

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report

of

Committee on Examination

This is to certify that we the undersigned, as a committee of the Graduate School, have given Mary Campbell Nye final oral examination for the degree of Master of Science . We recommend that the degree of Master of Science be conferred upon the candidate.

Minneapolis, Minnesota

May 26 1921

Alice Biester

Chairman

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C. A. Morrow

THE UNIVERSITY OF MINNESOTA

GRADUATE SCHOOL

Report
of
Committee on Thesis

The undersigned, acting as a Committee
of the Graduate School, have read the accompanying
thesis submitted by Mary Campbell Nye
for the degree of Master of Science.

They approve it as a thesis meeting the require-
ments of the Graduate School of the University of
Minnesota, and recommend that it be accepted in
partial fulfillment of the requirements for the
degree of Master of Science.

Alice Biester

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A STUDY OF CERTAIN FACTORS RELATING
TO THE MANAGEMENT AND TO THE FOOD IN
A GROUP OF CHILDREN'S HOMES

A Thesis submitted to the
Faculty of the Graduate School of the
University of Minnesota

by

Mary Campbell Nye

In partial fulfillment of the requirements

for the degree of

Master of Science

June 1921.

MOM
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A STUDY OF CERTAIN FACTORS RELATING TO THE
MANAGEMENT AND TO THE FOOD IN A GROUP OF CHILDREN'S HOMES

INTRODUCTION

The Social Service Directory of Minneapolis, published by the Council of Social Agencies, lists a group of institutions conducted for the purpose of providing for the needs of children who are deprived, temporarily or permanently, of the shelter, care and training of the home. The purposes of these institutions are variously stated as follows:

- 1) "Provides temporary home for dependent children".
- 2) "Extends help and protection to children deprived of adequate material comforts, care and moral supervision".
- 3) "A home to care for children until they can be placed in family homes".
- 4) "Home for boys between the ages of four and thirteen".
- 5) "Home for girls between the ages of three and fourteen".
- 6) "Home for orphans and neglected and dependent children".
- 7) "Home for orphans and destitute children".
- 8) "Emergency home for children under nine years of age".
- 9) "Temporary home for needy children".
- 10) "Home for orphan and half-orphan children of the State of Minnesota".

These homes have a combined total capacity of about one thousand children. Some are operated by denominational organizations, e.g., Catholic, Episcopal, Lutheran and Jewish. Most of them have some limitation such as age for the particular type of children received. In general, however, their aims and purposes - and to some extent, their plan of organization - are much the same. They are supported, principally, by voluntary contributions and all provide homes for dependent but healthy children.

All aim to be, as far as possible, "homes" rather than "institutions", but the success with which this ideal is attained is necessarily determined largely by the personality of the one directly responsible for the organization of the household. The dividing line between the large family and the small institution, considered from the standpoint of the number of persons involved, is somewhat difficult to determine, and this particular group of homes, on the borderland between the private home and the institution, partakes somewhat of the nature of each. To provide a home for a child means much more than to provide suitable clothing, wholesome food and sanitary living conditions. These are desirable and necessary factors but they do not include the activities in the average home designed to prepare the child, physically, mentally and morally, for the duties and the responsibilities of citizenship. Any institution - large or small - is forced to acknowledge its limitations when comparing its activities with those of a well conducted home. On the other hand, the division of labor possible in the organization of the larger group may develop such an efficiency in the conduct of its affairs that the disadvantages may be largely if not quite offset by the advantages.

To those directly concerned with the management of these homes there are many questions constantly arising concerning some of the phases of these organizations. Is the food supply adequate? Are the funds of the institution wisely distributed? Is the organization of helpers efficient? Are supplies purchased with intelligence and economy? For the four homes selected for investigation there was little definite information available by means of which criticisms or questions could be answered although the need for such reliable information had long been felt.

So far as known, no study of a group of children's homes has been reported. Hence there has been no material available by means of which local conditions could be compared with any previously developed standard. A few dietary studies have been reported from scattered sources in this country and in Europe, giving results of investigations of food provided for groups of orphan children. From the nature and amount of food recorded, and from the comments relating thereto, one can glean something of the conditions under which the homes were operated, but apparently no attempt has been made to consider any aspect of the management of the home except that relating to the consumption of food. This investigation has therefore been made with a two-fold purpose in view:

- 1) To develop a plan for the study of these and similar institutions, by means of which significant factors may be observed and the results recorded for future comparisons.
- 2) To present the findings in such a way that they may be of assistance to the institutions themselves.

It was evident from the first that each institution had traditions and ideals peculiar to itself and developed through many years of experience. Therefore, widely divergent methods of organization and of operation were to be anticipated. It was hoped, however, that, out of the seeming differences, much that was desirable would prove to be the common possession of all of the institutions studied. It was decided that the purposes of the study could be best accomplished by directing the investigations along five distinct lines, each of the following calling for a particular method of treatment:

- 1) Observations of a general nature on the size of the institution, the equipment and the like.

- 2) A comparative study of the organization of service as developed in each institution.
- 3) A compilation of data concerning the weights and heights of the children studied.
- 4) Studies determining the character and amount of food consumed.
- 5) Analyses of expenditures for one year, together with per capita costs of caring for the children in the several homes.

For purposes of identification and discussion, the four institutions chosen will be designated as Home A, Home B, Home C and Home D. A questionnaire and other type-written forms were prepared in order that the data might be collected in a convenient and uniform manner with the greatest economy of time for all persons concerned. Copies of all forms used may be examined by referring to the Appendix. In Homes A, B, and C, from seven to ten days were required to collect the data reported for each home, the writer going to the home on each of the several successive days and devoting as many hours as seemed necessary for securing the data required. In Home D, where a dietary study was not made, only two visits were necessary. The writer wishes to acknowledge with gratitude the kindly welcome extended to her in each of the homes studied, and the hearty cooperation which was given not only by those in charge of the homes but also by the various workers whose time and duties were somewhat disturbed during the progress of the investigation. In Homes A, C and D especially, there were numerous evidences of a desire to assist in the investigation and to be helped by the findings of the study.

GENERAL DATA

In Table 1 will be found in condensed form, information of a miscellaneous nature which will help to describe various aspects of the homes under consideration.

Table 1 General Data Showing Character of Each Home

	A	B	C	D
I. Management:				
Administrative				
Public or private	Private	Private	Private	Private
Denominational	-	+	-	+
Official in charge, resident	-	+	+	+
Office secretary	+	-	-	+
Financial				
Sources of income				
Membership dues	+	+	-	+
Voluntary contributions	+	+	+	+
Donations	+	+	+	+
Board	+	+	+	-
Investments	+	+	-	-
Total annual income, 1920	\$ 28312	\$ 17913	\$ 12863	\$ 18905
Highest salary paid	\$ 2100	\$ 480*	\$ 660	\$ 1500
Bills paid mostly by check	+	+	+	+
Purchase of supplies				
Wholesale order, monthly	+	+	+	+
Local purchases, daily	+	+	+	+
II. Building and Grounds				
Area	10 city lots	90 acres	6 (?) city lots	3 (?) city lots
Building	brick	brick	frame	frame
Fire protection	+	+	+	+
Approximate no. of rooms	40	45	30	25
III. Residents				
Maximum capacity (children)	60	70	42	42
Number of children at time of study	33	59	35	40
Number of adults at time of study	17	12	12	9
Number of persons employed	20	13	12	8
Entrance requirements for children				
Social discriminations	-	-	-	-
Age qualification	+	+	+	+
Physical condition	+	+	+	+

*Plus maintenance of two adults.

Table 1 (continued) General Data Showing Character of Each Home

	A	B	C	D
IV. Equipment				
Professional				
Administrative office	+	-	-	+
Training school for nurses	+	-	-	-
Kindergarten	-	-	+	+
Service				
Children's beds	Single	Single	Single	Single
Bathrooms sufficient in no.	+	+	+	+
Dining rooms	2	2	2	1
Main kitchen				
Size (approximate)	15' x 18'	20' x 20'	12' x 15'	15' x 20'
Well lighted	+	+	+	+
Gas stove, no. burners	4	hotel size solid top	4	12
Coal range	+	-	-	-
Fireless cooker	+	+	+	+
Refrigerator	+	+	+	+
Labor saving devices				
Bread cutter	-	-	-	+
Dish washer	-	-	+	-
Diet kitchen for nursery	+	-	+	-
Laundry and cleaning				
Laundry in basement	+	+	+	+
Steam laundry equipment	+	-	-	-
Washing machine	-	+	+	+
Steam drier	+	-	+	-
Mangle	+	+	-	+
Electric irons	+	-	+	+
Vacuum cleaner	+	+	-	-
V. Specially trained employees				
Office secretary	+	-	-	+
Trained nurse	+	-	+	-
Dietitian	-	-	-	-
House manager	-	-	-	-
Kindergartner	-	-	+	-

ORGANIZATION OF SERVICE

In studying the organization of the service, an attempt has been made to find the answer to each of the following questions:

- 1) How many persons are actually employed?
- 2) What are the exact duties of each person?
- 3) To whom is each person responsible?
- 4) For whom is each person responsible?

In general, the organization is much the same for each of the homes as will be seen by a study of the accompanying charts¹⁻⁴⁻¹¹⁻¹²⁻¹³⁻¹⁴. In each case the main responsibility for the successful operation of the home rests with one person vested with authority from the Board of Directors but with duties varying from those which are purely executive to those which involve for the most part, the abilities of a competent housekeeper. In the latter case, the term "House Manager" would seem to express more nearly the type of duties involved, - general supervision of the home, children and servants, marketing, planning the meals, and the like. This is the case in Homes B, C, and D, but in Home A, the duties of the superintendent are purely executive. In each home, three well-defined groups of workers are apparent. One of these groups takes care of the routine duties of housekeeping, including cooking, care of the rooms, laundry and cleaning. A second group performs the duties of nursing and caring for the small children. The third group, although small in numbers, is none the less important, consisting of the engineers or janitors whose duties are as varied as are the personalities involved and the special needs of each home. The operation of the heating plant, care of the grounds, numerous jobs of carpentering, and the care of cows, chickens and garden are among the various duties of the "janitors". These three groups are shown particularly well in the charts for Homes A and C. In Home D the

