A DIETARY STUDY

OF SOME KANSAS INSTITUTIONS UNDER CONTROL OF THE STATE BOARD OF ADMINISTRATION

By E. H. S. BAILEY

Professor of Chemistry, University of Kansas
Chemist, State Board of Health

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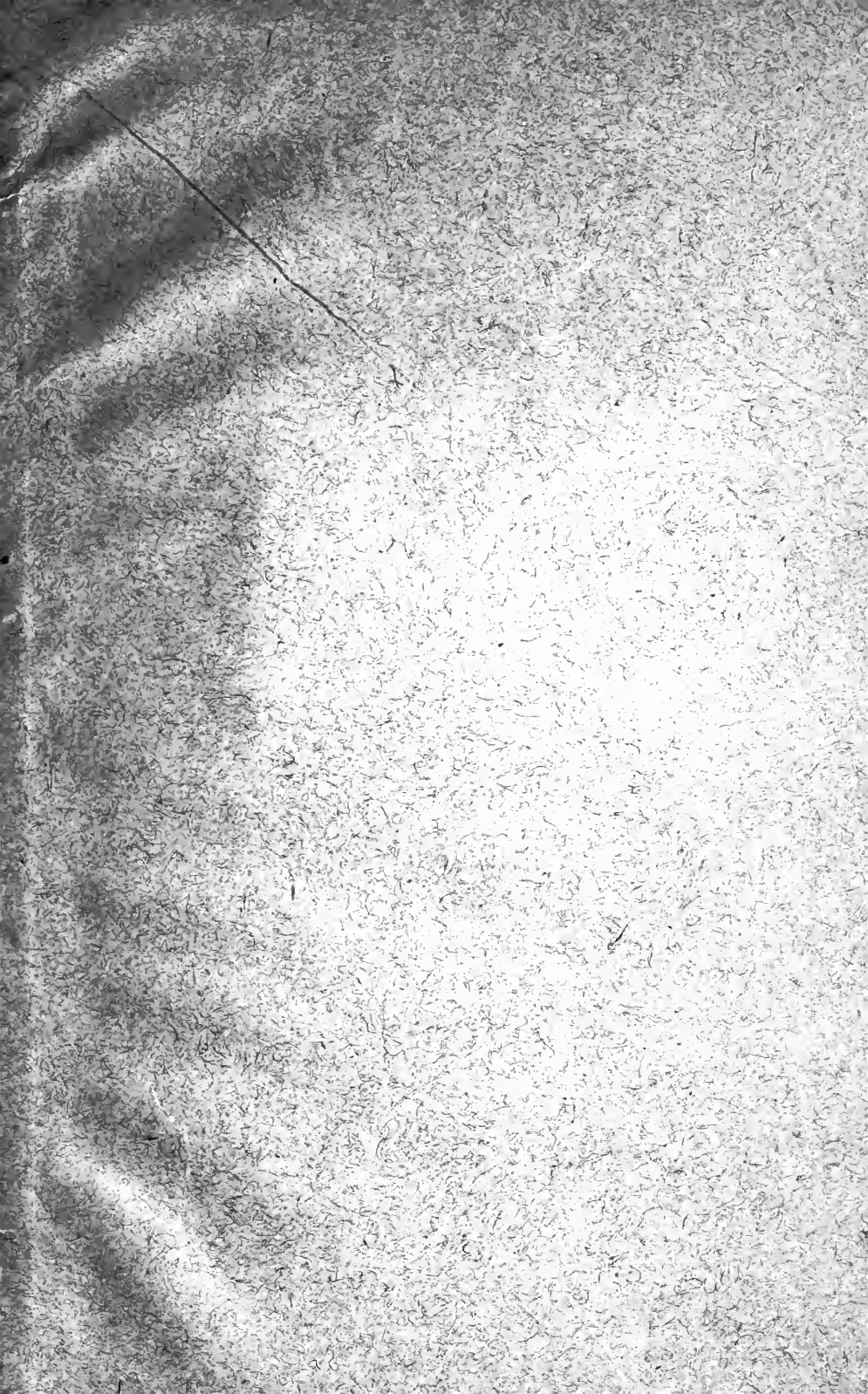

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LETTER OF TRANSMITTAL.

LAWRENCE, KAN., September 1, 1921.

To the State Board of Administration:

GENTLEMEN—In accordance with your request, I am transmitting herewith the abstract of my report on the dietaries of some of the state institutions under the control of your board.

Respectfully, E. H. S. BAILEY.

A Dietary Study of Some Kansas Institutions.

By E. H. S. Bailey.

INTRODUCTORY.

The importance of dietary studies has only been recognized for the past seventy-five years. The people of the United States have been regarded as generous feeders, as we grow all the food that we really need and have an excess to export to the nations abroad. The question as to the food of the individual becomes more complicated when applied to large groups of people, as to boarding schools, reformatories, orphanages and hospitals. Questions as to the quality, the quantity and the cost of foods furnished to such large units of people are constantly arising.

In order to study this understandingly we must first consider how food nourishes and sustains the body. The food is used in two ways: First, to build up and repair body tissue; and second, to furnish the body with the energy required to maintain vital processes and for muscular work. We are familiar in general with the fact that the protein or nitrogenous foods, such as meat, milk and eggs, are needed to build up the tissues, and that fats, or butter and oil, and carbohydrates, such as cereals and sugar, are needed to furnish the energy for work.

It is only within a comparatively few years that we have been able to measure dietaries in a scientific manner. Following the European chemists, Prof. W. O. Atwater was a pioneer in this country in making food investigations, and constructed what was called a respiration calorimeter, which was a large box in which an experimenter could remain for several days, all food used could be weighed, and all the products of the digestion and respiration could be analyzed. The work done, or mechanical energy produced by the food eaten, could also be accurately measured.

It has also been ascertained that if food is *burned* in a bomb calorimeter in the laboratory, the amount of heat evolved corresponds very closely to the *heat or energy* produced by the digestion of the food in the body. The analysis of a food tells us the *calories of heat* or energy, for it is established that—

One pound of protein gives.....	1,860 calories.
One pound of fat gives.....	4,220 calories.
One pound of carbohydrates gives.....	1,860 calories.

A *calorie* is the amount of heat that is required to raise the temperature of one kilogram of water from 0° to 1°C. This explanation is necessary that the data shown in the tables following may be intelligible.

There are *two general* methods of studying the amount of food needed for an individual. The *first* is to ascertain accurately how much food of each kind is consumed by a family, a club or an institution in a given time—say a month—then to find the food value of this total amount of

food, and from this data to get the amount per day per capita. In this method we consider the food under ordinary conditions of feeding, where no attempt is made to limit the diet.

The *second* method is to have "feeding squads" to whom determined amounts of food are given; here the diet can be regulated and different proportions of the nutrients given, and the waste matter, or "products of the metabolism," can be studied.

The *former* method, or a study of the food under normal conditions, has been used in the work on Kansas institutions. The chemistry department of the University, at the request of the state auditor's office, made some dietetic studies of the food used at the State Penitentiary, and these results are published in a report of the auditor under date of March 17, 1916. At the request of the State Board of Administration, the chemistry department has more recently made a study of other institutions under the care of the Board.

Some of the objects of this investigation were to find out as far as possible:

First: Whether the quantity of food used is sufficient for the inmates.

Second: Is the quality satisfactory?

