470·89	...
Potted Meat	16B	·33	398·64	94·07	110·42	...
Mince	2	1·25	679·50	154·24	135·90	...
Suet	21	...	339·75	15·96	277·91	...
Sausages	11	1·75	1,359·00	152·20	452·54	...
Liver	17	·50	679·50	137·25	21·06	16·98
Bacon	10	·91	453·00	43·03	269·08	...
Butter (fresh)	22	2·08	733·86	7·33	623·78	...
„ (salt)	22	·58	226·50	2·26	192·52	...
Eggs	12	3·41	3,078·00	366·28	286·25	...
Milk	13	2·58	8,680·00	286·25	347·20	434·00
Cheese	20	·29	226·50	67·04	86·74	...
Total (Animal)	...	18·26	18,892·75	1694·87	3274·29	450·98
Vegetable—						
Sugar	60	·81	2,431·61	...	...	2,431·61
Oatmeal	53	·54	1,585·50	255·26	114·15	1,070·21
Flour	52	·12	339·75	38·73	3·39	193·99
Onions	56A	·25	906·00	12·68	2·71	80·63
Jam	61	1·54	1,812·00	10·87	1·81	1,531·14
Semolina	52	·16	312·57	34·38	4·37	238·49
Potatoes	55	·37	3,284·25	59·11	3·28	482·78
Carrot and Turnip	56	·08	339·75	4·75	·67	16·30
Bread	50	3·29	12,063·39	1109·82	156·83	6,405·61
Tea-bread	50A	·66	1,898·07	127·17	182·21	1,374·20
Total (Vegetable)	...	7·82	24,972·89	1652·77	469·42	13,824·96
Total	...	26·08	43,865·64	3347·64	3743·71	14,275·94

Food Materials in Dietary Study No. 11.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Liver	17	·50	679·50	137·25	27·64	16·98
Steak	3	·33	226·50	40·99	52·32	...
Eggs (30)	12	1·25	1710·00	213·49	159·03	...
Milk	13	·81	2730·00	90·09	109·20	136·50
Ham	10	·62	566·25	82·10	187·99	...
Butter	22	1·08	819·93	8·19	696·94	...
Lard	29A	·25	226·50	4·98	212·91	...
Cheese	20	·62	679·50	201·13	260·24	...
Fish	26	·29	453·00	38·05	·90	...
Mince	2	·25	226·50	51·41	45·30	...
Total (Animal)	...	6·00	8317·68	867·68	1752·47	153·48
Vegetable—						
Sugar	60	·93	2,731·93	...	...	2,731·93
Oatmeal	53	·06	113·25	18·23	8·15	76·44
Bread	50	3·25	13,137·00	1208·60	170·78	6,975·74
Rhubarb	49	·16	2,038·50	8·15	8·15	44·84
Onions	56A	·08	453·00	6·34	1·35	40·31
Potatoes	55	·50	4,756·50	85·61	4·75	699·20
Pastry	50B	·25	453·00	30·35	43·48	327·97
Total (Vegetable)	...	5·23	23,683·18	1357·28	236·66	10,896·43
Total	...	11·23	32,000·86	2224·96	1989·13	11,049·91

Food Materials in Dietary Study No. 12.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Ham	10	1·50	2,423·89	351·46	804·73	...
Butter	22	·50	679·50	6·79	577·57	...
Milk (Condensed)	15	·25	245·67	22·11	33·16	126·52
Milk	13	·58	1,960·00	64·68	78·40	98·00
Butter milk	13B	·41	6,804·00	204·12	34·02	326·59
Mince	2	·25	226·50	51·41	45·30	...
Beef	1	1·66	4,983·00	926·83	991·61	...
„ (frying)	3	·50	453·00	81·99	104 64	...
Eggs (12)	12	·58	484·00	57·59	45·01	...
Cheese	20	·29	226·50	67·04	86·74	...
Total (Animal)	...	6·52	18,486·06	1834·02	2801·18	551·11
Vegetable—						
Bread	50	3·18	17,327·25	1594·10	225·25	9,200 76
Sugar	60	·33	1,159·68	...	...	1,159·68
Potatoes	55	·33	2,944·50	53·00	2·94	432·84
Vegetables (as Cabbage)	56	·25	1,359·00	19·02	2·71	65·23
Jam	61	·16	113·25	·67	·11	95·69
Rice	59	·16	453·00	36·24	1·35	357·89
Total (Vegetable)	...	4·41	23,356·68	1703·03	232·36	11,312·09
Total	...	10·93	41,842·74	3537·05	3033·54	11,863·20