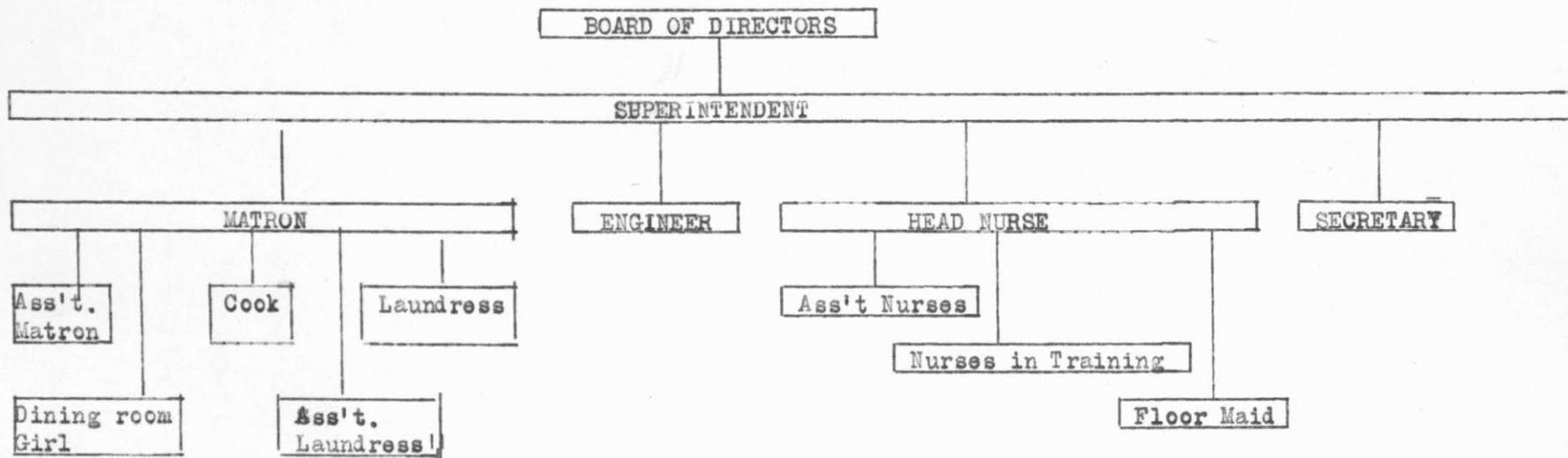


Chart 1, Showing Organization of Service in Home A

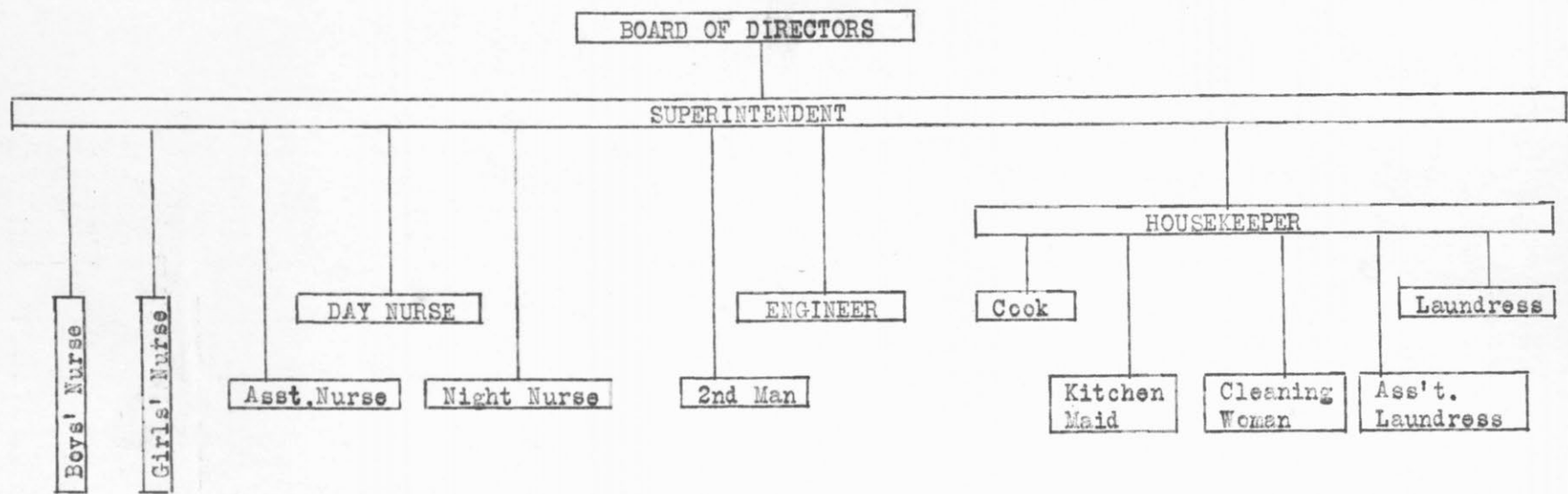


Chart 2, Showing Organization of Service in Home B

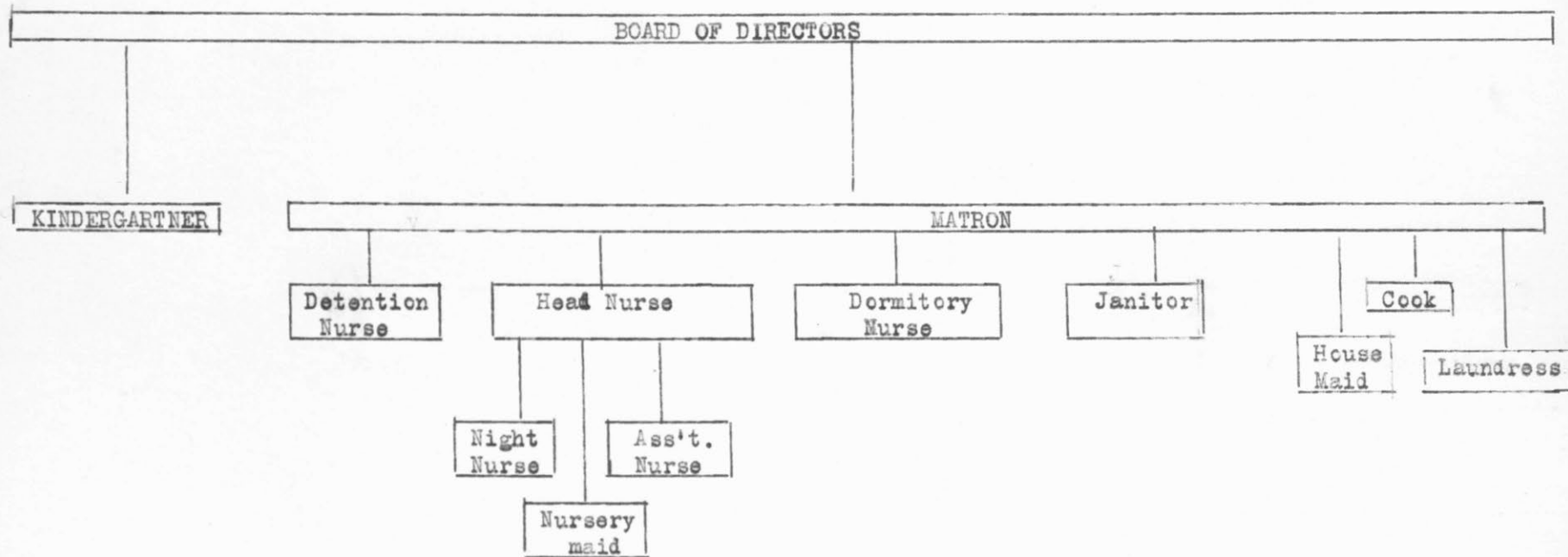


Chart 3, Showing Organization of Service in Home C

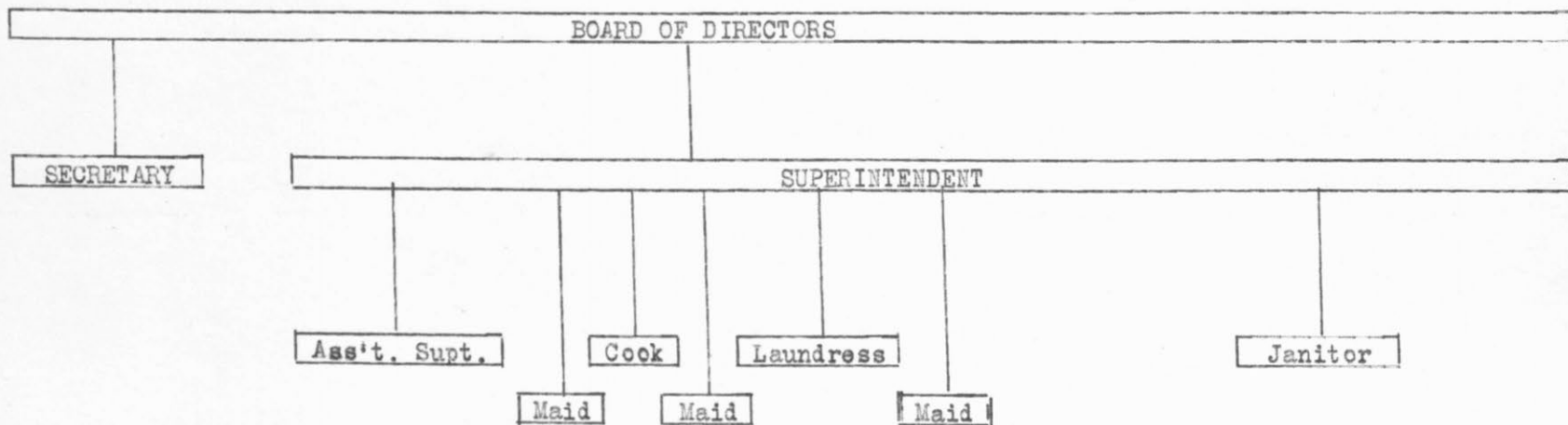


Chart 4, Showing Organization of Service in Home D

"nursing and nursery" group is of less importance because no children under three years of age are cared for at this home, and the care of the children is distributed among the other workers.

The care of the records and correspondence is managed in various ways. In Homes A and D a secretary who lives outside the home is employed. However, there is a big difference in the responsibilities attached to the position in the two homes. In the former, the position is more nearly that of a stenographer, while in the latter it is more comparable to that of a superintendent. In the latter case, too, it will be noticed that the secretary is directly responsible to the Board of Directors. In only one of the homes is there an educational group represented. It is the policy of all of these homes, as is generally the case throughout the country in the operation of homes of this character, to have the children attend the public schools as far as possible, and as each of these homes is conveniently near a public school, there is little occasion for educational activities within the homes. Nevertheless, a successful kindergarten is operated in connection with Home C. Half-day sessions are held throughout the year, including the summer, and it is obvious that the kindergarten teacher is in a position to render a real service in the way of helping to care for the younger children and in directing their play.

It is interesting to note that none of the homes has a regularly employed seamstress although it is evident that there is much sewing and mending to be done at all times. Certain organizations of women, e.g., the Sunshine Society, meet from time to time at some of the homes, where the women donate their services for the day in sewing on garments and household linen. In addition to this, a number of the women employed in the homes devote part of their time to the mending. The plan of having one

person employed whose duties would be mainly those of a seamstress is being considered in at least one of the homes.

On the whole, the duties of the various employees seemed to be rather well defined and the machinery of the household moved easily and smoothly. Home B proved to be the exception to this general statement, for it was difficult to differentiate here between the duties of superintendent and housekeeper; the duties of the second man were somewhat ill-defined; and much of the work of the household was being done by women who were temporarily employed by the day. In fact, during the week of this study, every effort was being made but without success to secure persons for the following positions: cook, two laundresses, cleaning woman, kitchen maid and nursery maid. The writer saw no reason for thinking that this situation was an unusual one for this home. If such is the case, it would seem that an inquiry would not be out of place to determine, if possible, the reason for the frequent turnover of labor in this particular home. From the above, it is evident that the picture shown in the **chart** for Home B represents an organization which is ideal rather than one actually existing at the time of the study.

It is hardly possible to compare the wages paid for the same type of service rendered, owing to the fact that in several instances a nominal salary is paid but in addition to this sum, maintenance is provided for members of the workers' families. For instance, it was found that nine children and two adults were living in Home B at the time of this study, their living being provided as part of the compensation for the services of the mothers. This fact should be kept in mind when comparing the percentages of expenditures as shown in the table given later in this discussion. In Home A, on the other hand, where the salaries average considerably higher

than in any of the other homes, there were no members of the employees' families living in the home at the time of the study. The highest wages paid for the different types of service are as follows:

House Manager	\$ 1000
Cook	600
Laundress	540
Maid	480
Engineer	1080
Nurse	1080

It is of interest to note in conclusion that very few of the persons engaged in service in these homes have had any special training for the particular type of service in which they are engaged. In Home A, the head nurse is a graduate nurse with several years' experience; the same thing is true of two of the nurses in Home C. All of the other nurses are merely "practical" nurses. On the other hand, of those responsible for the various household duties, none has had any technical training in home or institutional management. In each case the person has been selected for the position on the basis of successful housekeeping experience elsewhere.

HEIGHT AND WEIGHT DATA

With a total of one hundred sixty-seven children in the four homes studied, it was decided that the assembling together of data relating to the heights and weights of the children might be of value as an addition to the available information on this subject and as one measure of the adequacy of the diet.

In the past much emphasis has been placed on the relationships believed to exist between height and age and between weight and age for growing children. Of late, however, computations based upon these relationships have been proved to be entirely inadequate in the formation of standards by which the growth of the child may be measured, and at the present time those persons who have given the matter the most serious and careful consideration are in full agreement with the conclusions of Benedict and Talbot (1921): "After a careful consideration of various relationships between height, weight and age, we are convinced that the best ratio to indicate the normal state of nutrition is that of height to weight." The same opinion is expressed by Holt (1918): "In childhood less attention has been paid to this relationship (weight to height) than its importance deserves; and even though there are no absolute figures of weight to height which can be regarded as normal, and there are considerable individual variations seen in healthy subjects, yet these variations from the average are not so great but that they furnish important information regarding the nutrition of the child."

Many studies have recently been made for the purpose of securing more definite information concerning the relations between the heights and weights of American children. The work of Dr. Robert M. Woodbury, Director of Statistical Research, of the Federal Children's Bureau is particularly significant. Dr. Woodbury's tables, based upon measurements of 167,024 white chil-

dren, are unfortunately not yet in published form but a copy of the most important tables, enclosed in a personal communication, made it possible to compare these figures with those compiled from several other sources. The frequently quoted tables of Crum (1916), Gray (1917) and Holt (1918), together with the tables published by the Child Health Organization of New York, the Nutrition Clinics for Delicate Children of Boston, and those of Benedict and Talbot (1921) were examined. It was apparent that there was a rather general agreement among the different authorities as to the weight which should be considered normal for each height. In this connection, the writer was interested to note in the Journal of Home Economics for April 1921, (News from the Field), a brief report of a conference of seven organizations called by Dr. Holt for the purpose of preparing a uniform table of heights and weights for children of all ages. It was the decision of this conference that "there was substantial agreement between the various tables now in use, the difference being chiefly a matter of presentation and statement". Plans were accordingly formulated by these organizations for the preparation of a new table combining the results of previous investigations.

Of the many tables available at the present time, the one prepared for use in the Boston Nutrition Clinics was selected as being the most conveniently arranged for purposes of comparison. A copy of this table will be found in the Appendix. It must be borne in mind that in all recent tables of this kind, every attempt is made to distinguish between normal weights and average weights, and as the normal figures become more standardized and malnutrition in children becomes less prevalent than it is at the present time, the normal weights will more nearly approach those which may be considered as ideal for the American child.

In collecting the data for this study, the children under four years of age were weighed without clothing in most cases, but where this was not possible, an allowance of one pound was made for the clothes which the child wore, as it was found, by the actual weighing of the clothes of several children that there was little if any variation from this weight. The figures for Home B and Home D were taken from the measurements made under the supervision of the matrons. In the latter case, the records of heights and weights for the past three months were available, but in the other homes there was no weight record for the older children. In Homes A and C, the children in the nurseries were weighed regularly.

In Tables 2, 3, 4 and 5 the children in the four homes have been listed according to their ages. The age, the height, the weight, the normal weight for height, the per cent above or below the normal weight for the height, the length of time in the institution and the nationality are recorded for each child. Table 6 gives the distribution of the children in each of the homes according to the number and percent of children who are under weight, normal and over weight. The main interest in the table centers about the two columns in which are recorded the number of children 7% or more underweight and ^{the} number 10% or more underweight.

While authorities are agreed that the height-weight standard is the one which best indicates the child's state of nutrition, they have not yet come to an agreement as to how much variation from the normal is to be permitted in deciding whether a particular child is to be classed as well-nourished or mal-nourished. Most of the writers on the subject agree with Dr. Holt (1918): "To consider as under-nourished any child who falls 10% or more below the normal average is a workable standard and may be adopted in practice until

Table 2 Relation of Weights to Heights of Children in Home A

Age		Height (in.)	Weight (lb.)	Normal Weight for Height	Percent Variation from Nor- mal Weight	Length of Time in Institu- tion	Nationality
Boys							
1	3½ mo.	18	7.5	(12.5)	-67	2 mo.	Italian
2	4 mo.	24.5	13	13.2	-2	1 mo.	Norwegian- Bohemian
3	4 mo.	23.5	10.1	17.7	-37	3 mo.	American
4	4 mo.	24.5	11.3	13.2	-14	1 mo.	- - - -
5	8 mo.	23.5	10.4	11.7	-9	6 mo.	American
6	8 mo.	24	11.5	12.5	-8	4 mo.	- - - -
7	10½ mo.	27	16.8	16.9	0	7 mo.	Scotch
8	1 yr.	29	20	20.2	-1	7 mo.	Swedish
9	1 yr.	26.75	17	16.2	+4	10 mo.	Swedish
10	1 yr. 1 mo.	25	15.2	13.9	+9	8 mo.	Swedish
11	1 yr. 2½ mo.	29.5	20.3	20.7	-2	1 mo.	Irish
12	2 yr. 4 mo.	33	30	25.9	+16	1 yr. 2 mo.	Bohemian
13	2 yr. 9½ mo.	32	25.3	24.5	+3	2 yr. 5 mo.	- - - -
14	4 yr. 11 mo.	40.5	40	38.9	+4	1 yr.	Negro
15	5 yr. 4 mo.	44	49	45.4	+10	1 mo.	Norwegian
16	8 yr. 3 mo.	45	47	47.1	0	1 mo.	Norwegian
17	11 yr. 3 mo.	57.5	85.5	76.5	+11	9 mo.	Finnish
18	11 yr. 9 mo.	55	80	75.9	+7	1 mo.	Norwegian
19	13 yr.	57	80	82.8	-3	1 mo.	Norwegian
Girls							
1	1 mo.	18	4.9	8	-39	1 mo.	Scandinavian
2	5½ mo.	23	12	11	+8	1 mo.	Irish
3	6½ mo.	25	12.5	14	-9	1 mo.	Italian
4	1 yr.	26	19.1	15.5	+30	7 mo.	Swedish
5	1 yr. 1½ mo.	24	8.9	12.5	-24	6 mo.	Irish
6	1 yr. 2½ mo.	28	18.4	18.8	-2	10 mo.	American
7	1 yr. 4 mo.	27	18.9	17.2	+10	7 mo.	Scandinavian
8	1 yr. 6 mo.	31	23.7	23.4	+2	7 mo.	- - - -
9	2 yr. 2 mo.	28.5	20.7	19.6	+6	1 yr. 10 mo.	American
10	2 yr. 11 mo.	35	31.9	28.6	+11	1 yr. 10 mo.	German
11	5 yr. 5 mo.	40.75	42	39.6	+6	2 mo.	American
12	9 yr. 1 mo.	47.	52	50.9	+2	1 mo.	French
13	9 yr. 4 mo.	52.5	63	65.8	-4	2 mo.	Finnish
14	14 yr. 6 mo.	58.5	92	88.8	+4	1 mo.	Norwegian