Third: Are the different nutritives so distributed that there is a sufficient proportional quantity of carbohydrates, fats and proteins?

Fourth: Is it possible to substitute cheaper foods for those issued and still keep up the proper dietary?

Fifth: Could any other foods be added to the menu with advantage to the inmates?

Sixth: Is there any unnecessary waste in preparing, dispensing or serving the food?

Seventh: Are all the waste products utilized as far as possible by feeding to animals and in similar ways?

Eighth: Can the variety of food be increased without additional expense?

With these objects in view, the steward has been asked to furnish the quantity of each kind of food issued per month, and this investigation has been carried through for four or six months, or in some cases for an entire year, which would cover both the summer and winter dietary.

The results given in the following tables have been compiled from the steward's report, and following the tables is a discussion of the results, with suggestions as to any possible improvements that might be made.

As in most of these institutions the steward issues the needed foods daily to the different kitchens (at the Penitentiary there are four), an accurate account is kept of the daily population, or those who use this food, and from this data, at the end of the month, we have what the inmates have lived on for that month. In most of these kitchens the *waste* is fed to hogs, so that the actual loss of food material is small. The fruits, vegetables, etc., raised on the institution farm are accounted for, and issued to the inmates as if purchased at market price. This practice, of course, greatly lowers the actual cost to the state of keeping the inmates of these institutions.

There are in the state of Kansas the following institutions which provide shelter, food and clothing for the inmates:

Educational institutions:

1. School for Deaf, Olathe.
2. School for Blind, Kansas City.

Charitable institutions:

3. Topeka State Hospital.
4. Osawatomie State Hospital.
5. Parsons State Hospital for Epileptics.
6. State Training School, Winfield.
7. State Hospital, Larned.
8. State Orphans' Home, Atchison.
9. State Hospital for Tuberculosis, Norton.

Correctional institutions:

10. Penitentiary, Lansing.
11. Industrial Reformatory for Young Men, Hutchinson.
12. Industrial School for Boys, Topeka.
13. Industrial School for Girls, Beloit.
14. Industrial Farm for Women, Lansing.

The reports made on these institutions cover different periods of time, beginning in 1916. From the steward's report a table is made, giving the names of food materials, quantity; and, in pounds, the *weight* of *proteins, fat,* and *carbohydrates;* and finally, the total *calories* for that food. The calories are calculated according to a well-known method from the table of food analysis which is published by the United States Department of Agriculture, or the Laboratory Manual of Dietetics, by Dr. M. S. Rose. Figures in the column labeled "calories" show that the most of the energy from the food comes from bread, beef, butterine, beans, flour, lard, corn meal, milk, potatoes, rice and syrup. There is a great variety in the food, as shown in some cases by the tabulation of the varieties of food furnished for each month.

In the condensed reports of the different institutions which follow, a complete list of foods used for a single month, taken at random, is given, and this is followed by tables based on the study of the entire period. As this comparison of dietaries was made at different periods, partly during the war, it is not possible to compare too critically the institutions the one with the other, either with reference to costs or variety of foods served.

I.

KANSAS STATE PENITENTIARY.

(Abstract of Report.)

LAWRENCE, KAN., March 11, 1918.

Following is an abstract from the report on the food and dietary furnished at the State Penitentiary at Lansing.

QUALITY OF FOODS.

The stores examined were of good quality. A few special samples of foods were obtained for examination in the laboratory of the State University, and those showed that the quality was good, with no indication of adulteration.

FOOD SUPPLIED FOR EACH OF SIX MONTHS OF 1917.

The food is given out daily from the storeroom to the four kitchens—main, female ward, hospital, and insane—on requisitions. From these figures of the storekeeper we have obtained the amount issued to each kitchen for the six months beginning July 1, 1917. The total amount of each food for each of the above months, with the number of pounds of protein, fat and carbohydrates, and the calories or units of energy of each, and the sum for the month, are given in the accompanying tables. The detailed report for the single month of September is shown herewith.

KANSAS STATE PENITENTIARY.

TABLE A.—Dietary of all four kitchens for September, 1918.

Articles of Food.	Pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, green	8,232.00	24.69	24.69	889.05	1,761,648
Apples, dried	150.00	2.40	3.30	99.15	197.700
Baking powder	150.00	.....	.....	67.50	122,400
Beans, Mexican	1,100.00	240.90	14.30	716.10	1,842,500
Beans, white	1,100.00	247.50	19.80	655.60	1,720,400
Beans, Lima	560.00	103.36	8.40	369.04	888,160
Beans, green	2,935.00	61.63	8.80	202.51	516,560
Beef, fresh	19,484.00	2,825.18	3,273.31	.....	19,094,320
Beets	1,550.00	20.15	1.55	119.35	258,850
Butterine	1,320.00	15.84	1,095.60	.....	4,501,200
Carrots	525.00	4.72	1.05	38.85	83,475
Cabbage	4,650.00	65.10	9.30	223.20	560,790
Cheese	197.00	49.64	66.38	4.72	384,150
Corn, green	714.00	8.56	2.85	54.97	127,092
Corn flakes	78.00	4.29	1.17	63.18	127,218
Crackers, cream	347.50	33.90	42.28	343.60	676,282
Crackers, soda	198.30	19.43	18.04	144.95	371,812
Cucumbers	5,183.00	36.28	10.36	134.75	352,444
Ducks	316.00	48.66	50.56	.....	293,880
Eggs	228.00	27.13	21.20	.....	135,660
Flour	17,862.00	2,000.54	178.62	13,378.63	28,632,786
Lard	1,800.00	.....	1,800.00	.....	7,347,600
Meal, corn	600.00	55.20	11.40	452.40	967,800
Meal, oat	630.00	101.43	45.36	425.25	1,140,310
Milk	2,400.00	673.20	816.00	1,020.00	6,405,600
Onions	3,425.00	47.95	10.27	339.07	681,575
Oysters	15.00	1.32	.36	.58	5,025
Peaches	22.50	.15	.02	2.43	4,792
Peaches, dried	900.00	42.30	9.00	562.50	1,134,000
Pears	56.25	.16	.16	10.12	19,550
Pickles	50.00	.25	.15	1.35	3,500
Pork, fresh	3,125.00	234.37	1,712.50	.....	7,671,875
Pork, salt	5,339.00	315.00	4,214.83	.....	18,339,465
Potatoes, Irish	22,880.00	411.84	22.88	3,363.36	6,955,520
Potatoes, sweet	1,875.00	26.25	11.25	410.62	838,125
Prunes	200.00	3.60	.....	124.40	232,300
Radishes	290.00	2.61	.29	11.60	26,970
Raisins	250.00	8.05	10.50	239.75	492,450
Raspberries	28.50	.22	.59	16.07	32,775
Rice	500.00	4.00	1.50	395.00	795,500
Sardines	24.00	5.68	2.90	.....	22,176
Sausage, bologna	1,003.00	182.54	197.59	.....	1,137,402
Sugar, brown	300.00	.....	.....	285.00	517,200
Sugar, granulated	2,200.00	.....	.....	5,200.00	9,432,800
Sausage, pork	2,200.00	286.00	968.00	24.20	4,514,400
Susage, Vienna	2,706.00	757.68	598.02	165.06	4,018,410
Squash	1,500.00	10.50	3.00	67.50	154,500
Tomatoes	30,026.00	270.23	120.10	1,171.01	3,092,678
Yeast	200.00	23.40	.80	42.00	122,000
Totals	167,225.05	9,303.83	15,409.03	31,834.42	138,755,625

In addition to the report on all four kitchens, and as a check for comparison of the amounts of food used, a study is also made of the dietary for the months of October and December for the main kitchen and the female ward. The details of these are not given in the abstract.