Food Materials in Dietary Study No. 13.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Mutton Chops	5A	·33	172·14	40·79	31·84	...
Sausage Roll	...	·20	226·50	41·22	44·62	...
Sausages	11	·60	453·00	50·73	150·84	...
Beef	1	1·66	1,132·50	210·64	225·36	...
Mutton	5	1·12	1,019·25	140·65	376·10	...
Salt Round	1B	1·45	1,132·50	135·90	582·10	...
Suet	21	·16	113·25	5·32	92·63	...
Fresh Cod	27	·95	1,925·25	321·51	5·77	...
Fresh Haddock	26	·25	679·50	57·07	1·35	...
Tinned Salmon	27A	·54	453·00	88·33	33·97	...
Butter	22	2·16	851·64	8·51	723·89	...
Cheese	20	·77	566·25	167·61	216·87	...
Eggs	12	1·00	798·00	94·96	74·21	...
Ham	10	·91	1,078·14	156·33	357·94	...
Milk (skimmed)	14	1·95	6,580·00	223·72	19·74	335·58
,, (sweet)	13	·25	840·00	27·72	33·60	42·00
Veal	4	1·66	1,812·00	280·86	143·14	...
Total (Animal)	...	15·96	19,832·92	2051·87	3113·97	377·58
Vegetable—						
Oatmeal	53	1·08	3,456·39	555·47	248·86	2,333·06
Sugar	60	·91	3,225·36	...	...	3,225·36
Jam	61	·89	1,925·25	11·55	1·92	1,626·83
Bread (white)	50	3·33	15,823·29	1455·74	205·70	8,402·16
,, (brown)	51	·41	1,558·32	84·14	28·04	733·96
Potatoes	55	1·20	3,977·00	71·58	3·97	584·61
Lentils	64	·16	453·00	116·42	4·53	268·17
Vegetables (as Cabbage)	56	·50	2,781·42	38·93	5·56	133·70
Syrup	62	·20	453·00	10·87	...	313·92
Buns	50A	·16	625·14	41·88	60·01	452·60
Currants	65	·08	113·25	2·71	1·92	84·03
Raisins	66	·12	113·25	2·60	3·39	76·56
Flour	52	·29	1,585·50	180·74	15·85	905·32
Total (Vegetable)	...	9·33	36,090·17	2572·63	579·75	19,140·28
Total	...	25·29	55,923·09	4624·50	3693·72	19,517·86

Food Materials in Dietary Study No. 14.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Soup	32	·41	3402·00	37·42	3·40	265·35
Meat	1	3·08	2151·75	400·22	428·19	...
Butter	22	·79	289·92	2·89	236·42	...
Milk	13	1·06	3570·00	117·81	142·80	178·50
Eggs	12	·75	513·00	61·04	47·70	...
Total (Animal) . .	...	6·09	9926·67	619·38	858·51	443·85
Vegetable—						
Bread	50	5·56	23,895·75	2198·4	310·64	12,688·64
Sugar	60	·68	2,378·25	...	...	2,378·25
Potatoes	58	·58	3,171·00	57·07	3·17	466·13
Total (Vegetable) . .	...	6·82	29,445·00	2255·47	313·81	15,533·02
Total	...	12·91	39,371·67	2874·85	1172·32	15,976·87