Table 3 Relation of Weights to Heights of Children in Home B

	Age	Height (in.)	Weight (lb.)	Normal Weight for Height	Percent Variation from Nor- mal Weight	Length of Time in Institu- tion	Nationality
Boys							
1	8 $\frac{1}{2}$ mo.	33	31.5	25.9	+22	1 yr. 3 mo.	American
2	1 yr. 3 $\frac{1}{2}$ mo.	33	31	25.9	+20	3 mo.	American
3	2 yr. 2 $\frac{1}{2}$ mo.	39.25	42.5	36.7	+16	2 yr.	American
4	2 yr. 5 $\frac{1}{2}$ mo.	34.5	29.25	27.3	+8	4 mo.	- - - -
5	2 yr. 11 mo.	35	27.75	30	-8	7 mo.	German
6	3 yr. 2 $\frac{1}{2}$ mo.	33	31.5	25.9	+22	1 yr. 5 mo.	American
7	3 yr. 3 $\frac{1}{2}$ mo.	37	35.75	31.6	+13	3 mo.	Scotch
8	4 yr. 5 mo.	37	33.25	31.6	+5	5 mo.	Scotch
9	4 yr. 8.5 mo.	38	39	33.2	+14	3 yr. 7 mo.	Swedish
10	4 yr. 9 mo.	39	34.5	36.3	-5	1 yr. 7 mo.	- - - -
11	4 yr. 10 $\frac{1}{2}$ mo.	38	38.5	33.2	+16	3 yr. 7 mo.	American
12	5 yr. 3 mo.	40.25	43.5	38.2	+5	4 mo.	English- Irish
13	5 yr. 7 $\frac{1}{2}$ mo.	42.5	46	43.5	+5	5 yr.	German
14	6 yr.	40.5	33	38.4	-14	7 mo.	German
15	6 yr. 4 mo.	45	50.75	47.1	+8	5 yr. 11 mo.	American
16	6 yr. 6 $\frac{1}{2}$ mo.	40	36	38.1	-5	5 yr. 11 mo.	Swedish
17	6 yr. 10 $\frac{1}{2}$ mo.	47	47.5	47.8	0	5 yr. 1 mo.	Swedish- American
18	7 yr. 2 mo.	48	54.2	53	+2	1 yr. 1 mo.	Norwegian- French
19	7 yr. 6 $\frac{1}{2}$ mo.	46	55.5	49.5	+12	11 mo.	Norwegian
20	7 yr. 10 mo.	50	53.75	59.6	-10	7 yr. 10 mo.	American
21	8 yr. 1 $\frac{1}{2}$ mo.	46	52.2	49.5	+7	2 yr. 5 mo.	American
22	8 yr. 7 $\frac{1}{2}$ mo.	45.5	54.6	48.2	+13	4 mo.	American
23	9 yr. 5 mo.	46	56	49.5	+11	6 yr. 11 mo.	Swedish
24	9 yr. 7 mo.	53.5	67.75	70	-5	1 yr.	Swedish
25	9 yr. 9 $\frac{1}{2}$ mo.	51.5	73.75	62.5	+18	1 yr. 11 mo.	Norwegian- French
26	9 yr. 10 mo.	49	67.25	55.4	+21	4 mo.	American
27	10 yr. 9 mo.	51.5	62.2	63.7	-2	5 yr. 1 mo.	Swedish- American
28	11 yr. 2 mo.	56.5	68.75	80.8	-14	3 mo.	American
29	11 yr. 3 $\frac{1}{2}$ mo.	60.25	71	96	-26	4 mo.	American
30	12 yr. 5 mo.	53.25	59.25	69	-14	2 yr. 5 mo.	American
31	13 yr. 11.5 mo.	58	75	86.6	-13	7 yr. 1 mo.	Swedish

Table 3 (continued) Relation of Weights to Heights of Children in Home B

Girls	Age	Height (in.)	Weight (lb.)	Normal Weight for Height	Percent Variation from Nor- mal Weight	Length of Nationality Time in Institu- tion	
1	11½ mo.	28	23	18.8	+22	4 mo.	English- Irish
2	2 yr. 9½ mo.	33.5	26.5	26.6	0	8 mo.	German
3	4 yr. 5½ mo.	40	37.25	37.4	-14	4 yr. 6 mo.	American
4	4 yr. 9 mo.	37.25	37.75	31.7	+12	1 yr. 5 mo.	American
5	4 yr. 9½ mo.	42	44.75	41.2	+9	3 mo.	Scotch- American
6	5 yr. 7½ mo.	43	44.5	43.1	+3	4 mo.	Norwegian
7	6 yr. ½ mo.	38	30	32.7	-8	1 yr. 10 mo.	American
8	6 yr. 6 mo.	44.5	47	45.2	+4	11 mo.	American
9	6 yr. 7 mo.	48	51	55.8	-9	3 mo.	Scotch- American
10	7 yr. 1½ mo.	48.75	56.25	56.8	-1	3 yr. 7 mo.	Swedish
11	7 yr. 10½ mo.	43	40	43.1	-10	10 mo.	American
12	7 yr. 11 mo.	47	52.5	50.9	+3	10 mo.	Norwegian
13	7 yr. 11 mo.	48	50.25	53.3	-7	5 mo.	American
14	9 yr. 2 mo.	49.5	52.5	56.4	-7	5 mo.	American
15	9 yr. 3 mo.	52	60.75	66.8	-9	2 yr. 5 mo.	American
16	9 yr. 3 mo.	50	60.25	58.3	+3	1 yr. 3 mo.	Dutch
17	9 yr. 6 mo.	51.5	60.5	62.5	-3	2 yr. 5 mo.	American
18	9 yr. 8 mo.	49.75	53.5	56.8	-6	5 mo.	American
19	10 yr. 7 mo.	50.5	64.25	59.7	+8	1 mo.	American
20	10 yr. 7 mo.	52.5	75.5	66.3	+14	1 yr. 7 mo.	American
21	10 yr. 7½ mo.	51.5	63.5	62.7	0	1 yr. 3 mo.	Dutch
22	11 yr. 1 mo.	59.25	92.75	92.4	0	10 mo.	Norwegian
23	11 yr. 11 mo.	52.5	65	66.3	0	1 yr. 3 mo.	Dutch
24	12 yr. 1 mo.	55.25	78	75.5	+3	2 yr. 5 mo.	American
25	12 yr. 2 mo.	50	57.25	58.3	-1	6 yr. 1 mo.	Swedish
26	12 yr. 5½ mo.	57.75	79.75	83.5	-4	1 yr. 1 mo.	American
27	15 yr. 3½ mo.	65.5	125	133.5	-6	2 yr. 5 mo.	American
28	16 yr. 1 mo.	62.75	113.5	113.9	0	4 yr. 8 mo.	American

Table 4 Relation of Weights to Heights of Children in Home C

	Age	Height (in.)	Weight (lb.)	Normal Weight for Height	Percent Variation from Nor- mal Weight	Length of Time in Institu- tion	Nationality
Boys							
1	1 yr.	31.25	23	23.5	0	7 mo.	Jewish
2	1 yr. 2 $\frac{1}{2}$ mo.	29.5	20.5	21	-2	2 mo.	- - -
3	1 yr. 5 mo.	32	24.7	24.5	0	1 mo.	- - -
4	1 yr. 8 mo.	31.5	19.5	23.9	-14	2 mo.	- - -
5	?	32	27.7	24.5	+13	1 mo.	- - -
6	?	34	23.9	27.3	-12	1 mo.	Swedish
7	2 yr. 1 mo.	32	20.8	24.5	-11	6 mo.	Swedish
8	2 yr. 7 mo.	35.5	25	29.1	-14	7 mo.	Polish
9	2 yr. 9 mo.	33.5	27	28	-4	2 mo.	American
10	2 yr. 11 mo.	37.5	39	32.4	+23	1 mo.	- - - -
11	4 yr.	39.5	34	37.1	-8.	10 mo.	American
12	4 yr. 6 mo.	42.5	45.5	42.6	+7	1 yr. 6 mo.	- - -
13	4 yr. 6 $\frac{1}{2}$ mo.	39.5	34.8	37.2	-7	1 mo.	American
14	4 yr. 11 mo.	38	31.25	33.2	-7	2 mo.	American
15	5 yr. 2 $\frac{1}{2}$ mo.	41.25	43	40.2	+5	1 yr. 8 mo.	- - -
16	5 yr. 11 mo.	45.25	46.25	47.4	-3	1 yr. 6 mo.	Swedish
17	6 yr. 10 $\frac{1}{2}$ mo.	45.25	43	47.4	-9	4 mo.	American
18	8 yr. 6 $\frac{1}{2}$ mo.	52	64	65.8	-3	1 mo.	American
19	9 yr.	53.25	69	69.2	0	1 yr. 6 mo.	Swedish
20	9 yr. 5 mo.	53.25	63	69.2	-9	1 mo.	American
21	11 yr. 8 mo.	54.5	66	72.7	-9	1 mo.	Norwegian
22	12 yr. 9 mo.	57	77.5	82.8	-6	4 yr. 9 mo.	American
23	14 yr. 10 mo.	61	97	99.3	-2	4 yr. 9 mo.	American
Girls							
1	4 mo.	24.5	13	13	0	1 mo.	- - -
2	5 mo.	26	11.5	15.5	-25	2 mo.	Polish
3	1 yr.	28	18.5	18.8	0	1 mo.	- - -
4	1 yr. 6 mo.	29.5	15.4	21	-27	9 mo.	Jewish
5	2 yr. 8 mo.	32.25	22.2	25	-9	10 mo.	- - -
6	4 yr. 2 $\frac{1}{2}$ mo.	37.75	33.25	32	+4	10 mo.	American
7	4 yr. 9 $\frac{1}{2}$ mo.	37.5	34	31.9	+7	10 mo.	American
8	5 yr. 10 mo.	43.25	43.5	45.5	-4	3 mo.	American
9	7 yr. 2 mo.	45	44.75	46.4	-4	3 mo.	American
10	7 yr. 5 mo.	46.25	48	48.8	0	2 mo.	American
11	7 yr. 8 mo.	48	57	53.3	+7	1 yr. 7 mo.	Swedish
12	9 yr. 1 $\frac{1}{2}$ mo.	52.25	64.5	65.3	0	10 mo.	American

Table 5 Relation of Weights to Heights of Children in Home D

Age			Height (in.)	Weight (lb.)	Normal Weight for Height	Percent Variation from Nor- mal Weight	Length of Time in Institu- tion	Nationality
Boys								
1	3 yr. 10 mo.		39.5	38	37.2	0	7 mo.	Jewish
2	4 yr. 3 mo.		37	30	31.6	-5	2 mo.	Jewish
3	4 yr. 3 mo.		39	34	36.3	-6	1 yr. 5 mo.	Jewish
4	5 yr. 5 mo.		44.5	50	59.6	-16	1 yr. 1 mo.	Jewish
5	5 yr. 6 mo.		46	46	49.5	-7	1 yr. 1 mo.	Jewish
6	6 yr.		46.5	45	50.5	-10	1 yr. 8 mo.	Jewish
7	6 yr. 3 mo.		44	44	45.4	-4	1 yr. 9 mo.	Jewish
8	7 yr. 5 mo.		48.5	63	54	+10	3 mo.	Jewish
9	7 yr. 8 mo.		48	58	53	+9	9 mo.	Jewish
10	7 yr. 9 mo.		48	60	53	+13	1 yr. 10 mo.	Jewish
11	7 yr. 11 mo.		50	63	59.6	+6	1 yr. 1 mo.	Jewish
12	8 yr. 8 mo.		49	61	55.4	+10	3 mo.	Jewish
13	9 yr. 4 mo.		51	68	62.5	+9	11 mo.	Jewish
14	10 yr. 1 mo.		50	63	59.6	+5	2 mo.	Jewish
15	10 yr. 3 mo.		55.5	85	77.3	+8	9 mo.	Jewish
16	11 yr. 7 mo.		55	73	75.4	-3	1 yr. 3 mo.	Jewish
17	11 yr. 10 mo.		55.5	73	77.3	-6	1 yr. 10 mo.	Jewish
18	12 yr. 8 mo.		52.5	75	67.3	+10	9 mo.	Jewish
Girls								
1	4 yr. 6 mo.		41	41	39.8	+3	8 mo.	Jewish
2	4 yr. 9 mo.		38.5	35	33.1	+11	8 mo.	Jewish
3	4 yr. 9 mo.		41	35	39.8	-12	1 mo.	Jewish
4	4 yr. 10 mo.		40	37	38.1	-3	1 yr. 8 mo.	Jewish
5	4 yr. 11 mo.		41	40	39.8	0	8 mo.	Jewish
6	5 yr. 1 mo.		39.5	38	37.2	+2	7 mo.	Jewish
7	5 yr. 4 mo.		45.5	41	48.2	-14	1 mo.	Jewish
8	6 yr.		46.5	47	48.8	-3	8 mo.	Jewish
9	6 yr. 5 mo.		46	46	49.5	-7	1 yr. 8 mo.	Jewish
10	6 yr. 7 mo.		48	49	53	-8	1 yr. 10 mo.	Jewish
11	6 yr. 10 mo.		47	50	51.4	-3	1 mo.	Jewish
12	7 yr. 7 mo.		50	63	59.6	+6	7 mo.	Jewish
13	7 yr. 8 mo.		48	46	53	-13	1 yr. 8 mo.	Jewish
14	7 yr. 9½ mo.		50	57	59.6	-4	1 yr. 8 mo.	Jewish
15	8 yr. 10 mo.		48	54	53	+2	1 yr. 10 mo.	Jewish
16	9 yr. 5 mo.		50	56	59.6	-6	1 yr. 8 mo.	Jewish
17	10 yr. 9 mo.		55.5	73	77.4	-6	1 yr. 1 mo.	Jewish
18	11 yr. 2 mo.		53	71	68.9	+4	1 yr. 1 mo.	Jewish
19	11 yr. 9 mo.		55	70	75.4	-7	1 yr. 8 mo.	Jewish
20	12 yr.		57.5	95	85	+12	2 mo.	Jewish
21	13 yr. 2 mo.		57	90	82.8	+8	1 yr. 1 mo.	Jewish
22	14 yr. 3 mo.		60	92	95.2	-3	1 yr. 1 mo.	Jewish

Table 6 Distribution of Children According to Number and Percent of Children Under- and Overweight

Place of residence	Children, normal or less than 7% underweight		Children 7 to 9.9% underweight		Children 10% or more than 10% underweight		Children less than 10% overweight		Children 10% or more than 10% overweight		Total number of children
	No.	%	No.	%	No.	%	No.	%	No.	%	
	Home A	8	24.2	3	9.1	5	15.2	11	33.3	6	
Home B	16	27.1	6	10.2	8	13.6	14	23.7	15	25.4	59
Home C	15	42.9	7	20.0	6	17.1	5	14.3	2	5.7	35
Home D	14	35.0	4	10.0	5	12.5	11	27.5	6	15.0	40
Average		32.3		12.3		14.6		24.7		16.1	

further experience throws more light on the subject." Smith (1919) and Roberts (1919) make substantially the same comment. On the other hand, Emerson (1919) makes the dividing line 7%. Richardson (1921) considers both lines of division: "One-third of all the children in the United States are at least 7%, and many of them 10%, and even much more than this, below the weight that is normal for their age and height."

Since there is still considerable difference of opinion regarding the limits of weight -to- height variations, consistent with the well-being of children, Table 6 has been so arranged that comparisons with other tables based upon either the 7% or the 10% scale may be easily made. Thus it will be seen that in the four homes under consideration, 14.6% of the total number of children are under weight to the extent of 10% or more, while an additional 12.3% or 26.9% of the total number are at least 7% under weight.

All the data available from other sources indicate that a high percentage of children who are malnourished is characteristic of practically every group of children that has been studied, and that the condition is just as prevalent in Europe as in our own country. The following table indicates briefly the results recorded from various sources.

Table 7 Percentage of Children in Various Groups
Who are Underweight

Place	No. of Children Examined	Underweight		Date of Publication	Author
		7%	10%		
New York City	All School Children		21%	1917	Roberts
New York City	900		31.8%	1919	Gordon & Bartley
Boston	3000	18%		1919	Emerson
Kansas City, Mo.	All from One School		41%	1920	Brown
Evanston, Ill.	2250		17%	1921	Emmis

The results of many similar investigations are cited by Bryant (1913), but unfortunately without comment as to the basis of determining malnutrition. New York, Chicago, Philadelphia, Boston and St. Paul are included in this survey and all show high percentages of undernourished children. From unpublished figures on record in the office of the Women's Community Council of Minneapolis collected during the past two years, it is estimated that 25% of all Minneapolis school children are more than 10% below normal weight.

In view of the figures given above, the fact that a rather high percentage (26.9%) of children in these homes are at least 7% under weight cannot be interpreted as an indication that these children are more poorly nourished than children of similar ages in private homes. The ~~preceding~~ data in Tables 8 and show the percentage of weight variation from the normal in relation to the length of residence. These furnish no justification for concluding that the length of time during which the children have been under the care of the home is a factor in determining the percentages of children within the range of 7% or 10% under weight for height, and therefore to be considered under the term "malnourished".