KANSAS STATE PENITENTIARY.

TABLE B.—Summary for all four kitchens and of main kitchen and female ward.—Per capita use of food.

Dietaries.	Weight of foods, pounds.	Protein.		Fat.		Carbohydrates.		Calories.
		Pounds.	Grams.	Pounds.	Grams.	Pounds.	Grams.	
1917.								
July	5.57	0.36	163.29	0.56	254.01	1.45	657.72	5,441
August	7.55	.35	158.76	.51	231.33	1.60	725.76	5,821
September	6.92	.38	174.36	.63	285.76	1.39	630.50	5,748
October	5.65	.28	127.00	.38	173.36	1.59	721.22	5,332
November	5.58	.35	158.22	.57	258.55	1.46	662.25	5,734
December	4.88	.30	136.54	.39	176.90	1.42	644.11	4,799
Average	5.93	0.32	147.60	0.49	223.18	1.48	673.59	5,389
COMPARISON OF SINGLE KITCHENS.								
Main kitchen, October	5.63	0.33	152.40	0.44	199.58	1.60	725.75	5,383
Female kitchen, October	4.93	.25	113.40	.27	122.47	1.38	625.96	4,049
Main kitchen, December	4.77	.27	124.47	.38	172.35	1.39	630.50	4,557
Female kitchen, December	3.72	.21	96.25	.23	104.32	1.00	453.60	3,441

KANSAS STATE PENITENTIARY.

TABLE C.—Comparison of per capita use of some of the important staples at Lansing, for all four kitchens for each of six months, 1917.

Staples.	July, ounces.	August, ounces.	September, ounces.	October, ounces.	November, ounces.	December, ounces.
Flour	10.56	12.96	11.84	12.64	10.24	12.80
Hominy and corn meal	.50	.32	.32	1.44	1.12	1.00
Potatoes, Irish	10.72	13.44	15.04	11.84	14.88	15.04
Potatoes, sweet	.....	.....	1.12	8.48	9.12	4.12
Beans and peas, dry	1.92	1.44	1.76	1.44	1.60	1.44
Sugar	2.56	2.40	1.60	4.80	1.76	1.76
Sirup	3.84	4.64	.....	2.08	4.12	3.04
Beef	8.48	8.80	12.80	9.28	11.52	7.68
Pork, fresh and salt	5.60	3.84	5.60	1.76	4.48	1.44
Lard	.80	1.00	1.12	1.28	1.00	1.12
Sausage, four varieties	4.64	3.84	3.84	4.48	4.48	2.88
Butterine	.50	.64	.80	.64	1.00	1.00
Milk	16.48	15.52	13.44	10.24	8.00	7.68

DISCUSSION OF RESULTS.

Considering the "fuel value" or calories furnished by the food supplied, and the amount of protein per capita for each of the six months, it will be noted that the range of calories for the six months considered is from 4,799 to 5,821, with an average of 5,389. The female kitchen for October and December is 4,049 and 3,441. It is estimated that women need one-fifth less food than men. A recent authority, Doctor Davis, in Food in Health and Disease, quotes the following dietary standards for the United States:

	Grams protein.	*Calories.*
Women with light muscular work	90	2,400
Women with moderate muscular work	100	2,700
Men without muscular work	100	2,700
Men with light muscular work	112	3,000
Men with moderate muscular work	125	3,500
Men with hard muscular work	150	4,500

Doctor Langworthy, of the United States Department of Agriculture, gives similar figures for men only, which range from 2,450 without muscular work to 5,500 for very hard muscular work.

Considering the number of inmates fed one day during the six months at the Lansing Penitentiary, which is 144,975: 31,104, or 21.5 per cent, are in the female, insane and hospital kitchens and would not need the greatest quantity of food; of the remaining 78.5 per cent, many are engaged in light muscular work. It would seem then that an average of not over 3,500 calories ought to be sufficient for the inmates of this institution. The figures show that there is an excess of 1,800 calories per day per capita.

In regard to the amount of protein used, the proportion between that and the other food is fairly well maintained. There is, however, too much protein used, the average for the six months being 153 grams per day per capita, while 120 grams should be sufficient. There should be a decrease in the total food issued which would bring the protein down to nearer the required amount, and the proportion of carbohydrates (bread, sugar, syrup) and of fats (pork and sausages) might be still further reduced.

DIETARY TABLE, PER CAPITA.

Attention is further called to the nutritive ratio of dietaries per capita for each month, as shown in table B. This shows the actual weight of food used by each inmate, and of what it consisted. There is an appreciable decrease in the weight of the food for December, which is also shown by the calories consumed. The number of grams of protein consumed for each month is also given, which can be compared with the 120 grams assumed to be sufficient. There is a notable diminution in the number of calories and in the weight of the food for December. This may be due partly to the use of less sugar.

PER CAPITA USE OF STAPLE FOODS.

Referring to table C, a comparison is made of the staple foods used for each month, both in decimals of a pound, and, for convenience, in ounces.

Flour ranges from 10.24 to 12.96 ounces. This amount would give a little more than a pound of bread for each person. Corn meal and corn products should replace to a greater extent the wheat products.

Sweet potatoes evidently when served do not take the place of Irish potatoes, as might be the case, but are served in addition to the Irish potatoes.

In regard to sugar and sirup, the United States, before the war, used of sugar 3.95 ounces per capita.

	Per capita.
Hoover's estimate of amount necessary	1.58 ounces
France uses	.57 ounces.
England uses	1.14 ounces.
Italy uses	.39 ounces.

The figures shown above for the Kansas Penitentiary show the use of 2.5 ounces, with an addition of 3.5 ounces in the sirup, thus making 6 ounces all together.

The amount of beef varies from 8.48 ounces to 12.8 ounces, but to this, for animal food, must be added the pork, lard and sausages.

The amount of butterine is not excessive, and increases during the cold weather, as would be expected.

CLASSIFICATION OF GROUPS OF FOODS.

All four kitchens, each of six months—per cent of calories of total calories.

Classes.	*July.*	*Aug.*	*Sept.*	*Oct.*	*Nov.*	*Dec.*
Breadstuffs	26.53	26.07	23.75	29.79	22.50	32.62
Vegetables	9.60	13.46	13.76	13.51	13.34	12.75
Fruits	3.39	2.12	2.78	1.97	2.93	3.54
Sugar, sirup	13.60	14.07	8.53	14.78	11.63	11.70
Lard, butterine	3.50	7.30	7.17	9.73	8.32	11.17
Milk, cheese, eggs	6.91	5.74	4.99	4.00	6.79	3.68
Meats, fowls, fish	36.50	31.28	39.77	26.59	33.64	24.41

This shows a great variation in the different months; and although one class may take the place of another to a certain extent, yet it would seem that it should be more uniform.

FOOD COST, PER CAPITA.

A practical study of the per capita cost of food for inmates of penitentiaries in some of the surrounding states is given below. More detailed information will be furnished on this point when comparison with the different institutions is completed.