Food Materials in Dietary Study No. 15.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef	1	·83	679·50	126·38	135·22	...
Steak	3	1·41	906·00	163·98	209·28	...
Chop	7	·58	453·00	55·26	88·78	...
Mince	2	·45	453·00	102·83	90·60	...
Liver	17	·16	226·50	45·75	7·02	5·66
Sausages	11	·60	906·00	101·47	301·69	...
Ham	10	2·75	1,531·14	232·01	508·33	...
Butter	22	1·29	652·32	6·52	554·47	...
Cheese	20	1·00	679·50	201·13	260·24	...
Eggs (11)	12	1·25	627·00	74·61	58·31	..
Herring	23	·16	679·50	76·10	26·50	...
Milk (Condensed)	15	...	253·40	22·80	34·20	130·50
Milk	13	1·81	6,090·00	200·97	243·60	304·50
Total (Animal)	...	12·29	14,136·86	1409·81	2518·24	440·66
Vegetable—						
Flour	52	·29	765·57	87·27	7·65	437·14
Oatmeal	53	·25	738·39	118·88	53·16	498·39
Potatoes	55	·66	6,369·18	114·64	6·36	936·26
Vegetables (as Cabbage)	56	·25	2,043·03	28·60	4·08	98·06
Barley	58	·08	226·50	19·25	2·49	176·21
Bread	50	4·33	15,542·43	1429·90	202·05	8,253·03
Onions	56A	·12	906·00	12·68	2·71	80·63
Lentils	64	·16	453·00	116·42	4·53	268·17
Sugar	60	·89	2,631·93	...	...	2,631·93
Cake	67	·75	679·50	42·80	61·15	430·12
Jam	61	·75	906·00	5·43	·90	765·57
Total (Vegetable)	...	8·53	31,261·53	1975·87	345·08	14,575·51
Total	...	20·82	45,398·39	3385·68	2963·32	15,016·17
Beverages, &c.	...	1·16	339·75	...	...	...

Food Materials in Dietary Study No. 16.

Kind of Food Material.	Analysis Reference.	Total Cost.	Weight Used.			
			Total Food Material.	Nutrients.		
				Protein.	Fat.	Carbo-hydrates.
Animal—		Shillings.	Grams.	Grams.	Grams.	Grams.
Beef	1	·35	313·60	58·80	62·72	...
Milk	13	·23	840·00	25·84	33·60	42·00
Butter	22	·18	89·60	·89	76·16	...
Total (Animal)	...	·76	1243·20	85·53	172·48	42·00
Vegetable—						
Barley	58	·09	196·00	16·24	1·68	152·88
Bread	50	·23	840·00	77·84	11·20	436·80
Peas	57	·03	302·40	75·60	2·60	187·60
Leek and Carrot	56	·04	313·60	4·39	·62	15·05
Total (Vegetable)	...	·39	1652·00	174·07	16·10	792·33
Total	...	1·15	2895·20	259·60	188·58	834·33

APPENDIX B.

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Analyses used in Dietary Studies.

A. Animal Food.

Those marked "A" are from "American Food Materials" by Atwater and Bryant, Bulletin 28 (Revised Edition), U.S. Department of Agriculture, 1899.

Those marked "O" are from original Analyses made in the College of Physicians' Laboratory. The number of Analyses made is given.

Kind of Food.	Analysis Number.	Source of Analysis.	Proteid.	Fat.	Carbo-hydrates.
Beef (flank)	1	A., p. 21	18·6	19·9	...
„ (mince)	2	O., 2	22·7	20·0	...
„ (rump)	3	A., p. 25	18·1	23·1	...
Veal	4	A., p. 31	15·5	7·9	...
Mutton (flank)	5	A., p. 35	13·8	36·9	...
„ (loin)	5A	A., p. 36	23·7	18·5	...
„ (neck)	7	A., p. 36	12·2	19·6	...
Ham	10	A., p. 41	14·5	33·2	...
Sausages (beef)	11	O., 3	11·2	33·3	...
Eggs	12	A., p. 53	11·9	9·3	...