Improper feeding is only one of many factors that are recognized as contributing causes to the condition described by the general term of "malnutrition". Improper food habits, insufficient sleep, over fatigue, and lack of proper child training are specific causes of malnutrition which can be controlled in the institutional home quite as readily as in the private home. Other common causes of malnutrition such as defective teeth, diseased tonsils, adenoids, and various diseases need to be controlled here as carefully as in the private home - if possible, even more carefully.

Table 8 Distribution of Children According to Per Cent Under-
or Overweight and According to Length
of Residence in Home A

Length of residence in months	Number of children					Totals
	Normal or less than 7% under-weight	7 to 9.9% under-weight	10% or more than 10% under-weight	Less than 10% over-weight	10% or more than 10% over-weight	
0.0 - 2.9	5	1	3	5	1	15
3.0 - 5.9	2	2	1			5
6.0 - 8.9			1	2	2	5
9.0 - 11.9	1			1	1	3
12.0 - 17.9				1	1	2
18.0 - 23.9				2	1	3
Totals	8	3	5	11	6	33

Home B

0.0 - 2.9				1		1
3.0 - 5.9		3	2	5	5	15
6.0 - 9.9	2	1	1			4
10.0 - 11.9	1		1	2	1	5
12.0 - 17.9	4			2	3	9
18.0 - 23.9	1	1			2	4
24.0 - 35.9	2	1	1	2	1	7
36.0 - 47.9	1				2	3
48.0 - 59.9	1		1			2
60.0 - 71.9	3			2		5
72.0 or more	1		2		1	4
Totals	16	6	8	14	15	59

Home C

0.0 - 2.9	7	4	3		2	16
3.0 - 5.9	2	1				3
6.0 - 9.9	1		3			4
10.0 - 11.9	1	2		2		5
12.0 - 17.9						
18.0 - 23.9	2			3		5
24.0 - 35.9						
36.0 - 47.9						
48.0 - 59.9	2					2
Totals	15	7	6	5	2	35

Table 8 (continued), Distribution of Children According to Per Cent Under- or Overweight and According to Length of Residence in

Home D

Length of residence in months	Number of children					Totals
	Normal or less than 7% under-weight	7 to 9.9% under-weight	10% or more than 10% under-weight	Less than 10% over-weight	10% or more than 10% over-weight	
0.0 - 2.9	2		2	1	1	6
3.0 - 5.9				3	1	7
6.0 - 8.9	3			3	1	4
9.0 - 11.9			1	3		9
12.0 - 17.9	4	1	1	1	1	12
18.0 - 23.9	5	3	2			
Totals	14	4	5	11	6	40

To this end it is strongly recommended that all of the children in these homes be given frequent and rigid physical examinations by the attending physicians and that the most careful records be kept of the heights and weights of the children so that symptoms of malnutrition may be promptly and effectively treated by removing the contributing causes. That the institutional home has a distinct advantage over the ordinary home in its opportunity for overcoming the effects of early malnutrition is the hopeful message of Dr. Emerson (1919): "Where there is complete control of the patient during the whole of the twenty-four hour period, as in a child-helping institution, recoveries may occur in nearly 100% of all cases".

FOOD

Dietary StudiesPurpose

The purpose of the dietary studies was to determine if the food supplied in the homes was adequate in amount and of such a nature as to furnish the materials necessary for growing children. The investigations were therefore such that the degree to which the following requirements were met could be quantitatively studied:

1. Protein requirement
2. Mineral requirement (calcium, phosphorus, iron) .
3. Energy requirement

The present status of our knowledge concerning vitamins is such that this aspect of the adequacy of the diets could be studied qualitatively, only.

Method

In the dietary studies, the usual procedure was followed. On a certain day, between two consecutive meals, all the food in the kitchen was carefully weighed. The following morning and each morning thereafter during the progress of the study all the additional food supplied for the day's needs, either by purchase or from the store-room, was also weighed. The sum of the amount on hand at the beginning and of the amounts added each day gave the total amount of food available during the time of the study. After the last meal during the period, all the food which remained in the kitchen was weighed. When the amount of the final inventory was subtracted from the total amount available, the remainder represented the total amount of food used. Computations were then made, based on tables of percentage composition secured from various standard sources, but chiefly from those given by Sherman (1917). For each food, the total weights of the four constituents, protein, calcium,

phosphorus and iron, were calculated, and the number of Calories furnished in each case was also determined. Wherever necessary the "edible portion" was computed from amounts "as purchased" according to the method suggested by Rose (1919). From these data, the total amounts were determined for all food used during the stated time.

A certain amount of the food actually prepared for the table was returned to the kitchen as "edible waste". In two of the dietaries, this was weighed, as was also the "refuse" which consisted of the vegetable parings, bones and other materials which are not edible but which are nevertheless included in the regular supply as purchased. However, since it was not possible to analyze the edible waste, the usual allowance of 10% was made for it. This amount when deducted from the previous totals left the total amount of food actually consumed during the whole number of days.

In order to compute the daily allowance of food per person, it was necessary to apply certain factors by which the physiological needs of all the persons included in the dietary could be reduced to the commonly accepted unit, the number of "man meals" per day. The factors so used are given in Table 9, which is based upon the caloric requirements for different ages and sexes proposed by Holt and Fales (1921). The factors to be used in each case were obtained by computing the ratios for the caloric requirements for boys, girls and women, to the 3265 Calories required for the adult man. The whole number of meals was then reduced to the number of meals for one man. By dividing the "man meals" by 3, the number of "man days" provided by each dietary was determined.

In Tables 10, 11 and 12, will be found the total number of meals taken in each of the three dietaries, together with the equivalent number of "man days".

Table 9 Data Concerning Caloric Requirements for Children
and Factors Derived Therefrom.

Age in Years	Caloric Requirements		Ratio of Caloric Require- ment to 3265 Calories		Factors Used	
	Boys	Girls	Boys	Girls	Boys	Girls
1	950 Cal.	940 Cal.	.2909	.2878	0.3	0.3
2	1135	1110	.3476	.3399	0.3	0.3
3	1275	1230	.3904	.3767	0.4	0.4
4	1380	1300	.4227	.3981	0.4	0.4
5	1490	1410	.4563	.4318	0.5	0.4
6	1600	1520	.4900	.4655	0.5	0.5
7	1745	1660	.5343	.5084	0.5	0.5
8	1920	1815	.5880	.5544	0.6	0.6
9	2110	1990	.6463	.6095	0.6	0.6
10	2330	2195	.7137	.6722	0.7	0.7
11	2510	2520	.7688	.7718	0.8	0.8
12	2735	2864	.8377	.8772	0.8	0.9
13	3040	3210	.9311	.9831	0.9	1.0
14	3400	3350	1.0410	1.0200	1.0	1.0
15	3855	3235	1.1810	.9908	1.2	1.0
16	4090	3160	1.2520	.9679	1.3	1.0
17	3945	3060	1.2080	.9371	1.2	0.9
18	3730	2950	1.1420	.9035	1.1	0.9
Adult	3265	2640	1.0000	.8085	1.0	0.8

Table 10 The Total Number of Meals Taken in the
Dietary of Home A

	No. of Meals	Factor	No. of Man Meals
23 Children, 1 - 2 years	461	0.3	138
Total no. of man meals =			138

Equivalent to meals for 1 man for 46 days.

Table 11 The Total Number of Meals Taken in the
Dietary of Home B

	No. of Meals	Factor	No. of Man Meals
7 Children, 1 - 2 years	125	0.3	38
9 " 3 - 4 "	161	0.4	64
1 Girl 5 "	18	0.4	7
7 Girls 6 - 7 "	125	0.5	63
5 " 8 - 9 "	90	0.6	54
3 " 10 "	54	0.7	38
2 " 11 "	36	0.8	29
3 " 12 "	52	0.9	47
2 " 13 -16 "	36	1.0	36
9 Boys 5 - 7 "	162	0.5	81
6 " 8 - 9 "	108	0.6	65
1 Boy 10 "	18	0.7	13
3 Boys 11 -12 "	54	0.8	43
1 Boy 13 "	18	0.9	16
13 Women	146	0.8	117
3 Men	46	1.0	46
Total no. of man meals =			757

Equivalent to meals for 1 man for 252 days.

Table 12 The Total Number of Meals Taken in the
Dietary of Home C.

		No., of Meals	Factor	No. of Man Meals
15 Children	1 - 2 years	270	0.3	81
6 "	3 - 4 "	108	0.4	43
1 Girl	5 "	18	0.4	7
3 "	7 "	54	0.5	27
1 "	9 "	18	0.6	11
3 Boys	5 - 7 "	54	0.5	27
3 "	8 - 9 "	54	0.6	32
2 "	11 -12 "	36	0.8	29
1 "	14 "	18	1.0	18
12 Women		150	0.8	120
1 Man		1	1.0	1

Total no. of man meals = 396

Equivalent to meals for 1 man for 132 days.

Dietary Study in Home A.

In Home A, the children under three years of age are cared for in a separate nursery in charge of a trained nurse and her assistants. A separate diet kitchen is provided where all the food for these children is prepared by nurses in training under the supervision of the head nurse. The weekly menu, prescribed by an attending physician, is conveniently posted on the wall in the kitchen and does not change materially from month to month. A copy of this menu is included with the other menus discussed elsewhere. All of the adults and children over three years of age are served with food prepared in the main dining room. Only one dietary study could be made in this home on account of time limitations. Therefore the study was made in the diet kitchen where the food for the nursery children is prepared. The lunches of crackers and milk which were provided for the children during the morning and afternoon were included in the whole dietary as part of the three regular meals.

In Table 13 are shown the amounts of each kind of food used for seven days. The weights of protein, calcium, phosphorus and iron, the number of Calories and the cost of the different foods have also been tabulated. In Table 14 the data from the preceding table are summarized, giving the totals for each of the above items for the five groups of foods: animal products, cereal products, vegetables, fruits, and miscellaneous foods. The amounts per man per day have been computed and included in the summary table as well as certain standards used for the adult man. According to recommendations made by Sherman (1917) (1920) the amounts of protein, calcium, phosphorus and iron which are considered adequate in the day's dietary for the adult man weighing 70 kilograms are:

Protein,	70 grams
Calcium,	0.70 "
Phosphorus,	1.55 "
Iron	0.015 "

To what extent these amounts need to be increased to provide for the extra requirements of growing children cannot be definitely stated. In order to be sure that the food is adequate the amounts allowed for the adult man should probably be increased very appreciably. A comparison of the results of this dietary with the standards recommended by Sherman shows that the protein, calcium and phosphorus are abundantly provided. Such findings might be expected from the large amount of milk used in the diet. Since the per cent of iron in milk is very low, the total amount of iron in the dietary is much smaller relatively than the amounts of calcium and phosphorus. As seen by referring to the menus (page 62) for this dietary, carrots, spinach, dried peas and prunes, all of which are good sources of iron, are included in the

Table 13 Total Food Used in Dietary of Home A

Animal Products	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Bacon	0.28	.02940	.0001624	.0030184	.00004200	795	\$0.0868
Butter	0.30	.00300	.0000450	.0000510	.00000060	1047	.1500
Eggs	1.00	.13400	.0006700	.0018000	.00003000	672	.4000
Gelatine	0.61	.55754	- - -	- - -	- - -	1013	.5490
Milk, whole	225.28	7.43424	.2703360	.2095104	.00054067	70738	11.2640
Milk, skimmed	55.50	1.88700	.0677100	.0532800	.00013875	9269	1.1100
Totals	282.97	10.04518	.3389234	.2676598	.00075202	83534	\$ 13.5598
Cereal Products							
Bread, graham	1.00	.08900	.0005000	.0021800	.00002500	1189	\$0.0800
Bread, white	3.98	.36616	.0010746	.0037014	.00003582	4704	.3582
Cornmeal	2.49	.22908	.0004482	.0047310	.00002241	4034	.0996
Crackers, graham	2.63	.26300	.0008416	.0104937	.00016306	5010	.5786
Crackers, soda	3.06	.29988	.0006732	.0031212	.00004590	5738	.6120
Cream of wheat	5.88	.64680	.0019992	.0088788	.00014700	9508	1.1760
Flour, barley	0.45	.04725	.0001935	.0018000	.00001845	738	.0245
Oats, rolled	1.83	.29463	.0012627	.0071736	.00006954	3314	.0732
Rice	2.88	.23040	.0002592	.0027648	.00002592	4582	.3456
Zwieback	0.31	.03038	.0000837	.0002883	.00000279	594	.0775
Totals	24.51	2.49658	.0073359	.0451328	.00055589	39411	\$ 3.4252

Table 13 (continued) Total Food Used in Dietary of Home A

Vegetables	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Carrots	9.31	.10021	.0052136	.0042826	.00005586	1899	\$0.3492
Onions	0.71	.01136	.0002414	.0003195	.00000426	156	.0316
Peas, dried	0.30	.07380	.0002520	.0012000	.00001710	483	.0300
Potatoes	24.30	.53460	.0034020	.0140940	.00031590	9185	.6078
Spinach, dried	0.55	.15235	.0048620	.0049500	.00026125	791	.7700
Spinach, canned	1.56	.03276	.0010452	.0010608	.00005616	170	.1248
Tomatoes, canned	1.95	.02340	.0002145	.0005070	.00000780	201	.0975
Totals	38.68	.92848	.0152307	.0264139	.00071833	12885	\$ 2.0109
<u>Fruits</u>							
Apples	2.75	.01100	.0001925	.0003300	.00000825	784	\$0.3670
Oranges	0.71	.00568	.0003195	.0001491	.00000142	165	.0970
Prunes	1.33	.02793	.0007182	.0013965	.00003990	1819	.2028
Totals	4.79	.04461	.0012302	.0018756	.00004957	2768	\$ 0.6668
<u>Miscellaneous</u>							
Dextri maltose	0.58	- - -	- - -	- - -	- - -	978	\$0.2900
Jello	0.61	.11163	- - -	- - -	- - -	1088	.3660
Sugar	8.05	- - -	- - -	- - -	- - -	14611	.9660
Totals	9.24	.11163	- - -	- - -	- - -	16677	\$ 1.6220

Table 14 Summary of Food Used in Dietary of Home A

	Total Weight E. P. Lb.	Weights of Constituents				Total Calories	Cost
		Protein lb.	Ca lb.	P lb.	Fe lb.		
Animal Products	282.97	10.04518	.3389234	.2676598	.00075202	83534	\$13.5598
Cereal Products	24.51	2.49658	.0073359	.0451328	.00055589	39411	3.4252
Vegetables	38.68	0.92845	.0152307	.0264139	.00071833	12885	2.0109
Fruits	4.79	0.04461	.0012302	.0018756	.00004957	2768	0.6668
Miscellaneous	9.24	0.11168	- - -	- - -	- - -	15677	1.6220
Total food	360.19	13.62645	.3627202	.3410821	.00207581	155275	21.2847
10% deduction for edible waste	324.17	12.26381	.3264482	.3069739	.00186823	139747	
Per man per day	7.05	0.26660	.0070973	.0066733	.00004061	3037	0.4627
Per man per day Standards		gm. 121 70	gm. 3.22 0.70	gm. 3.03 1.55	gm. .018 .015		3265

foods listed. It must be remembered, however, that about half of these children, 10 out of the 23, were bottle-fed and not yet old enough to receive, or to need, the foods containing iron which were provided for the older children in the group. As explained by Sherman (1918), there is a storage of iron in the body of the infant at birth which is sufficient for the needs of the first few months. Therefore, while the amount of iron in the dietary is relatively less than the amounts of the other two minerals, it is probable that it is sufficient for the needs of the group as a whole.