	Cost per day per capita.
Indiana penitentiary (Michigan City)	14.9 cents.
Kentucky penitentiary	17.3 cents.
Minnesota penitentiary (Stillwater)	23.0 cents.
Missouri penitentiary	24.0 cents.
Illinois penitentiary (Joliet)	37.0 cents.
Kansas penitentiary (Lansing)	39.5 cents.

SUMMARY.

1. Since the amount of food supplied appears to be higher than necessary, it should be decreased as much as can be done without injury to the health and well-being of the inmates.

2. The use of 20 per cent of corn meal, rye flour or some other substitute in the bread is to be commended. Bolted corn meal, rather than a corn flour that has been degerminated and thus deprived of most of its fat, is recommended for use.

3. The amount of sugar products and sirup is still too high. Although starch is a satisfactory food when muscular exertion is required, if a part of it is replaced by sugar there is less tendency to fatigue. As much as five ounces per day can be utilized in the body, but so much is not necessary.

4. If more lard is used than is furnished by the farm, a substitute consisting largely of vegetable oils and fats, a number of which are on the market, may be substituted for a part of the lard purchased, at a considerable saving.

5. As the protein foods, such as meats, sausage, etc., are usually the most expensive part of the diet, these should be diminished, in the interest of economy.

6. Fish is more rapidly and just as completely digested as meat. It is extensively used as a part of the dietary of most public institutions. It will add to the variety of the diet, and if bids were asked for a definite delivery per week, its use might diminish the cost of protein foods.

7. The use of larger quantities of vegetables and fruits, especially in season, will add greatly to the bulk of the food, and allow a decrease of the heavier staple foods. If the vegetables and fruits can be raised on the farm, so much the better.

8. At the beginning of the season complete arrangements should be made by the purchase of a suitable canning apparatus to can large quantities of fruit and vegetables, especially corn, peas, tomatoes, sweet potatoes, pumpkins, peaches and pears. Much of this material can be raised on the farm.

9. In some states, especially in Illinois, a system of dietaries is carefully worked out for the institutions, and those in charge of the kitchen are required to follow them in the serving of meals to the inmates.

10. As the matter of per capita cost of the food is involved in all the statements made above, no definite suggestions on this point are necessary.

LAWRENCE, KAN., April 20, 1918.

In order to arrive more accurately at the amount of food used in a given time, a careful account of food used in the main kitchen daily, from March 11 to April 9, 1918, inclusive, was made, and from the total amount of protein, fat, carbohydrates and calories for these periods the following per capita use of foods was determined:

PER CAPITA USE OF FOODS FOR FIVE-DAY PERIODS.

Date.	*Protein.*	*Fat.*	*Carbohydrates.*	*Calories.*
March 11-15	140.61	199.98	734.80	5,409
March 16-20	113.40	226.80	548.80	4,587
March 21-25	131.54	185.97	557.92	4,572
March 26-30	154.22	172.36	604.80	5,698
March 31 to April 4	127.00	204.00	585.00	4,416
April 5-9	108.86	158.76	508.00	4,000
Average	129.32	191.31	589.88	4,780

LAWRENCE, KAN., October 10, 1918.

Referring to a report on the dietary of the State Penitentiary at Lansing, under date of March 11, 1918, and to a supplementary report under date of April 20, 1918, on the food actually used for five-day periods from March 11 to April 9, the officers of the institution kindly gave the data for making another special test of the food for seven-day periods from May 12 to June 10. It was thought that a seven-day period would show more fairly the quantity of food actually used, as the coal miners especially cleaned up a certain amount of coal in a weekly run, and did more work at the beginning of the week than at the end. This test was made especially to ascertain whether any improvement had been made in the direction of decreasing the actual amount of food used, as well as in diminishing the total protein and carbohydrates in the diet.

The tests were made on the main kitchen and women's kitchen separately. As the number fed from the main kitchen is so much larger than that from the other kitchens, it is better to derive most of the conclusions from an inspection of these figures.

KANSAS STATE PENITENTIARY.

Main kitchen, summary of seven-day periods, per capita use of food.

Period.	Attendance.	Amount, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.
May 12 to 19.....	3,657	4.30	167	267	562	5,326
May 19 to 26.....	3,790	4.32	167	244	585	5,287
May 26 to June 2.....	3,701	3.88	145	244	467	4,872
Average.....	3,716	4.16	159	251	538	5,161

CONCLUSIONS.

A consideration of the results shown in the table for the three seven-day periods shows that the protein, fat and carbohydrates furnished are all very high, even for the average of the men fed from this kitchen. The protein is 167, 167, 145 grams per day per capita, while 125 grams would certainly be a great excess. Doctor Langworthy, an authority on nutrition, in the United States Year Book, Department of Agriculture, 1907, gives the figures as for average of 162 studies of "Men at moderate muscular work," farmers, artizans, laborers, etc., protein 100 grams, with a total energy of the diet at 3,685 calories. Men at hard muscular work and athletes would of course require more food, but the average of such men belong to a different class from those in the penitentiary.

As the fats and carbohydrates are also high, the average of the calories for the three periods studied is 5,161, which is at least 1,500 more than necessary.

A chart was made representing a comparison, expressed in ounces, of the daily per capita consumption of food at Lansing State Penitentiary from May 12 to June 1, 1918, and the daily per capita consumption of food in national training camps. The data, which were for young and vigorous men in hard physical training, using the training-camp messes, was obtained from the article "Diet of the United States Army Soldier in the Training Camp," by Dr. John R. Murlin, in the *Journal of American Medical Association* for September 21, 1918.

The Lansing diet yielded 5,161 calories per day for the three weeks referred to. The training-camp diet messes yielded 3,963 calories per day.

In regard to fresh beef, the Lansing dietary for each week is nearly 50 per cent higher than that of the army messes. Fresh beef and pork taken together show that more is used at the Penitentiary than at the camps. In the case of bacon and sausage there is three times as much used as at the Penitentiary, and the fats from lard and compound are two and one-half times as much.

Butter and butterine is about the same in both tables. Twice as much syrup is used at the Penitentiary, but much less sugar, as the sugar ration had been cut down.

More than twice the weight of dried beans was used at the Penitentiary, and more cereals for each of the three weeks considered.

Except in the case of the first week, more potatoes were consumed in the army messes than at the Penitentiary.

More flour and more milk are consumed at the Penitentiary than in the camps. Dried and other fruits and vegetables do not show any startling difference in amounts.

The figures all indicate that without any loss in efficiency of the men at work, and in the interests of health and economy, the total amount of food can be appreciably cut down. While we are saving food in every possible way to send to our allies across the water, it is a suitable time to begin reforms in those institutions over which the state has control.

II.

STATE INDUSTRIAL REFORMATORY, HUTCHINSON.

(Abstract of Report.)

LAWRENCE, KAN., May 16, 1918.

The dietary of the institution was furnished me by Mr. J. N. Herr, superintendent, from the quantity of food consumed for the months of July, 1917, to February, 1918, inclusive. In each case, from the total amount of food used and a knowledge of each food product, the pounds of protein, fats and carbohydrates were computed. From this it was easy to obtain the total calories or food value of each foodstuff used.

Table A shows the amount of staples used per day per capita in each of the eight months.

Table B, subdivision 1, shows the amount of food per capita per day.