A. Animal Food—*continued.*

Kind of Food.	Analysis Number.	Source of Analysis.	Proteid.	Fat.	Carbo-hydrates.
Milk (whole)	13	A., p. 55	3·3	4·0	5·0
,, (skimmed)	14	A., p. 55	3·4	·3	5·1
,, (Nestlé) *	15	‡ O., 1	9·0	13·5	51·5
Cream	13A	A., p. 55	2·5	18·5	4·5
Liver	17	A., p. 28	20·2	3·1	2·5
Tripe	18	O., 2	14·1	3·1	...
Cheese (Cheddar)	19	A., p. 54	27·7	36·8	4·1
,, (American)	20	A., p. 54	29·6	38·3	...
Suet	21	A., p. 29	4·7	81·8	...
Butter	22	A., p. 54	1·0	85·0	...
Herring (fresh)	24A	A., p. 47	11·2	3·9	...
,, (salt)	24	O., 2	18·9	14·6	...
,, (kipper)	25	O., 4	17·7	2·6	...
Haddock (fresh)	26	A., p. 47	8·4	·2	...
,, (Findon)	28	O., 2	18·7	...	...
Cod	27	A., p. 46	16·7	·3	...
Dripping	29	O., 2	...	97·7	...
Potted Head	16	O., 2	11·6	12·1	...
Butter milk †	13B	O.,	3·0	·5	4·8
Soup *	32	O.,	1·1	·1	7·8
Lard	29A	A., p. 55	2·2	94·0	...
Corned Beef	1A	A., p. 30	14·3	23·8	...
Salt Round	1B	A., p. 30	12·0	51·4	...
Tinned Salmon	27A	A., p. 51	19·5	7·5	...
Potted Meat	16B	O.,	23·6	27·7	...

* Report on Prison Dietaries, 1899, p. 30.
† Report on Prison Dietaries, 1899, p. 21.
‡ Also Analyses from *Scottish Analyst.*

B. Vegetable Food.

(All from American Food Stuffs.)

Kind of Food.	Analysis Number.	Source of Analysis.	Proteid.	Fat.	Carbo-hydrates.
Bread (white)	50	A., p. 61	9·2	1·3	53·1
,, (brown)	51	A., p. 59	5·4	1·8	47·1
Cakes	67	A., p. 63	6·3	9·0	63·3
Flour	52	A., p. 58	11·4	1·0	57·1
Oatmeal	53	A., p. 56	16·1	7·2	67·5
Rolled Oats	54	A., p. 54	16·7	7·3	66·2
Potato	55	A., p. 68	1·8	·1	14·7
Vegetables (as cabbage)	56	A., p. 66	1·4	·2	4·8
Peas (dried)	57	A., p. 67	24·6	1·0	62·0
Rice (,,)	59	A., p. 57	8·0	·3	79·0
Barley (,,)	58	A., p. 56	8·5	1·1	77·8
Sugar	60	A., p. 65	...	...	100·0
Jam (as marmalade)	61	A., p. 74	·6	·1	84·5
Syrup (Molasses)	62	A., p. 64	2·4	...	69·3
Sago	63	A., p. 64	9·0	·4	78·1
Lentils	64	A., p. 67	25·7	1·0	59·2
Currants	65	A., p. 73	2·4	1·7	74·2
Raisins	66	A., p. 73	2·3	3·0	68·5
Arrowroot	69	A., p. 64	...	...	97·0
Onions	56A	A., p. 67	1·4	·3	8·9
Tea-bread (as cookies)	50A	A., p. 63	6·7	9·6	72·4
Rhubarb	49	A., p. 68	·4	·4	2·2

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