The energy requirement per day, as shown by the table based on the Holt and Fales (1921) recommendations, ^{in 34,} would call for a total of 3265 Calories per man per day. By comparison, the total of 3037 Calories found in this dietary study is somewhat less than is desired, although it must be remembered that in the particular group studied almost half of the children were under one year of age. The fact previously referred to, that about 25% of these children were found to be under normal weight, makes the need for increasing the daily energy supply still more urgent.

The vitamines content of the food may probably be considered as adequate in view of the fact that such foods as milk, spinach, tomato juice and fruit pulp were provided in the menus for each day.

Dietary Study of Home B

In Home B, all of the food is prepared in one kitchen, so that the dietary study includes the food served to both children and adults. The total amounts of foods used for the six days during which the dietary study continued, are shown in Table 15. The foods used and the amounts of protein, calcium, phosphorus, iron and Calories furnished per man per day are summarized in Table 16. As compared with the standards discussed in

Table 15 Total Food Used in Dietary of Home B

Animal Products	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Bacon	0.75	.07875	.0004350	.0080850	.00011250	2130	\$0.2511
Beef, soup meat	19.53	4.29660	.0113274	.2105334	.00292950	12636	3.1000
Beef, corned	10.50	1.63800	.0060900	.1131900	.00157500	14207	2.6250
Beef, Hamburg	5.00	1.07000	.0029000	.0539000	.00075000	3660	1.4000
Beef, dried	2.50	.75000	.0014500	.0269500	.00037500	2043	.5500
Beef, cooked	5.50	1.17700	.0031900	.0592900	.00082500	4026	1.9250
Mutton, leg	12.92	2.55816	.0074936	.1392776	.00193800	11150	5.0400
Pork, chops	3.60	.59760	.0020880	.0388080	.00054000	5508	1.1250
Salmon	2.91	.64020	.0031719	.0334068	.00016005	2686	.7275
Weiners	12.00	3.36000	.0069600	.1293600	.00180000	17820	1.8000
Cooking fat	3.57	0 - -	- - -	- - -	- - -	14566	.7497
Oleomargarine	6.56	.08528	- - -	- - -	- - -	22370	1.7712
Butter	10.59	.10590	.0015885	.0018003	.00002118	36970	5.2950
Eggs	4.95	.66330	.0033165	.0089100	.00014850	3326	1.9800
Cheese, American	3.19	.88363	.0296989	.0217877	.00004147	6635	.7975
Cheese, cottage	0.63	.13167	.0018900	.0014805	.00000378	314	.0504
Milk, whole	492.84	16.29672	.5926080	.4592712	.00118522	135066	24.6920
Milk, condensed	0.44	.03872	.0013200	.0010340	.00000264	.651	.2000
Milk, whole powdered	1.00	.26700	.0098600	.0076400	.00001970	2822	.9000
Totals	599.98	34.63853	.6853878	1.3147245	.01242754	318586	\$54.9794

Table 15, (continued) Total Food Used in Dietary of Home B

Cereal Products	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Bran	0.13	.02080	.0001573	.0014716	.00001495	211	\$0.0143
Bread, white	19.94	1.83448	.2053838	.0185442	.00017946	23569	1.7946
Cornmeal	6.00	.55200	.0010800	.0114000	.00005400	9720	.2400
Crackers, soda	1.66	.16268	.0003652	.0016932	.00002490	3113	.3320
Farina	22.03	2.42330	.0046263	.0275375	.00017624	36129	1.1015
Flour, patent	128.44	14.64216	.0256880	.1181648	.00128440	206788	7.7064
Flour, cracked wheat	3.56	.39516	.0011036	.0084728	.00008900	5821	.2492
Malt o'wheat	1.50	.16500	.0005100	.0022650	.00003750	2426	.1800
Oats, rolled	2.81	.45241	.0019389	.0110152	.00010678	5089	.1124
Rice	0.88	.07040	.0000792	.0008448	.00000792	1400	.1056
Rycrip	1.11	.16539	.0002997	.0010323	.00000999	1804	.3108
Sago	.13	.00052	.0000299	.0001170	.00000208	209	.0091
Spaghetti	7.39	.99026	.0016258	.0106416	.00008868	12009	.7390
Tapioca	2.41	.00964	.0005543	.0021690	.00003856	3875	.1687
Totals	197.99	21.88420	.0434420	.2153690	.00211446	312163	\$ 13.0636

Table 15 ,(continued) Total Food Used in Dietary of Home B

Vegetables	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Beans, dry	4.38	.98550	.0070080	.0206298	.00030660	6855	\$0.2190
Beans, string, canned	3.28	.07544	.0215088	.0017056	.00003608	604	.3280
Beets	2.00	.03200	.0005800	.0007800	.00001200	418	.0750
Cabbage	4.84	.07744	.0021780	.0014036	.00005324	692	.1138
Carrots	3.85	.04235	.0021560	.0017710	.00002310	785	.1443
Corn	3.75	.10500	.0007500	.0106125	.00010875	1706	.3750
Lettuce	0.48	.00576	.0002064	.0002016	.00000336	42	.1120
Onions	2.48	.03968	.0008432	.0011160	.00001488	546	.1100
Parsnips	6.85	.10960	.0040415	.0052060	.00004110	2014	.4986
Peas, canned	5.00	.18000	.0014000	.0063500	.00008500	1260	.7500
Peas, dry	2.38	.58548	.0019992	.0095200	.00013566	3834	.2380
Pumpkin, canned	2.13	.02130	.0004899	.0012567	.00001704	249	.5751
Potatoes	74.95	1.64890	.0104930	.0434710	.00097435	28331	1.4990
Tomatoes, canned	5.47	.06564	.0006017	.0014222	.00002188	563	.2735
Tomatoes, soup	1.31	.02358	.0002358	.0005109	.00000786	235	.2620
Totals	123.15	3.99767	.0344915	.1059569	.00184090	48134	\$ 5.5733

Table 15 ,(continued) Total Food Used in Dietary of Home B

Fruits	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Apples	8.11	.03244	.0005677	.0009732	.00002443	2311	\$ 1.0810
Apples, dried	9.69	.15504	.0031008	.0046512	.00014535	12771	1.7442
Bananas	0.92	.01196	.0000828	.0002852	.00000552	411	.1410
Grapefruit	2.05	.01230	.0004305	.0004100	.00000615	482	.4215
Oranges	14.64	.11712	.0065880	.0030744	.00002928	3411	2.0060
Peaches, dried	4.63	.21761	.0015742	.0067598	.00005516	5834	1.0649
Raisins	1.14	.02964	.0007296	.0015048	.00002394	1781	.2737
Jam	11.06	.11060	.0032074	.0029862	.00007742	11060	3.8710
Totals	52.24	.68671	.0162810	.0206448	.00036725	38061	\$ 10.6033
<u>Miscellaneous</u>							
Cocoa	1.00	.21600	.0011200	.0070900	.00002700	2258	\$0.2200
Coffee	5.78	- - -	- - -	- - -	- - -	- -	1.7340
Cornstarch	0.50	- - -	- - -	- - -	- - -	816	.0250
Honey	0.81	.00324	.0000324	.0001539	.00000567	1200	.2673
Jello	1.22	.22326	- - -	- - -	- - -	2177	.7320
Peanut butter	1.75	.51275	.0012425	.0069825	.00003500	4797	.3850
Sugar, gran.	36.44	- - -	p - - -	- - -	- - -	66139	3.1728
Sugar, brown	4.81	- - -	- - -	- - -	- - -	8292	.6734
Syrup	3.63	- - -	- - -	- - -	- - -	5082	.3630
Tea	0.19	- - -	- - -	- - -	- - -	- -	.0760
Totals	56.13	.95525	.0023949	.0142264	.00006767	90761	\$ 7.6458

Table 16 Summary of Food Used in Dietary of Home B

	Total Weight E. P. Lb.	Weights of Constituents				Total Calories	Cost
		Protein lb.	Ca lb.	P lb.	Fe lb.		
Animal Products	599.98	34.63853	.6853878	1.3147245	.01242754	318586	\$54.9794
Cereal Products	197.99	21.88420	.0434420	.2153690	.00211446	312163	13.0636
Vegetables	123.15	3.99767	.0344915	.1059569	.00184090	48134	5.5733
Fruits	52.24	.68671	.0162810	.0206448	.00036725	38061	10.6033
Miscellaneous	56.13	.95525	.0023949	.0142264	.00006767	90761	7.6458
Total food	1029.46	62.16236	.9619972	1.6709216	.01681782	807705	91.8654
10% deduction for edible waste	926.51	55.94612	.8657975	1.5038294	.01513604	726934	
Per man per day	3.67	.22201	.0034357	.0059675	.00006006	2884	0.3645
Per man per day Standards		gm. 101 70	gm. 1.56 0.70	gm. 2.71 1.55	gm. .027 .015		3265

connection with the previous dietary the protein allowance of 101 grams is somewhat larger than needed for adults, while the total of 2884 Calories is considerably less than the 3265 Calories per man per day recommended. A better balanced dietary would therefore result for the adults if more of the energy-producing foods containing starches, sugars and fats, were used, and less ~~of~~ meat which in this case was the main source of the protein. The fact that a fairly large group of children in the home are under weight lends emphasis to the fact that the total food allowance per day for some children may fall below the amount needed thus explaining the low average for Calories for the group. Calcium, phosphorus and iron are all probably supplied in sufficient amounts as they are well over the minimum standards suggested. Nevertheless a study of the menus for this week reveals the fact that the children under three years of age were probably not receiving a proper share of the foods other than milk that are rich in both iron and vitamins, e.g., fruits and vegetables. The butter used in this dietary, 11 pounds, is a valuable source of vitamins, but more careful planning of the menus would insure a safer supply of the three vitamins. Spinach, leafy vegetables, legumes, and as much fruit as possible need to be deliberately placed in the menus of the children with this end in view.

Dietary Study for Home C

In Home C, most of the food served to the smallest children was prepared in a small diet kitchen on the second floor, and a few meals were prepared in the kitchen of one of the adjoining cottages, - the Detention Home. Since the supplies for both of these small kitchens were received from the main kitchen, the three kitchens were considered collectively. The amount of food accounted for in the dietary study therefore represents the food served

to all of the children and to the adults. The total amounts of foods used, the weights of the protein, calcium, phosphorus, and iron, the total Calories and the cost are shown in Table 17, and the summary of these items together with the amounts per man per day are given in Table 18. The results show that the protein and mineral constituents are probably provided in amounts sufficient to provide the necessary margin of safety. The Caloric value of the food used is less than the amount recommended and should be increased so that the average per man per day is 300 Calories higher than that found. The children who are under weight may represent cases in which the difficulty might be remedied by increasing the food intake. A study of the menus for this week in connection with amounts of food as shown in the table suggest the need for providing more definitely for the necessary vitamins in the food. This could be done by increasing the amounts of such foods as whole cereals, tomatoes, spinach and other vegetables, oranges and other fruits, and butter. In this dietary, oleomargarine was used entirely - probably as an economy measure - but with the price of butter gradually decreasing, the substitution should no longer be necessary.

Table 17 Total Food Used in Dietary of Home C

Animal Products	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Bacon	2.68	.28140	.0015544	.0288904	.00040200	7611	\$.9021
Beef, Hamburg	6.44	1.37816	.0037352	.0694232	.00096600	77414	1.8032
Beef, shank	4.23	.92637	.0024534	.0455994	.00063450	2610	.4230
Chicken	7.40	1.59100	.0042920	.0797720	.00111000	3648	3.8000
Cooking fat	2.44	- - -	- - -	- - -	- - -	9955	.5124
Oleomargarine	7.25	.09425	- - -	- - -	- - -	24723	1.9575
Eggs	6.63	.88842	.0044421	.0119340	.00019890	4455	2.6520
Cheese, cottage	3.22	.67298	.0096600	.0075670	.00001932	1607	.2576
Milk, whole	271.44	8.95752	.3257280	.2524392	.00065146	85232	13.5720
Buttermilk	12.90	.38700	.0135450	.0125130	.00003225	2090	.3870
Totals	324.63	15.17710	.3654101	.5081382	.00401443	146645	\$ 26.2668

Table 17 (continued) Total Food Used in Dietary of Home C

Cereal Products	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Bread, graham	3.44	.30616	.0017200	.0074992	.00008600	4090	\$0.2752
Bread, white	62.06	5.73846	.0170262	.0586458	.00056754	75609	5.6754
Barley, pearled	0.56	.04760	.0001120	.0010136	.00001120	904	.1008
Cornmeal	1.06	.09752	.0001908	.0020140	.00000954	1717	.0424
Crackers, graham	1.69	.16900	.0005408	.0067431	.00010478	3219	.3718
Crackers, soda	4.00	.00392	.0008800	.0040800	.00006000	7500	.8000
Flour, patent	6.56	.74784	.0013120	.0060352	.00006560	10562	.3936
Flour, graham	1.08	.14364	.0004212	.0039312	.00003996	1758	.0756
Hominy	2.56	.21248	.0002816	.0036864	.00002304	4119	.4608
Macaroni	0.91	.12194	.0002002	.0013104	.00001092	1479	.0728
Oats, rolled	4.06	.65366	.0028014	.0159152	.00015428	7353	.1624
Post Toasties	2.63	.14465	.0004734	.0049970	.00002367	4290	.2367
Rice	5.47	.43760	.0004923	.0052512	.00004923	8703	.6564
Tapioca	1.00	.00400	.0002300	.0009000	.00001600	1608	.0700
Vitos	17.09	1.87990	.0035889	.0213625	.00013672	28028	3.4180
Totals	115.17	10.70837	.0302708	.1433848	.00135848	160939	\$ 12.8119

Table 17, (continued) Total Food Used in Dietary of Home C.