Table B, subdivision 2, is a comparison of dietaries for each of the eight months.

Table C is a classification of groups of foods for each of the eight months studied.

Table D shows the number of pounds and per capita of three food nutrients obtained from each of a selected list of foods.

As illustrative of table A, the dietary for October is given. Fifty different food products were utilized in the dietary for the period studied.

KANSAS STATE INDUSTRIAL REFORMATORY.

Dietary for October, 1917.

Articles of Food.	Pounds.	Protein, pounds.	Fat, pounds.	Carbo-hydrates, pounds.	Calories.
Apples	13,680.00	41.04	41.04	1,477.44	2,927,520
Baking powder	40.00	.....	.....	12.00	21,760
Beans, navy	900.00	202.50	16.20	536.40	1,407,600
Beans, green	1,770.00	37.17	5.31	112.13	311,520
Beans, Mexican	1,200.00	262.80	15.60	781.20	2,010,000
Beef, fresh	5,175.00	750.37	869.40	.....	5,071,500
Butter	30.00	.30	25.50	.....	104,640
Beets	1,960.00	25.48	1.96	150.92	131,320
Oleomargarine	480.00	5.76	398.40	.....	1,636,800
Catsup	6.00	.09	.01	.74	1,590
Cabbage	1,800.00	25.20	3.60	86.40	217,080
Cheese	40.00	11.52	14.36	.12	79,760
Carrots	75.00	.67	.15	5.55	11,925
Corn	15.00	.42	.18	2.85	6,667
Crackers	20.00	1.96	1.82	14.62	37,500
Egg compound	4.50	.74	.13	3.42	8,469
Flour	6,000.00	672.00	60.00	4,494.00	9,618,000
Hominy	62.00	5.14	.37	48.98	99,696
Lard	778.00	.....	778.00	.....	3,175,796
Macaroni	360.00	48.24	3.24	266.76	584,640
Meal, corn	100.00	9.20	1.90	75.40	161,300
Meal, oat	200.00	33.40	14.60	132.40	360,600
Milk	7,512.00	241.29	292.48	365.60	2,295,968
Onions	1,425.00	19.95	4.27	126.82	283,575
Oysters	15.00	1.32	.36	.58	5,025
Peaches	6.25	.04	.....	.67	1,331
Peas	15.00	.54	.03	1.47	3,765
Peas, split, dry	120.00	29.52	1.20	74.40	193,440
Potatoes, Irish	1,500.00	27.00	1.50	220.50	456,000
Potatoes, sweet	2,750.00	38.50	16.50	602.25	1,229,250
Pumpkins	2,180.00	10.90	2.18	56.68	130,800
Rice	900.00	7.20	2.70	711.00	1,431,900
Bologna	753.00	137.04	148.34	.....	853,902
Sugar	2,100.00	.....	.....	2,100.00	3,809,400
Sorghum	900.00	21.60	.....	567.00	1,067,400
Tomatoes	6,160.00	55.44	24.64	240.24	634,480
Turnips	3,300.00	29.70	3.30	188.10	409,260
Yeast	30.00	3.50	.12	6.30	18,300
Totals	64,161 75	2,757.54	2,749.39	13,462.94	40,810,479

KANSAS STATE INDUSTRIAL REFORMATORY.

TABLE A.—Amount of staples used per day per capita for each of the eight months.

Staples.	July and Aug., 1917, average.	Sept., 1917.	Oct., 1917.	Nov., 1917.	Dec., 1917.	Jan., 1918.	Feb., 1918.	Average.
	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
Flour	14.72	19.36	8.32	17.60	14.72	14.72	14.43	14.83
Macaroni	.20	.20	.50	.21	.13	.15	.96	.77
Hominy and corn meal	.016	.77	.22	1.62	.60	.....	.32	.69
Potatoes, Irish	6.56	6.56	2.08	7.52	12.80	14.50	4.48	7.73
Potatoes, sweet	.....	2.24	4.16	29.60	.....	.....	.....	12.00
Beans and peas, dry	3.04	2.88	3.04	2.40	2.72	2.72	2.03	2.69
Sugar	2.40	2.24	2.88	2.24	1.92	1.92	1.92	2.21
Sirup (in terms of sugar)	.22	.....	.83	.83	.83	2.56	2.03	1.22
Beef, fresh and dried	1.71	4.64	7.29	6.88	5.76	6.53	5.76	5.49
Pork, fresh and salt	6.56	.20	.....	1.17	1.22	1.02	1.18	1.89
Lard and shortening	1.04	1.13	1.12	1.17	1.12	.60	.64	.87
Bologna sausage	.64	.88	.96	.88	1.12	.....	.....	.89
Butterine and butter	.42	.73	.64	.72	.88	.18	.77	.62
Milk	7.52	9.76	10.24	10.08	10.72	11.8	11.36	10.19

DISCUSSION OF RESULTS.

It is noted with satisfaction that an average of 10.19 ounces of milk per day per capita is used. This is such a perfect food, to use in correcting deficiencies in diet, that the amount should be increased as much as possible. When produced on the farm, even when some of the fodder must be bought, its use tends to notably decrease the cost of living per capita. Dr. E. V. McCollum, the most recent authority on dietetics, advises the daily use of 24 ounces of milk as a minimum.

In considering table A the first thing noted is the irregularity of amounts of some of the supplies furnished. This is more probably due to inaccuracies of bookkeeping than to a real change in the amount of food furnished. If a supply for several weeks is issued to the kitchen at one time, a part of the amount is liable to be carried over from one month to the next, thus affecting the apparent food supplied to the inmates. As an illustration, 19.36 ounces of flour per day per capita is supplied in September and only 8.32 in October. It is evident from the average of the other months that about 14.5 ounces is used per day, but at least 25 per cent of the wheat flour should be replaced by corn or some other cereal.

There is great irregularity in the Irish-potato supply. This may be due to local causes, or to the accounting, as noted above. At any rate, with the present price of potatoes, their use should be pressed to the limit, and continued until new potatoes are fairly abundant. If the potatoes are kept in a dark, cool place and the sprouts thoroughly removed as often as they appear, the quality of the potato will not be seriously impaired.

In the case of sugar there is a slight decrease in the amount used in the later months, but a notable increase in the sirup, so that the sum of both, which is 2.62 ounces in July and August, increases to 4 ounces in February. This total saccharine material is probably more than absolutely needed.

The summary shows the amount of beef to be low in July and August, as should be the case in warm weather. This, however, seems to be more than replaced by pork.

The butter and butterine used is not excessive. (This is hereafter referred to.)

KANSAS STATE INDUSTRIAL REFORMATORY.

TABLE B (1).—Amount of food per capita per day.

Month.	Population.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.
1917.						
July and August	23,684	3.24	86.18	81.64	553.39	3,413
September	10,890	4.61	131.54	104.32	680.40	4,249
October	11,408	5.62	108.86	108.86	535.24	3,577
November	10,830	5.41	140.61	131.54	802.87	4,966
December	10,850	3.82	123.47	127.00	598.75	4,084
1918.						
January	10,819	4.77	145.15	95.25	666.79	3,705
February	9,968	4.00	122.47	113.40	639.47	4,235
Average	12,635	4.49	122.61	108.86	639.46	4,032

KANSAS STATE INDUSTRIAL REFORMATORY.

TABLE B (2).—Comparison of dietaries for each of eight months.

Month.	Grams of protein per capita.	Total weight.	Weight of protein.	Weight of fat.	Weight of carbohydrates.	Total calories.
July and August	86.18	76,774.06	4,503.13	4,419.69	28,894.26	80,836,619
September	131.54	50,290.50	3,237.20	2,567.56	16,418.91	46,273,384
October	108.86	64,161.75	2,747.54	2,749.39	13,462.94	40,810,479
November	140.61	58,614.75	3,380.38	3,200.79	19,177.93	53,780,518
December	123.47	41,505.75	2,935.00	3,113.49	14,362.83	44,314,393
January	145.15	51,625.00	3,568.40	2,299.37	15,901.70	40,966,170
February	122.47	39,883.25	2,628.75	2,516.90	14,133.92	42,227,960
Average	122.61	54,693.58	3,287.20	2,981.02	17,478.91	49,888,503

In considering a comparison of the dietaries for each of eight different months, as in table B (1 and 2), there is considerable variation in the per capita calories or heat units used, but the ratio between the sum of the fats and the carbohydrates together, and the protein, is fairly constant; that is, from 1:6 to 1:7. For some reason the protein used in July and August was low, which would indicate a vegetable diet. It has been previously noted that the beef was low during these two months and the pork high.

The protein used varies considerably in the different months, but the average (122.47) is quite satisfactory, especially when we consider the age of the inmates and their necessity for abundant food.

The calories (average, 4,032) is probably somewhat higher than necessary, as 3,500 would seem to be enough for good bodily health. If the sugar and sirup are diminished in quantity this will tend to reduce the amount of calories, and there will still be a sufficient quantity of nutritional foodstuffs.

In regard to the proportion of fat compared to carbohydrates, although no very definite statements are made, the standards noted below are recommended by different authorities for men with moderate muscular work. Experience has shown that to a certain extent carbohydrates may replace fats, but bodily health and vigor cannot be sustained without considerable fat. The proportions at the Hutchinson Reformatory are quite satisfactory:

ALLOWANCE OF FOODSTUFFS FOR A MAN AT MODERATE MUSCULAR WORK.

	Voit.	*Playfair.*	*Gautier.*
Protein	118 gms.	119 gms.	107 gms.
Fat	56 gms.	51 gms.	65 gms.
Carbohydrates	500 gms.	531 gms.	407 gms.

On the consideration of the food substances necessary for the maintenance of the health and growth of the body—namely, the proteins, fats, carbohydrates, mineral salts, and water—it has been assumed that the mixed diet used will contain a sufficient quantity of mineral salts and of water for proper building up and repair of the body. Such beverages as coffee and tea, although of great value in the menu, furnish no nutritive substances and therefore are not considered.

KANSAS STATE INDUSTRIAL REFORMATORY.

TABLE C.—Per cent classification of groups of foods for each of eight months.

Classes of Foods.	July and Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Breadstuffs	46.98	41.97	30.24	41.98	42.12	43.02	45.34
Vegetables	15.99	13.95	18.22	24.60	13.32	9.41	11.67
Fruits	2.97	2.89	7.18	2.89	4.38	6.66	5.54
Sugar, sirup	8.93	5.98	11.95	7.69	7.73	13.54	10.82
Lard, butter, butterine	9.99	10.69	12.04	9.55	11.76	4.85	7.78
Milk, cheese, eggs	6.98	6.94	5.82	5.90	5.15	6.07	5.25
Meats, fowls, fish	6.06	8.99	14.53	13.25	15.98	16.36	13.78

Table C shows what proportion of the total food used belongs in each of seven classes. Breadstuffs, vegetables and fruits together constituted from 55.64 per cent of the food in October to 68.48 per cent in November, or an average of nearly two-thirds of the food used. There is quite a variation in the amount of sugar and sirup (taken together) used, as the per cent is twice as much in January as in September. More sugar can be taken care of by the body in winter than in summer, so this difference in amount is in the right direction. The same thing is true of the animal foods, which are higher in percentage used in the later months of the year.

By an intelligent selection of foods in this way—that is, by pushing the use of cereals and vegetables in the summer and allowing more sugar, fats and animal foods in the winter—the health of the inmates will be improved and the cost of maintenance will be decreased.

Table D shows in rather an interesting way from what foods the proteins, fats and carbohydrates are obtained during each month. The analysis of this table is perhaps best made from the average of the eight months, although the monthly variations are of interest.

Since *proteins* from vegetable sources are usually much cheaper than those from animal sources, the use of vegetable proteins should be encouraged whenever this can be done without sacrifice of health conditions. Although it is probably true that a diet containing protein entirely from peas, beans and cereals would not be satisfactory, yet there is little danger of crowding the vegetable diet too far under present conditions. With more than a third of the protein (35 per cent) coming from animal sources, there is no danger of an excess of vegetable protein; in fact, the animal protein might be much decreased without ultimate deficiency in this class of nutrients.

Looking for the source of the *fat* in the diet, it is evident that at least 55 per cent of it is of animal origin. The butterine and oleo and the compound lards are largely of vegetable origin. While, as before stated, milk, cheese and eggs should be used as freely as possible, the oleo and compound lards for shortening (all vegetable fats) may be used to replace fat pork and the fat of beef. This means a saving of animal fats for export and a reduction of cost by the purchase of vegetable fats.

There is not so much to be said of the source of the carbohydrates, for bread and breadstuffs must furnish at least one-half. The free use

TABLE D.—Showing the number of pounds and the per capita of protein and fat obtained from each of the foods mentioned.

PROTEINS.

Source.	July and August.		September.		October.		November.		December.		January.		February.		Average.
	Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct.	Lbs.	Per ct.	Per ct.
Beans and peas, dry	939	20.8	394	12.1	494	20.9	368	10.8	397	13.5	411	11.5	302	11.4	14.4
Beef, fresh and dried	606	13.4	509	15.7	750	31.8	730	21.6	571	19.7	639	17.9	517	19.6	19.9
Bologna	173	3.8	109	3.3	137	5.8	109	3.2	135	4.6	.....	.....	.....	.....	4.1
Cereals	1,590	35.3	1,590	49.1	777	32.9	1,616	47.8	1,279	43.5	1,175	32.9	1,373	52.2	41.9
Fruit and vegetables	255	5.6	107	3.3	225	9.5	45	1.3	23	.09	138	3.8	81	3.0	3.9
Milk, cheese, eggs	460	10.2	334	10.3	252	10.6	226	6.7	240	8.2	261	7.3	233	8.0	8.7
Potatoes, sweet and Irish	176	3.9	102	3.1	65	2.7	371	10.9	154	5.3	176	4.9	50	1.9	4.7
Pork, fresh and salt	86	1.9	18	0.5	.....	.....	60	1.7	56	1.8	31	0.8	47	1.7	1.4

FAT.