Vegetables	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Beans	41.28	.96300	.0068480	.0201588	.00029960	6698	\$0.2140
Beets	8.40	.13440	.0024360	.0032760	.00005040	1756	.3150
Cabbage	4.73	.07568	.0021285	.0013717	.00005203	676	.1112
Carrots	20.75	.22825	.0116200	.0095450	.00012450	4233	.7782
Cauliflower	1.00	.01800	.0012300	.0006100	.00000600	139	.3750
Celery	1.38	.01518	.0010764	.0005106	.00000690	116	.4500
Lettuce	1.99	.02388	.0008557	.0008358	.00001393	173	.4680
Onions	4.67	.07472	.0015878	.0021015	.00002802	1027	.2076
Potatoes	72.25	1.58950	.0101150	.0419050	.00093925	27311	1.8062
Tomatoes, canned	1.19	.01428	.0001309	.0003094	.00000476	123	.0595
Turnips	9.95	.12935	.0063680	.0045770	.00004975	1771	.2844
Totals	130.59	3.26624	.0443963	.0852008	.00157514	44023	\$5.0691
<u>Fruits</u>							
Apples	27.52	.11008	.0019264	.0033024	.00008256	7843	\$3.6690
Oranges	2.58	.02064	.0011610	.0005418	.00000516	601	.3530
Raisins	2.69	.06994	.0017216	.0035508	.00005649	4202	.6187
Totals	32.79	.20066	.0048090	.0073950	.00014421	12646	\$ 4.6407

Table 17 (continued) Total Food Used in Dietary of Home C

Miscellaneous	Total weight E.P. Lb.	Weights of Constituents in Pounds				Total Calories	Cost
		Protein	Ca	P	Fe		
Chocolate	0.19	.02451	.0001748	6 .0008745	.00000513	526	\$ 0.0741
Cocoa	0.16	.03456	.0001792	.0011344	.00000432	361	.0352
Coffee	2.88	- - -	- - -	- - -	- - -	- -	.8640
Cornstarch	1.06	- - -	- - -	- - -	- - -	1730	.0530
Dextri maltose	1.66	- - -	- - -	- - -	- - -	2800	.8300
Jello	1.22	.22326	- - -	- - -	- - -	2177	.7320
Molasses	0.63	.01512	.0013293	.0002772	.00004599	820	.0315
Peanut butter	2.13	.62409	.0015123	.0084987	.00004260	5838	.4686
Sugar	26.06	- - -	- - -	- - -	- - -	47299	3.1272
Syrup	2.13	- - -	- - -	- - -	- - -	2982	.2130
Tea	0.31	- - -	- - -	- - -	- - -	- -	.1240
Totals	38.43	.92154	.0031956	.0107748	.00009804	64533	\$ 6.5526

Table 18 Summary of Food Used in Dietary of Home C

	Total Weight E. P. Lb.	Weights of Constituents				Total Calories	Cost
		Protein lb.	Ca lb.	P lb.	Fe lb.		
Animal Products	324.63	15.17710	.3654101	.5081382	.00401443	146645	\$26.2668
Cereal Products	115.17	10.70837	.0302708	.1433848	.00135848	160939	12.8119
Vegetables	130.59	3.26624	.0443963	.0852008	.00157514	44023	5.0691
Fruits	32.79	.20066	.0048090	.0073950	.00014421	12646	4.6407
Miscellaneous	38.43	.92154	.0031956	.0107748	.00009804	64533	6.5526
Total food	641.61	30.27391	.4480818	.7548936	.00719030	428786	55.3411
10% deduction for edible waste	577.45	27.24652	.4032736	.6794042	.00647127	385907	
Per man per day	4.37	.20641	.0030551	.0051470	.00004902	2924	0.4192
Per man per day Standards		gm. 94 70	gm. 1.39 0.70	gm. 2.33 1.55	gm. .022 .015		3265

Summary of Foodstuffs and Calories Furnished

In Table 19 the results of the three dietaries are arranged for purposes of comparison with each other and with the minimum standards recommended. Since the conditions under which the dietaries for Homes B and C were obtained were quite similar, comparisons of the results in these two cases may be freely made; but since the figures for Home A are based entirely on the food used by children under three years of age, comparisons between ^{Home} ~~Home~~ A and the other homes must be made with some caution. For instance the larger proportion of milk in the dietary for Home A means that a relatively higher total weight of food was furnished than in the other two homes where the less bulky foods furnished a larger part of the diet. Hence approximately 7 pounds of food were necessary to supply the nutriment for Home A as compared with approximately 4 pounds in the other two homes. The high percentages of calcium and phosphorus and the low percentage of iron in the dietary for Home A are also accounted for by the fact that the diet was composed largely of milk. The use of more meat in the dietary of Home B than in that of Home C accounts for the relatively higher amounts of mineral constituents in the former, although the total amount of food and the total Calories are higher for Home C than for Home B. It is apparent that in each of the three dietaries ample provision probably has been made for the protein and mineral requirements, but that the total amount of food as indicated by the number of Calories, is somewhat under the requirements recommended by recent investigators. Benedict and Talbot (1921) in calling attention to the fact that the energy requirements of growing children are very much greater than they are commonly supposed to be, make the following suggestion: "Every effort may legitimately be expended to secure a maximum

Table 19 Comparison of the Amounts of Food Used per Man per Day
in the Three Dieteries

	Total Weight E.P.Lb., (Pounds)	Weights of Constituents								Total Calories	Cost
		Protein		Calcium		Phosphorus		Iron			
		Pounds	Grams	Pounds	Grams	Pounds	Grams	Pounds	Grams		
Home A	7.05	.26660	121	.0070973	3.22	.0066733	3.03	.00004061	.018	3037	\$0.4627
Home B	3.67	.22201	101	.0034357	1.56	.0059675	2.71	.00006006	.027	2884	0.3645
Home C	4.37	.20641	94	.0030551	1.39	.0051470	2.33	.00004902	.022	2924	0.4192
Minimum standard			70		0.70		1.55		.015	3265	

skeletal growth and the development of children above so-called average weight". Holt and Fales (1921) state with equal emphasis ~~that~~ : "All results go to show that children receive too little rather than too much food". In fact the standards recommended by Holt and Fales (1921), given in Table 9 , indicate that the daily Caloric requirement for ~~boys~~^{children} may be as high as 4090 Calories for a boy of sixteen years and 3300 Calories for the girl of fourteen, as compared with the 3265 Calories needed by the average man.

Cost of Food

It was not the purpose of this study to investigate in detail the cost of the food used, but rather its amount and adequacy. Nevertheless it was thought that an approximate determination of the total cost and the amount spent per day for the food served in the three homes would be of interest. Instead of attempting to secure the actual prices paid for the food by each of the homes - a task which would have been unnecessarily arduous - a composite price list was made up largely from prices paid during February and March in the purchase of supplies for the University Farm Cafeteria. The prices thus secured were calculated to the basis of the cost per pound of the food as purchased and were used in estimating the cost of food for the three dietaries. The food purchased in each of the homes is bought at a reduction from the usual retail prices, so that it seemed that the use of the wholesale prices furnished by the Cafeteria would furnish a reasonable basis for computing the cost of the food as recorded in this study. This price list will be found in the appendix.

Table 20 Summary of Cost of Food in the Three Dieteries

	Total Number of Calories	Cost of Food per man per day as served	Cost of Food per 1000 Calories	Cost of 3265 Calories per day
Home A	3037	\$0.4627	\$0.1523	\$.4972
Home B	2884	0.3645	0.1263	.4124
Home C	2924	0.4192	0.1433	.4678
Average	2948	0.4155	0.1406	.4591

It will be seen from Table 19, and also from Table 20 in which the costs are further summarized, that the cost per man per day for food as served is somewhat higher for Home C than for Home B, but a comparison with the figures in the preceding column makes it clear that the higher cost is accompanied by a larger amount of food as measured by total Calories. The same relation holds for the cost for Home A as compared to the costs in the other two dieteries. This is also consistent with frequent observations to the effect that the food required for the feeding of the very small child is more expensive than that required to provide simple, adequate food for the older child or the adult.

The cost of food per 3265 Calories per day shows some variation in the three homes, varying from approximately 41 cents in Home B to about 50 cents in Home A, with the cost for Home C 47 cents, close to the average of 46 cents for the group. The cost of food per 1000 Calories shows a corresponding variation - approximately 15 cents, 13 cents and 14 cents for the three homes respectively.

By computing the cost per man per year, on the basis of the average cost per man per day, it is found that food comparable in kind to that provided in

these homes could be provided at a cost of approximately \$170 per year. To determine the approximate cost per child per year, revision according to the factors given in Table 9 would be necessary with a slightly larger allowance for the cost of the food for the younger children of the group.

Comparisons of the cost of food in these dietaries with the cost in previously published dietaries seemed to be of little value, owing to the higher prices which have prevailed during the last few years.

Use of Milk in the Dietaries

In view of the fact that milk furnished a large amount of the total foodstuffs in these dietaries, Table 21 was prepared as a means of testing the assertion frequently made that milk is the cheapest and best single source of food. In this table, the protein, calcium, phosphorus, iron, Calories and cost are shown for each home, for the milk used and also for the total food used. The resulting per cents show in a striking manner, that a large per cent of the calcium furnished in the dietary was supplied by milk at a relatively small per cent of the total cost. That is, for Home A, six-tenths of the total cost provided nine-tenths of the total calcium; for Home B, three-tenths of the total cost provided six-tenths of the total calcium; and for Home C, one-fourth of the total cost provided three-fourths of the total calcium. For Home A and Home C, the protein and phosphorus show in general the same relationship but to a less degree. For Home B this relationship is modified no doubt by the relatively large amount of meat used in the dietary. Although Table 21 would indicate that other foods in the dietary are less expensive, sources of iron and of energy than milk, the returns for expenditures for milk in terms of calcium, phosphorus and protein justify the use of liberal amounts of milk in the dietary.

Table 21 Percentages of Protein, Calcium, Phosphorus, Iron, Calories
and Costs Covered by Milk in the Various Diets

	Protein	Calcium	Phosphorus	Iron	Calories	Cost
Home A						
Totals for dietary	13.62645 lb.	.3627202 lb.	.3410821 lb.	.00207581 lb.	155275	\$21.2847
Totals for milk in dietary	9.32124	.3380460	.2627904	.00067942	80007	12.3740
Per cent of totals covered by milk	68.4%	93.2%	77.0%	32.7%	51.5%	58.1%
Home B						
Totals for dietary	62.16236 lb.	.9619972 lb.	1.6709216 lb.	.01681782 lb.	807705	91.8654
Totals for milk in dietary	16.60244	.6037880	.4679452	.00120756	158539	25.7920
Per cent of totals covered by milk	26.7%	61.7%	28.0%	7.2%	19.6%	28.1%
Home C						
Totals for dietary	30.27391 lb.	.4480818 lb.	.7548936 lb.	.00719030 lb.	428786	55.3411
Totals for milk in dietary	9.34452	.3392730	.2649522	.00068371	87322	13.9590
Per cent of totals covered by milk	30.9%	75.7%	35.1%	9.5%	20.4%	25.2%

of growing children. Biological feeding experiments have repeatedly demonstrated the superior quality of the proteins furnished and the value of milk as a source of vitamins.

Table 22 shows the amount and kind of milk received daily in each of the homes in which a dietary study was made and also in Home D.

Table 22 The Amount and Kind of Milk Received Daily in Homes A, B, C and D.

Home	Produced on Premises	Raw, Bottled	Pasteurized Bulk	Pasteurized Bottled	Preparation for Infant Feeding
A	-	-	10 qt.	20 qt.	Pasteurized
B	22 qt.	-	16 qt.	-	Heated on stove
C	-	20 qt.	-	-	Pasteurized
D	-	-	20 qt.	-	(No infants here)

In Home A, the bottled milk is provided for the diet kitchen, and the bulk milk for the main kitchen. In Home B, the raw milk and purchased milk (pasteurized) are used without distinction; but as noted above, the milk fed to the youngest children is cooked before being served. Raw bottled milk is used entirely in Home C but responsibility for this selection has been assumed by a committee from the Board of Directors. The writer was assured that every precaution was taken to provide a safe and pure supply of milk and that samples were from time to time submitted to the city chemist for determining the bacterial count. It is desirable that in this home, as in the other homes where milk is delivered from various and unknown sources, every possible precaution should be made to provide a product free from dangerous

contamination; and all recent investigations seem to point toward pasteurization as the one dependable method for securing such protection. After carefully reviewing all of the arguments for and against this process, Parker (1917) sums up the case for pasteurization as follows: "In the present state of preventive medicine it is the only way to protect the milk-consuming public from the dangers of chance infection to which even the best of milk is liable".

Menus

The menus listed on pages 62 to 67 bring out certain aspects concerning the planning of meals which are not emphasized in the dietary studies. The same periods are covered by the dietary studies and menus for Home A (I), Home B and Home C. In Home A it will be recalled that the dietary study did not include the food served from the main kitchen. However, the menus for these meals are included in the menus given, as are also the menus from Home D, although no dietary study was made at this home. In this case, the superintendent was asked to write down the menus from day to day and mail the copy to the writer at the end of the week. In Homes A, B, and C, the menus were obtained daily at the same time that the dietary studies were being conducted.

In general it may be said of the three homes in which dietary studies were made that very little thought was given to the planning of the menus. In no case was there any attempt to keep copies of the menus on file to be referred to for future guidance and in no case did there seem to be any evidence that the person in charge looked forward from day to day to securing a carefully planned dietary for the week or month as a whole. In fact it was often the case that the menu was hastily planned and without previous thought, when the writer made a request for the data for a given day.

Menus for Week in Home A

I. Food for children under three years prepared in separate diet kitchen but prescribed by attending physician.

	<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Monday	Cream of wheat Milk Zwieback	Baked potato Scraped beef Spinach Milk Jello	Milk toast
Tuesday	Oatmeal Milk	Mutton broth Vegetable puree Bread Chocolate pudding	Cornmeal mush Milk
Wednesday	Apple sauce Milk Rice	Mashed potato Bacon Creamed carrots Junket	Bread Milk
Thursday	Prune pulp Cream of wheat Zwieback Milk	Cream of vegetable soup White cracker Bread pudding	Cornmeal mush Milk
Friday	Oatmeal Tomato juice Milk	Beef broth with rice Crackers Jello	Cream of wheat Milk
Saturday	Cream of wheat Tomato juice Milk	Split pea soup Bread; butter	Milk toast
Sunday	Half orange Cream of wheat Milk	Beef broth with vegetables Junket Milk	Rice Milk

The cereals were always served with whole milk and a very little sugar.

During the morning, the babies were served with a lunch consisting of a soda cracker and milk. In the afternoon a graham ^{cracker} was given for lunch.

The smallest babies were fed from bottles in which specially modified milk was prepared for each child according to the instructions of the attending physician.

Each child received a daily allowance of about two teaspoons of powdered spinach, - made into a paste and mixed with the cereal or milk.

Menus for Week in Home A

II. Food for adults and children over three years of age.

	<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Tuesday	Oatmeal Toast Cookies Jelly	Boiled ham Creamed cabbage Baked potato Mince pie	Fried potatoes Hash Peach sauce Hot rolls
Wednesday	Apple Cream of wheat Hot muffins Syrup Toast	Liver and bacon Scalloped potato Stewed tomato Apple cobbler - lemon sauce	Sweet potato Cold meat Rolls Sauce Cookies
Thursday	Apple sauce Cream of wheat Hot biscuits Syrup Toast Jello	Round steak with onions Boiled potato Gravy Creamed corn Blanc Mange	Creamed beef Sauce Cake
Friday	Apple Oatmeal Toast	Creamed codfish Boiled potato Stewed tomato Pickles Pumpkin pie	Fried potato Baked beans Cold meat Apricot sauce Cookies
Saturday	Prune sauce Cream of wheat Toast	Veal stew; dumplings Stewed carrots Boiled potato Jello with cream	Fried potato Baked beans Cold meat Apricot sauce
Sunday	Half orange Sausage Coffee cake Toast	Roast pork Browned potato Parsnip Càlery Mince pie	Cold meat Lettuce salad Sauce
Monday	Prune sauce Grape nuts Toast Hot rolls	Cold meat Browned potato; gravy Stewed corn Apple dumplings	Fried potato Cold meat Hot rolls Doughnuts Sliced bananas

The cereals were served with milk and sugar.

For breakfasts and suppers, milk or cocoa was served for the children and tea or coffee for the adults.

Menus for Six Days in Home B

- (1) Food served to babies (under 3 years)
 (2) Food served to children 3 - 9 years
 (3) Food served to older children and adults

		<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Thursday	(1)	Cream of wheat Milk	Mashed potato Rice pudding	Bread and milk
	(2)	Same as (3)	Weiners Spaghetti with cream sauce	Bread and butter Milk Peach sauce Gingerbread
	(3)	Cracked wheat Bread and butter Pancakes	Pork chops Potato Creamed parsnips	Weiners Cold meat Potatoes Peach sauce Coffee cake
Friday	(1)	Breakfast cereal Milk	Vegetable soup Raspberry Jello	Bread and milk
	(2)	Same as (3)	Macaroni and cheese Stewed vegetables Peach and apple tapioca	Bread and butter Cocoa Apple butter
	(3)	Cereal Wheat muffins	Meat loaf Potato Beets Tapioca pudding	Salmon Fried potato Sauce
Saturday	(1)	Farina Milk	Pea soup Junket	Bread and milk
	(2)	Oatmeal Milk Bread; peanut butter	Pea soup Meat stew Farina pudding	Bread and milk
	(3)	Cereal Pancakes	Corned beef Potato Stewed tomatoes	Beef hash Pickles Sauce

Menus for Six Days in Home B, (continued)

		<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Sunday	(1)	Cereal Milk	Poached egg on toast Orange Jelly	Bread and milk
	(2)	Same as (1)	Meat loaf Boiled potato Cream sauce Cabbage salad Orange	Bread and milk Apple sauce cake
	(3)	Orange Cereal	Roast mutton Potato Stewed corn Apple pie	Cold meat Lettuce salad Apple sauce
Monday	(1)	Farina Milk	Tomato soup Crackers Apple pudding	Bread and milk
	(2)	Same as (1)	Baked hash Brown Betty	Bread and milk Corn bread Maple syrup
	(3)	Cereal Bacon	Cold meat Potato Pumpkin pie	Creamed beef Potato Baking powder biscuits Syrup
Tuesday	(1)	Farina Milk	Spaghetti with cream sauce Baked apple	Bread and milk
	(2)	Same as (1)	Baked beans Creamed beef Sliced onions	Cheese custard Noodles Prunes Milk
	(3)	Cereal Pancakes; syrup	Meat stew Onions Potato Tapioca with sauce	Cold meat Fried potato Prunes

Tea or coffee served with two meals to adults.

Bread and butter with each meal.

Menus for Six Days in Home C

For children over three years and adults

	<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Saturday	Oranges Oatmeal Toast	Bacon with milk gravy Steamed potato Beets Celery Rice pudding (for children) Apple pie (for adults)	Cornmeal mush Lettuce salad Apple sauce Cocoa
Sunday	Cooked cereal Toast Eggs	Mashed potato Mashed rutabaga Chicken pie Pickles Jello with cream	Oranges Post Toasties Graham crackers
Monday	Apple or banana Cream of wheat Toast	Milk gravy Potato patties Left-over vegetables Baked apple	Potato soup Crackers Apple butter
Tuesday	Oatmeal Toast Hot milk	Vegetable soup Crackers Baked potato Boiled beef Tapioca pudding	Rice with raisin Apple sauce
Wednesday	Farina Toast Cocoa	Baked beans Baked potato Creamed onions Rice pudding	Creamed potato Baked apples Milk
Thursday	Vitos Toast Hot milk	Hamburg steak Baked potato Cold slaw Chocolate Blanc Mange	Fried potatoes Corn bread Syrup

Cereal served with milk and sugar.

Bread and butter with each meal.

Tea or coffee served to adults.

Menus for Week in Home D

	<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Friday	Oranges Oatmeal Cocoa	Noodle soup Roast beef Mashed potato Bread pudding	Cream of barley Cocoa
Saturday	Oatmeal Cocoa	Pea soup Scrambled eggs Mashed potato Jello	Spaghetti with milk Cocoa
Sunday	Cream of wheat Cocoa	Parsley soup Meat stew Mashed potato Creamed carrots	Rice with milk Cocoa
Monday	Cream of rye Cocoa	Vegetable soup Boiled fish Mashed potato Prune sauce	Baked potato Pickled herring Cocoa
Tuesday	Oranges Oatmeal Cocoa	Vegetable soup Meat loaf Mashed potato Prune sauce	Cream of barley Cocoa
Wednesday	Cream of rye Cocoa	Corn soup Boiled fish Mashed potato Baked apples	Bananas with cream Cocoa
Thursday	Milk toast Cocoa	Noodle soup Veal loaf Potatoes Prune sauce	Cream of wheat Cocoa

Cereals served with milk and sugar.

Bread and butter with each meal.

A study of the menus from Home D would seem to indicate that these comments are less true of this home than of the other three. These meals show a scheme through^{out} the week that is apparently not the result of chance. It is a simple matter to formulate the plan which the superintendent had in mind:

<u>Breakfast</u>	<u>Dinner</u>	<u>Supper</u>
Fruit (?)	Soup	Cereal or other
Cereal	Meat, fish or egg	starchy food
Cocoa	Potato	Cocoa
	Simple dessert	

A study of the menus for Home D will show that this plan was followed consistently throughout the week.

As a rule, the dinners in the menus for Home A (II) show more careful planning than the other meals - consisting uniformly of meat, potato, one other vegetable and dessert, but on the whole the lack of a definite plan in the menus for Homes A (II), B and C is quite apparent. The advantages of careful planning of the meals would be shared by those preparing the meals and those partaking of the food when served. The ordering for the day would be simplified; the time of employees and the fuel required in the preparation of the food would be used more economically; there would be a greater variety in the kind of food and in the method of preparation; better combinations of food would result; left-overs would be served in more attractive ways; and the important groups of food would be supplied regularly and in amounts adequate for all the needs of maintenance and growth.

Without going into an analysis of each of the menus, a few illustrations will indicate some of the things which might be avoided by more careful planning.

1. Repetition in the same meal of foods having somewhat the same function, e.g., apple sauce, syrup and jelly; fried potatoes and hash; fried potatoes, cold meat and beans.
2. Repetition of the same food several times in one week, e.g., cold meat, six times; fried potatoes, four times; pancakes, three times.
3. Serving of food difficult for children to digest, e.g., hot breads, griddle cakes, fried foods and heavy desserts.
4. Unnecessary variety in foods to be prepared for different groups for the same meal (as in Home B). For instance the macaroni and cheese served on Friday for the younger children might well have been prepared in larger amount and served as the main dish for the older group as well. The work in the kitchen would be materially simplified by such a change.

In order to insure an adequate diet, it is suggested that in planning for the day's meals for children, the following be included:

Milk in abundance - to provide calcium, phosphorus, protein and vitamins.

Butter - the best source of the vitamin known as fat-soluble A.

Bread and well cooked cereals to furnish the energy required. Hot breads should not be served.

Fruit once a day as a source of vitamin and mineral.

Potatoes, served in many ways, but not fried, and some other vegetable each day. Vegetables used freely are a valuable source of the energy, vitamin and mineral requirements.

Meat, fish or eggs - not necessarily every day.

Desserts, if served, which are simple and easily digested, made of milk

cereals, eggs or fruit.

The whole meal should be planned for the children, rather than for the adults. Therefore, fried foods and highly-seasoned foods should be ^{not} ~~be~~ ^{provided} ~~omitted~~. Coffee and tea are easily provided for the adults, if desired.

The menus on pages 71 and 72 were prepared for the University Farm Dining Hall. They are reproduced here to show in a concrete way that it is possible to provide at a low cost, meals which are varied, wholesome and well balanced. These meals are provided for boys and girls averaging about seventeen years of age, at a cost of \$6.50 per week which includes overhead expenses. It is true that the conditions are not strictly comparable for the two groups of persons, but there is nevertheless much to be gained by studying the two types of menus presented.

Menus for Week - University Farm Dining Hall

(Meals served during the same week as those reported from Home A.)

	<u>Breakfast</u>	<u>Luncheon</u>	<u>Dinner</u>
Monday	Stewed figs Cream of wheat	Peanut butter soup Left overs Bread pudding Vanilla sauce	Hungarian Goulash Mashed potato Buttered carrots Chocolate cake
Tuesday	Baked apple Milk toast	Browned potato Creamed cabbage Fruit whip	Pork chops Escalloped potato Stewed corn Peach sauce Gingerbread
Wednesday	Apricot sauce Oatmeal	Spaghetti and tomatoes Corn bread and syrup Fig tapioca pudding	Creamed beef Steamed potato Mashed rutabaga Snow pudding Custard sauce
Thursday	Plum sauce Boiled rice with raisins	Escalloped potato Stewed corn Cocoa Graham crackers	Fish Creamed potato Buttered peas Banana cream pie
Friday	Stewed prunes French toast	Rice and cheese Stewed tomato Cornstarch pudding Custard sauce	Swiss steak Mashed potato Creamed onions Blackberry cobbler
Saturday	Sauce Cereal	Left overs Fruit gelatine Whipped cream	Baked lima beans Tomatoes Stewed corn Tapioca pudding
		(Supper)	(Dinner)
Sunday	Half orange Post Toasties Cinnamon rolls	Sandwiches. Pickles Cookies Banana	Rib roast Mashed potato Buttered peas Ice cream

Coffee was served for breakfasts.

Bread and butter with each meal.

Menus for Week - University Farm Dining Hall

(Meals served during the same week as those reported from Home B)

	<u>Breakfast</u>	<u>Luncheon</u>	<u>Dinner</u>
Monday	Prune sauce Ralston's cereal	Browned potato Left-over vegetables Pineapple sauce	Hamburg balls Gravy Mashed potato Creamed onions Blackberry cobbler
Tuesday	Plum sauce Milk toast	Cream of corn soup Baked kidney beans Fruit gelatine	Breaded veal hearts Creamed potatoes Buttered carrots White cake
Wednesday	Stewed peaches Oatmeal	Escalloped potato Corn bread and syrup Cocoa Graham crackers	Meat stew Parsley buttered potato Creamed peas Raisin tapioca
Thursday	Blackberry sauce Bran muffins Cream of wheat	Macaroni and tomatoes Mashed rutabaga Fruit whip	Baked beans Cabbage in vinegar Steamed brown bread Cottage pudding Lemon sauce
Friday	Stewed figs French toast	Fried potato Carrots and peas Bread pudding Vanilla sauce	Codfish balls Creamed gravy Steamed potato Breaded tomato Pineapple pie
Saturday	Cereal Toast	Cream of pea soup Left-over vegetables Left-over desserts	Weiners Escalloped potato Rutabagas Lemon rice meringue
		(Supper)	(Dinner)
Sunday	Half orange Post Toasties Cinnamon rolls	Cheese sandwiches Raisin bread Pickles Cookies Banana	Pork roast Dressing; gravy Mashed potato Corn and pimento Ice cream

Coffee was served for breakfast.

Bread and butter with each meal.

ANALYSIS OF EXPENDITURES

The expenditures for the last year (1920) have been analyzed and summarized in Table 22 . The items of expenditure were considered to be strictly comparable throughout except for the amount spent for salaries and wages in Home A. This institution differs from the others in that it is state-wide in its operations. It employs four District Superintendents whose duties are quite distinct from anything relating to the management of the home itself. For this reason these workers are not included in the organization chart for Home A. In the course of their duties they travel about the state securing funds for operating the home; investigating cases where children have been consigned to the home and if necessary conducting them thither; aiding materially in securing places for adoption for the wards of the organization and following up the cases of adoption with frequent visits to be sure that satisfactory care is being provided for the children. Therefore in the table, under Home A₁ the total expenditures include the salaries of the District Superintendents, while under Home A₂, these salaries are omitted. By this revision the percentage expenditures for Home A are believed to be justly comparable to those for Homes B, C and D. The figures for the four homes show a rather striking similarity. The greatest range of difference is in the percentages for salaries and wages which vary from 28.5 per cent in Home B to 44.9 per cent in Home A. This may be readily accounted for by taking into consideration: (1) that in Home A a training school for nurses is maintained which means more salaries paid for nurses and one relatively large salary paid for the services of the Head Nurse; and (2) that in Home B where the lowest per cent occurs, eleven persons - nine children and two adults - are provided with maintenance in partial payment of wages for certain of the employees.

Table 22 Analysis of Expenditures for the Year 1920, in the Four Homes Studied

Home	A ₁	A ₂	B	C	D	Average not inc. A ₁
Salaries and wages	54.7%	44.9%	28.5%	38.4%	38.3%	37.525%
Traveling and communication	3.7	4.5	0.9	1.0	0.7	1.775
Heat; water; light; power	11.5	14.0	18.8	12.7	10.4	13.975
Rent, taxes, insurance, etc.	0.2	0.3	2.9	1.4	7.2	2.950
Supplies						
Food	17.4	21.1	32.7	30.3	19.7	25.950
Clothing	1.7	2.1	0.7	0.6	2.7	1.525
Medical and nursery	1.5	1.9	0.6	0.4	0.3	0.800
Office	0.3	0.4	0.1	- -	1.7	0.550
Laundry	1.1	1.3	3.2	0.8	0.3	1.400
Household	2.2	2.6	2.6	2.1	0.1	1.850
Miscellaneous (Grounds, etc.)	- -	- -	4.4	0.3	1.5	1.550
Equipment and Repairs	2.5	3.0	1.4	11.9	17.1	8.350
Advertising and Printing	2.5	3.0	0.4	0.1	- -	0.875
Miscellaneous	0.7	0.9	2.8	- -	- -	0.925
Total	100 %	100 %	100 %	100 %	100 %	100 %
Total expenditure	\$28904.00	\$23784.00	\$17952.00	\$12491.00	\$18282.00	
Total number child days	13889	13889	(18000)*	10921	14274	
Expenditure per child per day	\$ 2.08	\$ 1.71	(\$1.00)	(\$ 1.14	\$ 1.28	

*It was not possible to secure the number of child days for Home B, from the existing records. Therefore an estimate was made based upon the number of dependent children in the home at the time when the study was made.

The percentages for food show considerable variation ranging from 19.7 per cent in Home ^D_A to 32.7 per cent in Home B, but it must be kept in mind that these are the ratios between the amounts actually spent for food and the total expenditures. In the cases of Homes C and D, for example, approximately the same amounts were spent for food (\$3783 for food in Home C and \$3594 for Home D), but since the total expenditures for Home D were much the larger for the same period of time, the relative amount spent for food was much less in Home D than in Home C. Food expenditures have been discussed in greater detail in connection with the dietary studies.

The methods of buying supplies materially affect the amounts spent for food. The amount spent by Home D is seen to be considerably less than that in the other three homes. This is undoubtedly due to the method of purchasing the monthly supplies in Home D. It happens that one of the members of the Board of Directors for this home is engaged in a successful commission business in the city and that he makes all of the large purchases of groceries for the home. In Home C only one order of groceries is placed monthly and, if at the end of the month, supplies seem to be running low, as happened to be the case at the time when the dietary study was being made, there seemed to be no provision made for supplementing the supplies from the neighboring stores. For instance, in this home, through an error in the order of the preceding month, no prunes or other dried fruit had been ordered. Consequently no food of this kind had been included in the menus for the current month. In Home B, one main order is placed each month, but about twice a week smaller orders of groceries are received with the meat supply - everything being purchased from one firm at wholesale rates. Frequent small purchases were observed in Home A. The neighborhood store was depended

upon to supply the daily wants, although here as in the other homes, one large monthly order was given to a down town store. The dependence upon a nearby store for the daily supplies is not without its disadvantages in the day's economy of time, as was shown by one case which happened to be observed. About 8:00 a.m. one of the little girls in the home was sent to the store for eggs and carrots and an hour later, another child was sent to the same store for one loaf of bread. It is therefore evident that in the purchasing of supplies, more careful thought and planning would eliminate the necessity for hasty and last-minute purchases and would save time for the persons employed with the result that the food provided would be better, more varied and also furnished at a somewhat lower cost.

A large quantity of food is undoubtedly donated to these homes, e.g., supplies of home-canned fruits and vegetables in Home B, much of the cereal in Home C and all of the milk in Home D; but there was no way of determining to what extent the total cost of the food was influenced by this factor.

It is thus seen that a large part of the funds for each institution must go toward the accounts of wages and food. Over 60 per cent of the total is accounted for by these two items. The remaining 40 per cent is variously distributed in the different homes and the variations are largely due to the conditions under which the homes are operated. The amount spent for clothing is relatively small in all of the homes varying from 0.6 per cent or \$74.96 in Home C to 2.7 per cent or \$493.61 in Home D and 2.1 per cent or \$499.46 in Home A₁. Wherever possible the parent or guardian of the child is quite generally expected to provide the necessary clothes. Numerous donations of clothing are also received by these homes.

The explanation given in regard to the salaries for Home A will also account for the relatively large per cents necessary for traveling and communication and for advertizing and printing in the same home. The total amounts for these items are considerably greater than the combined amounts for the same activities in the remaining three homes. The medical and nursery percentage is also larger than for any of the other institutions on account of the larger nursery.

The laundry expenditure listed in this table for Homes A, C and D refers only to supplies - the large element of service in the operation of the laundries being included in the salaries and wages. In Home B the laundry item includes the relatively large charge for having the laundry done in part outside of the home - a factor probably explained by the frequent change of employees in this home already mentioned. Under Equipment and Repairs, the percentages of 11.9 and 17.1 for Home C and Home D, respectively, are much larger than for the other homes. During this year, extensive repairs were made in Home C, including extra lighting and heating equipment; and in Home D, a large expenditure of this kind was necessary to equip the home for its first year of operation. The averages in the last column indicate the division of expenditures in the group as a whole.