Beef, fresh and dried	530	11.9	510	19.8	869	31.6	766	23.9	661	21.2	741	32.2	600	23.8	23.5
Bologna	184	4.1	118	4.6	148	5.3	118	3.7	147	4.7	.....	.....	.....	.....	4.5
Butter and oleo	538	12.1	421	16.4	424	15.4	411	12.8	498	15.9	99	4.3	398	15.8	13.2
Milk, cheese, eggs	547	12.3	408	15.8	306	11.1	274	8.5	291	9.3	316	13.1	282	11.2	11.6
Cereals	161	3.6	165	6.4	84	3.0	157	4.9	137	4.4	121	5.3	248	9.8	5.3
Lard and shortening	1,562	35.3	798	31.0	778	28.3	790	24.9	774	24.8	397	17.3	404	16.0	25.3
Pork, fresh and salt	764	17.2	52	2.2	.....	.....	416	13.0	535	17.1	553	24.0	528	20.9	15.7
Vegetables and fruit	124	2.8	86	3.3	137	4.9	170	5.3	65	2.0	66	2.8	51	2.0	3.3

of peas, beans, potatoes and vegetables releases some of the cereals for export, and tends to diminish cost of maintenance. The rather abundant use of saccharine products has already been discussed. It is understood that at least 25 per cent of vegetable substitute is used with the cereals. If corn is the substitute selected, a fresh bolted corn meal, made from the whole grain, is more nutritious than a corn flour made from the degerminated cereal.

SUMMARY.

1. In order that a satisfactory check may be kept on the actual amount of food used, it is advisable to see that only the food actually used for each period, say of a month, be charged to the kitchen.

2. The amount of sugar used should be decreased as much as possible, but this may partially be replaced by sirup, which is made mostly from corn. Sorghum can be raised in large quantities, and the use of this sirup will decrease the cost of maintenance.

3. Increase the amount of milk used as rapidly as possible. It is not only a valuable food, but it contains certain little-known substances, often called "vitamines," that are essential to growth and bodily vigor.

4. There would probably be no loss in physical and mental powers of the inmates, by cutting down the total amount of food used ten per cent. The proportion of the different food constituents is quite satisfactory.

5. The intelligent *selection* of the *foods* used, so that less fat, meat and sugar are used in the warmer months, and more vegetables and fruits, will tend to improve the health of the inmates and at the same time will result in a diminished cost.

6. Use vegetable protein as much as possible, at the same time decreasing that from animal sources, with the exception of milk. Raise as many vegetables as possible on the farm, and can or dry for winter use.

7. Since it is now possible to obtain butter substitutes made from the vegetable oils, and lard substitutes mainly from the same source, there is no objection to using as much of these as is necessary to yield the fat required.

8. In the use of wheat substitutes, use fresh corn meal.

9. Hoover's estimate of the amount of sugar necessary per day per capita is 1.58 ounces, while the average used in this institution is 2.21 ounces. The sugar may therefore be diminished, while any deficit may, if necessary, be made up by the use of sirup.

10. If it is possible in the vicinity of Hutchinson to make arrangements to serve fish, or if salted or frozen fish can be obtained for a portion of the year, the diet would be improved without increased cost.

III.

OSAWATOMIE STATE HOSPITAL.

(Abstract of Report.)

OUTLINE OF INVESTIGATION.

LAWRENCE, KAN., September 26, 1918.

The dietary of the institution for ten months, beginning July, 1917, was furnished by Supt. F. A. Carmichael. In each case the quantity of food used or issued to the kitchen was reported for each variety of food.

Table A shows the total amount of each food for each month, from which is computed the pounds of protein, of fats and of carbohydrates, and the total calories. A summary for each month, with the computation of the amount per day per capita, is given.

As illustrative of this table, the food used for the month of October only is given, but all ten months are considered in the summary.

Table B shows the per cent of two food nutrients obtained from each of eight classes of food for each month.

Table C gives a comparison of the per capita use of some of the important staples for each of the ten months.

Table D gives a comparison of the dietaries for each of the ten months, showing the per cent of calories per capita of total calories.

Table E is a summary of the dietaries for the ten months, showing the per capita use of food, and the cost.

OSAWATOMIE STATE HOSPITAL.

TABLE A.—Dietary for October, 1917.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, canned	387.50	1.01	8.10	183.60	377,000
Apples, dried	1,000.00	16.00	22.00	681.00	1,350,000
Apples, fresh	3,420.00	10.26	10.26	369.36	731,880
Apricots	225.00	8.10	.....	155.70	306,000
Bacon	109.00	10.35	64.74	.....	283,073
Baking powder	35.00	.....	.....	10.50	19,040
Bananas	20.00	.16	.08	2.86	5,800
Beans, white	1,460.00	328.50	26.28	870.16	2,283,440
Beans, Lima	723.00	130.86	10.84	476.45	1,146,678
Beans, green	675.00	14.17	2.02	46.57	119,400
Beans, brown	885.00	189.12	15.93	527.46	1,384,140
Beef	9,681.00	1,403.74	1,626.40	.....	9,487,380
Beets	1,358.00	17.65	1.35	104.56	226,786
Blackberries	185.00	1.48	3.88	104.34	207,940
Cabbage	13,100.00	184.66	26.38	633.12	1,582,800
Catsup	4.00	.06	.00	.49	1,060
Celery	144.00	1.29	.14	3.74	9,792
Cherries	336.00	3.64	.28	72.59	139,440
Cheese	481.00	138.52	172.67	1.44	957,114
Chicken	46.00	7.30	5.65	.....	34,546
Chocolate	17.00	2.19	8.27	5.15	47,134
Chowchow	30.00	.33	.12	1.20	3,330
Cocoanut	7.00	.44	4.01	2.20	21,106
Corn	60.00	2.52	1.08	17.10	40,050
Cornstarch	17.00	.....	.....	15.30	27,744
Crackers, cream	100.00	9.70	12.10	69.70	13,500
Crackers, soda	471.50	46.20	42.90	344.66	884,062
Crackers, Graham	116.00	11.60	10.72	85.60	220,864
Cucumbers	464.00	3.24	.92	12.06	31,552
Eggs	1,249.00	148.63	116.15	.....	743,155
Eggplant	320.00	3.84	.96	16.32	40,640
Figs	750.00	32.25	2.25	556.50	1,077,750
Flour, white	25,400.00	2,844.80	254.00	19,024.60	40,716,200
Gelatine	1.50	1.37	.00	.....	2,493
Gooseberries	57.00	1.70	.....	22.40	43,604
Grits	500.00	41.50	3.00	395.00	804,000
Ham	1,641.00	233.02	548.09	.....	2,660,061
Hominy	930.00	77.19	5.58	734.70	1,495,440
Lard	1,000.00	.....	1,000.00	.....	4,032,000
Lard compound	398.00	.....	398.00	.....	1,624,636
Lemons	69.00	.48	.34	4.07	9,660
Macaroni	520.00	69.68	4.68	385.32	844,480
Meal, oat	2,020.00	337.34	147.46	1,337.24	3,642,060
Meal, corn	20.00	1.84	.38	15.08	32,260
Melons	120.00	.24	.12	3.24	6,840
Milk, condensed	240.00	23.04	22.32	26.88	181,680
Milk	30,538.00	1,007.75	1,221.52	1,526.90	9,588,632
Mutton	876.00	132.27	128.77	.....	765,624
Oleomargarine	3,000.00	36.00	2,490.00	.....	10,230,000
Onions	385.00	5.39	1.15	34.26	76,615
Oranges	38.50	.23	.04	3.27	6,506
Oysters	36.00	3.16	.86	1.40	11,808
Peaches, canned	231.00	1.61	.23	24.94	49,203
Peaches, dried	500.00	23.50	5.00	312.50	645,000
Pears, fresh	675.00	3.37	2.70	85.72	172,800
Pears, canned	315.00	.94	.94	56.70	108,360
Peas	1,590.00	57.24	3.18	155.82	399,090
Pineapple	152.00	.60	1.06	55.32	105,792
Pork, fresh	1,472.00	110.40	806.65	.....	3,613,760
Pork, salt	169.00	9.97	133.17	.....	580,515
Potatoes, Irish	55,040.00	90.72	5.04	740.88	1,532,160
Potatoes, sweet	7,300.00	102.20	43.80	1,598.70	3,263,100
Prunes	1,000.00	21.00	.....	733.00	1,400,000
Raisins	500.00	13.00	16.50	380.50	802,500
Raspberries	114.00	.91	2.39	64.29	131,100

TABLE A.—CONCLUDED.