In connection with the actual and percentage expenditures for the four homes, the number of "child-days" for the year 1920 was determined, from which the expenditure per child per day was computed. In Home B, it was impossible to obtain the number of child-days from the records which were available. The number was therefore estimated from the number of dependent children (fifty) in the home at the time when the study was made. The expenditure per child per day amounted to \$1.71 in Home A₂, \$1.00 in Home B, \$1.14 in

Home C, and \$1.28 in Home D. The figures for per capita daily expenditure are of great interest and yet considerable caution is necessary in comparing the figures thus revealed. The important question is not so much: "What is the per capita cost?" as; "What is the benefit to the child from the money so expended?"

SUMMARY

The more important findings for the four children's homes studied may be set forth as follows:

1. In the organization of service in the homes, there are three main groups of activities - housekeeping, nursing and janitor service. Special provision is made in each home for other activities not included in the above groups.
2. A quantitative study of the food consumed indicates that the supply is probably adequate in regard to the protein and mineral requirements but insufficient in the energy requirement for growing children.
3. A qualitative study of the food showed that not enough thought is given to the planning of the meals and that the supply of vitamins may be inadequate in some cases.
4. The milk supply was found to be a very important source of protein, calcium and phosphorus in the dietaries investigated.
5. A study of the weights of the children in relation to their heights revealed the fact that approximately one-fourth of the children are 7 per cent or more under normal weight, and therefore, possibly in need of a more liberal daily allowance of food.
6. The expenditures for different items vary somewhat but the homes studied are not sufficient in number to determine the amounts which should be spent for the several items included in the budget.

For assistance in the preparation of the price list included in the Appendix, for aid in some of the computations of the dietary studies, and for securing two sets of menus from the University Farm Dining Hall, the writer gratefully acknowledges the assistance received from Miss Lois Farmer. The writer wishes also to thank Miss Nola Treat and Miss Lenore Richards, managers of the University Farm Cafeteria and Dining Hall for permission to use the above data.

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APPENDIX

	Pages
Forms Used for Collection of Data	85 - 92
Table for Determining Percentages of Children	
Underweight or Overweight	93
Price List	94

Name of home
Date

Address
Data Recorded by

I. General Management

Public or private
Official in immediate charge of home
Organization or board to whom responsible.
Method of selecting residents

II. Building

Owner
Size, number of rooms ; number of stories
Capacity

Maximum capacity (children)
Number of children at date of study
Maximum capacity (adults)
Number of adults at time of study

Construction (frame, brick, etc.)
Fire protection
Grounds (size, etc.)

III. Service

Employee	Wages	Duties	Person to whom Responsible.

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GENERAL DATA ON INSTITUTIONAL HOMES (CONTINUED)

IV. Equipment

Kitchen

Approximate size
 Stove
 Tables
 Arrangement
 Provisions for storage

Refrigerator

Labor saving devices

Electrical appliances

Dining room

Approximate size
 Number of tables
 Number of chairs
 Arrangement of tables
 Method of serving

Living room

Approximate size

Sleeping rooms

Number
 Number of beds

V. Financial management

Sources of income (including gifts of clothing etc.)

Total annual income

Method of buying

Method of paying bills

Method of keeping records

DIETARY STUDY

DATA ON RESIDENTS

Name of home:

Data Recorded By:

Date:

Name	Nation- ality	Date of admission	Occupation	Age	Sex	Height	Normal weight	Per cent above or below normal	Factor	Meals per man per day

Total meals per man per day
Equivalent to one man _____ days.

DIETARY STUDY

DATA ON AMOUNT OF FOOD USED

Data Recorded by:

Name of home:

Date:

Food	Description	Weight of food in pounds				Cost data		
		Initial Inventory	Food purchased after initial inventory.	Sum of initial inventory and food purchased.	Final Inventory	Food used	Cost per unit	Total cost of food used

DIETARY STUDY

DATA ON NUMBER OF MEALS EATEN

Name of home:

Study begun:

(Month, day, year, meal)

Data Recorded by:

And Completed:

(Month, day, year, meal)

Duration of study:

days;

Meals.

Name	First day			Second day			Third day			Fourth day			Fifth day			Sixth day			Seventh day					
	B	D	S	B	D	S	B	D	S	B	D	S	B	D	S	B	D	S	B	D	S			

SUMMARY SHEET

Name of home
Date of study

Data Recorded by
Calculations made by

Authorities for
Analyses

Food	Percentage Composition				Calories per pound	Total weight of food used			Weights of constituents				Total Cal.
	Prot.	Ca.	P.	Fe.		A.P. Lb.	E.P. Lb.	Gm.	Prot.	Ca.	P.	Fe.	

TABLE SHOWING INCREASES IN WEIGHT AT VARIOUS AGES BY YEARS, QUARTERS, AND WEEKS

Age	BOYS			GIRLS		
	Year—52 Weeks Pounds	Quarter—13 Weeks Pounds	Week Ounces	Year—52 Weeks Pounds	Quarter—13 Weeks Pounds	Week Ounces
Birth to 1 year	13.45	3.3625	53.8	13.34	3.335	53.30
1 to 2 years	6.3	1.575	25.2	6.0	1.56	24.0
2 to 3 years	5.2	1.3	20.8	5.0	1.25	20.0
3 to 4 years	4.3	1.075	17.2	3.8	.95	15.2
4 to 5 years	4.0	1.0	16.0	3.6	.9	14.4
5 to 6 years	4.0	1.0	16.0	3.6	.9	14.4
6 to 7 years	4.3	1.075	17.2	4.3	1.075	17.2
7 to 8 years	5.0	1.25	20.0	4.3	1.075	17.2
8 to 9 years	5.1	1.275	20.4	4.3	1.075	17.2
9 to 10 years	5.8	1.45	23.2	4.3	1.075	17.2
10 to 11 years	5.3	1.325	21.2	4.3	1.075	17.2
11 to 12 years	7.2	1.975	31.8	4.3	1.075	17.2
12 to 13 years	7.9	2.0	32.0	4.3	1.075	17.2
13 to 14 years	10.9	2.725	44.0	4.3	1.075	17.2
14 to 15 years	13.2	3.05	48.8	4.3	1.075	17.2
15 to 16 years	13.6	3.40	54.4	4.3	1.075	17.2

The tables on pages 1 and 4 are based upon those on pages 2 and 3. The material of the latter for the first four years is taken from Holt's Diseases of Infancy and Childhood (1910)—that for the succeeding years is derived principally from the work of Ross, Burk, Rowlett and Simsbly. The weights and heights in Holt's table are without clothing while those of the later years are with indoor clothing but without shoes.

It will be noted that the figures for the later years differ from the Bôas-Bark tables by six months. Our reason for setting the figures forward half a year is that in their original form they represent averages which include the very large number of children whom our clinical experience and studies of entire school groups find to be seriously malnourished. The tables in this present run lower than the former ones and are therefore compared mainly with normal children. As the tables have been prepared before the best copy standard for use will such a time as sufficient data are secured from weighing and measuring a large number of children who are normal.

NUTRITION CLINICS FOR DELICATE CHILDREN
BOSTON, MASSACHUSETTS
44 DWIGHT STREET

NUTRITION CLINICS FOR DELICATE CHILDREN
TABLE OF AVERAGE WEIGHTS OF CHILDREN AT VARIOUS HEIGHTS
Also Showing Weights 7% and 10% Underweight for Height.

Height Inches	BOYS			GIRLS		
	Average Weight for Height Pounds	7% Under- weight Pounds	10% Under- weight Pounds	Average Weight for Height Pounds	7% Under- weight Pounds	10% Under- weight Pounds
*21	8.2	7.6	7.4	7.9	7.3	7.1
*22	9.7	9.1	8.7	9.0	8.4	8.0
*23	11.1	10.5	10.1	10.7	10.0	9.6
*24	12.5	11.9	11.5	12.0	11.3	10.9
*25	14.0	13.4	13.0	13.5	12.8	12.4
*26	15.5	14.9	14.4	15.0	14.3	13.9
*27	17.0	16.4	16.0	16.5	15.8	15.4
*28	18.5	17.9	17.5	18.0	17.3	16.9
*29	20.0	19.4	19.0	19.5	18.8	18.4
*30	21.5	20.9	20.5	21.0	20.3	19.9
*31	23.0	22.4	22.0	22.5	21.8	21.4
*32	24.5	23.9	23.5	24.0	23.3	22.9
*33	26.0	25.4	25.0	25.5	24.8	24.4
*34	27.5	26.9	26.5	27.0	26.3	25.9
*35	29.0	28.4	28.0	28.5	27.8	27.4
*36	30.5	29.9	29.5	30.0	29.3	28.9
*37	32.0	31.4	31.0	31.5	30.8	30.4
*38	33.5	32.9	32.5	33.0	32.3	31.9
*39	35.0	34.4	34.0	34.5	33.8	33.4
*40	36.5	35.9	35.5	36.0	35.3	34.9
*41	38.0	37.4	37.0	37.5	36.8	36.4
*42	39.5	38.9	38.5	39.0	38.3	37.9
*43	41.0	40.4	40.0	40.5	39.8	39.4
*44	42.5	41.9	41.5	42.0	41.3	40.9
*45	44.0	43.4	43.0	43.5	42.8	42.4
*46	45.5	44.9	44.5	45.0	44.3	43.9
*47	47.0	46.4	46.0	46.5	45.8	45.4
*48	48.5	47.9	47.5	48.0	47.3	46.9
*49	50.0	49.4	49.0	49.5	48.8	48.4
*50	51.5	50.9	50.5	51.0	50.2	49.8
*51	53.0	52.4	52.0	52.5	51.7	51.3
*52	54.5	53.9	53.5	54.0	53.2	52.8
*53	56.0	55.4	55.0	55.5	54.7	54.3
*54	57.5	56.9	56.5	57.0	56.2	55.8
*55	59.0	58.4	58.0	58.5	57.7	57.3
*56	60.5	59.9	59.5	60.0	59.2	58.8
*57	62.0	61.4	61.0	61.5	60.7	60.3
*58	63.5	62.9	62.5	63.0	62.2	61.8
*59	65.0	64.4	64.0	64.5	63.7	63.3
*60	66.5	65.9	65.5	66.0	65.2	64.8
*61	68.0	67.4	67.0	67.5	66.7	66.3
*62	69.5	68.9	68.5	69.0	68.2	67.8
*63	71.0	70.4	70.0	70.5	69.7	69.3
*64	72.5	71.9	71.5	72.0	71.2	70.8
*65	74.0	73.4	73.0	73.5	72.7	72.3
*66	75.5	74.9	74.5	75.0	74.2	73.8
*67	77.0	76.4	76.0	76.5	75.7	75.3
*68	78.5	77.9	77.5	78.0	77.2	76.8
*69	80.0	79.4	79.0	79.5	78.7	78.3
*70	81.5	80.9	80.5	81.0	80.2	79.8
*71	83.0	82.4	82.0	82.5	81.7	81.3
*72	84.5	83.9	83.5	84.0	83.2	82.8
*73	86.0	85.4	85.0	85.5	84.7	84.3
*74	87.5	86.9	86.5	87.0	86.2	85.8
*75	89.0	88.4	88.0	88.5	87.7	87.3
*76	90.5	89.9	89.5	90.0	89.2	88.8
*77	92.0	91.4	91.0	91.5	90.7	90.3
*78	93.5	92.9	92.5	93.0	92.2	91.8
*79	95.0	94.4	94.0	94.5	93.7	93.3
*80	96.5	95.9	95.5	96.0	95.2	94.8
*81	98.0	97.4	97.0	97.5	96.7	96.3
*82	99.5	98.9	98.5	99.0	98.2	97.8
*83	101.0	100.4	100.0	100.5	99.7	99.3
*84	102.5	101.9	101.5	101.5	100.7	100.3
*85	104.0	103.4	103.0	103.5	102.7	102.3
*86	105.5	104.9	104.5	104.5	103.7	103.3
*87	107.0	106.4	106.0	105.5	104.7	104.3
*88	108.5	107.9	107.5	106.5	105.7	105.3
*89	110.0	109.4	109.0	107.5	106.7	106.3
*90	111.5	110.9	110.5	108.5	107.7	107.3
*91	113.0	112.4	112.0	109.5	108.7	108.3
*92	114.5	113.9	113.5	110.5	109.7	109.3
*93	116.0	115.4	115.0	111.5	110.7	110.3
*94	117.5	116.9	116.5	112.5	111.7	111.3
*95	119.0	118.4	118.0	113.5	112.7	112.3
*96	120.5	119.9	119.5	114.5	113.7	113.3
*97	122.0	121.4	121.0	115.5	114.7	114.3
*98	123.5	122.9	122.5	116.5	115.7	115.3
*99	125.0	124.4	124.0	117.5	116.7	116.3
*100	126.5	125.9	125.5	118.5	117.7	117.3

*Without Clothing.

Table Used for Determining Percentages of Children Underweight or Overweight

Table I Price Per Pound of Foods Listed in the Dietary Studies
(A.P. unless otherwise stated)

1	Apples	\$ 0.10	46	Lard	\$ 0.21
2	Apples, dried	.18	47	Lettuce	.20
3	Bacon	.31	48	Macaroni	.08
4	Bananas	.10	49	Malt o'wheat	.12
5	Barley, pearl	.18	50	Milk, skimmed	.02
6	Barley, flour	.05	51	Milk, whole	.05
7	Beans, dry	.05	52	Milk, buttermilk	.03
8	Beans, string, canned	.10	53	Milk, Borden's condensed	.35
9	Beef, corned	.25	54	Milk, powdered whole	.90
10	Beef, dried	.22	55	Molasses	.05
11	Beef, Hamburg	.28	56	Mutton, leg	.32
12	Beef, shank	.10	57	Oats, rolled	.04
13	Beets	.03	58	Oleomargarine	.27
14	Bran	.11	59	Onions	.04
15	Bread, graham	.08	60	Oranges	.10
16	Bread, white	.09	61	Parsnips	.06
17	Butter	.50	62	Peaches, dried	.23
18	Cabbage	.02	63	Peas, canned	.27
19	Carrots	.03	64	Peas, dried	.10
20	Cauliflower	.08	65	Peanut butter	.22
21	Celery	.30	66	Pork, chops	.25
22	Cheese, American cream	.25	67	Post Toasties	.09
23	Cheese, cottage	.08	68	Potatoes	.02
24	Chicken	.38	69	Prunes	.13
25	Chocolate	.39	70	Pumpkin, canned	.27
26	Cocoa	.22	71	Raisins	.23
27	Coffee	.30	72	Rice	.12
28	Corn, canned	.10	73	Rycrip	.28
29	Cornmeal	.04	74	Sago	.07
30	Cornstarch	.05	75	Salmon, canned	.25
31	Crackers, graham	.22	76	Spaghetti	.10
32	Crackers, soda	.20	77	Spinach, canned	.08
33	Cream of Wheat	.20	78	Spinach, powdered	1.40
34	Dextri maltose	.50	79	Sugar, brown	.14
35	Eggs (E.P.)	.40	80	Sugar, granulated	.12
36	Farina	.05	81	Syrup, corn	.10
37	Flour, cracked wheat	.07	82	Tapioca	.07
38	Flour, graham	.07	83	Tea	.40
39	Flour, patent	.06	84	Tomatoes, canned	.05
40	Gelatine	.90	85	Tomato, soup	.20
41	Grapefruit	.15	86	Turnips	.02
42	Hominy grits	.18	86	Vitos	.20
43	Honey, strained	.33	87	Weiners	.15
44	Jam	.35	88	Zwieback	.25
45	Jello	.60			