ARTICLES OF FOOD.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Rice	55.00	4.40	.16	43.45	87,505
Suet	138.00	9.48	112.88	.....	472,650
Salmon	192.00	37.44	14.40	.....	126,720
Sardines	12.00	2.84	2.36	.....	14,652
Sausage, Vienna	788.50	220.78	174.25	48.09	1,170 922
Sugar, granulated	5,100.00	.....	.....	5,100.00	9,251,400
Sugar, powdered	20.00	.....	.....	20.00	36,280
Sirup	4,590.00	.....	.....	3,694.95	6,660,090
Spaghetti	135.00	16.33	.54	103.00	218,700
Tapioca	46.00	.18	.04	40.48	73,968
Tomatoes, canned	3,408.00	40.89	6.81	136.32	248,024
Tomatoes, fresh	11,480.00	103.32	45.92	347.72	1,182,440
Turnips	217.00	1.95	.21	12.37	26,908
Wheat, cracked	90.00	9.99	1.53	67.95	135,090
Yeast	120.00	14.04	.48	25.29	73,200
Totals	201,235.50	8,441.91	9,803.03	42,731.99	133,391,114
Amount per day per capita	4.23	77 grams	117 grams	403 grams	2,973

TABLE B.—Showing the per cent of proteins and fat obtained from each of the foods given.

PROTEINS.

Source.	July, per cent.	August, per cent.	September, per cent.	October, per cent.	November, per cent.	December, per cent.	January, per cent.	February, per cent.	March, per cent.	April, per cent.	Average, per cent.
Beans, dry	6.7	7.1	1.0	7.6	6.4	3.6	6.2	6.1	8.1	9.3	6.21
Beef, mutton	16.7	17.5	22.2	18.2	18.2	21.2	31.5	21.9	20.1	19.0	20.65
Sausage	0.7	0.2	0.9	2.6	2.6	3.6	1.8	1.6	1.1	0.6	1.57
Cereals	44.8	40.8	35.6	41.3	42.2	37.0	34.4	30.6	33.2	39.2	37.91
Fruit, vegetables	5.9	5.8	19.2	6.5	6.5	4.3	2.8	3.4	4.1	2.7	6.12
Milk, cheese, eggs	10.7	16.2	20.5	15.6	15.3	17.7	14.6	21.5	21.9	17.7	17.17
Potatoes, sweet and Irish	6.6	4.6	5.9	2.3	4.5	5.7	4.2	6.9	5.8	6.3	5.28
Pork, salt and fresh	5.2	6.5	5.3	4.3	2.9	4.0	2.5	3.4	3.2	3.3	4.06

FAT.

Beef, mutton	19.9	15.5	18.8	17.9	20.0	17.7	34.9	21.3	18.6	19.8	20.64
Sausage	.08	1.5	0.7	1.7	2.0	8.8	1.4	4.7	3.2	2.0	2.68
Oleomargarine	30.8	30.0	22.4	25.4	26.9	19.5	13.0	27.6	25.3	25.9	24.68
Milk, cheese, eggs	11.9	16.4	17.9	15.6	17.7	16.4	18.0	21.9	20.2	18.1	17.41
Cereals	5.6	4.7	3.4	4.9	12.1	3.9	4.4	3.4	3.9	5.5	5.18
Lard, compound, suet	9.3	14.0	16.1	15.4	6.1	14.3	12.8	3.1	12.9	10.7	11.47
Pork, salt and fresh	18.7	14.8	18.0	15.9	17.9	16.9	13.0	15.2	13.1	15.8	15.93
Vegetables, fruit	2.5	3.8	2.5	2.9	2.7	1.8	2.0	0.9	2.2	1.9	2.32

OSAWATOMIE STATE HOSPITAL.

TABLE C.—Comparison of the per capita use of some of the important staples for each of ten months.

Staples Used.	July, oz.	August, oz.	September, oz.	October, oz.	November, oz.	December, oz.	January, oz.	February, oz.	March, oz.	April, oz.	Average, oz.
Flour, white and Graham	8.48	8.80	7.52	8.32	9.28	8.32	8.48	6.72	7.04	6.72	8.96
Hominy, corn meal, grits	.28	.19	.24	.48	.20	.14	.19	.72	.94	1.76	.51
Potatoes, Irish	7.84	7.68	8.96	1.69	7.36	10.08	8.16	11.04	10.56	10.40	8.37
Potatoes, sweet	.....	.....	.48	2.40	.52	.....	.....	.....	.....	.....	.34
Beans, dry	.83	.97	.22	1.02	.92	.56	1.36	.78	1.24	1.28	.91
Sugar, brown, granulated, powdered	1.76	1.76	1.76	1.71	1.36	1.24	1.16	1.05	1.12	.92	1.38
Sirup, in terms of sugar	1.15	1.05	.94	1.23	1.28	1.10	.97	1.26	1.16	1.71	1.18
Beef and mutton	3.04	3.52	4.32	3.52	3.84	4.64	7.52	4.32	4.64	4.00	4.33
Pork, fresh and salt	1.12	1.28	1.52	1.13	1.08	1.44	.92	1.04	1.10	1.12	1.17
Lard, compound, suet	.24	.48	.64	.54	.19	.62	.46	.11	.54	.36	.41
Sausage	.11	.24	.14	.25	.28	.88	.22	.36	.30	.14	.29
Oleomargarine	.99	1.23	1.04	1.00	1.05	1.02	.56	1.12	1.28	1.05	1.03
Milk, fresh	4.96	11.29	14.08	10.24	11.68	15.20	13.76	16.16	17.92	14.08	12.93
Fruits, dried	1.28	1.72	1.60	1.26	1.13	1.37	1.58	1.37	1.76	1.29	1.43

OSAWATOMIE STATE HOSPITAL.

TABLE D.—Classification of groups of foods.—Per cent of calories of total calories.

Classes of Food.	July, Per cent.	August, Per cent.	September, Per cent.	October, Per cent.	November, Per cent.	December, Per cent.	January, Per cent.	February, Per cent.	March, Per cent.	April, Per cent.
Breadstuffs	39.84	37.07	32.35	37.08	38.67	32.74	36.43	34.73	32.46	37.09
Vegetables	11.58	10.64	9.68	10.19	10.71	9.43	9.66	10.42	12.32	12.16
Fruits, dried and fresh	5.81	6.27	6.58	5.80	8.64	5.48	5.69	5.55	5.46	4.49
Sugar, sirup	12.69	10.43	10.77	11.95	9.88	8.62	8.32	9.14	8.27	10.27
Lard, oleomargarine, lard compound, suet	10.43	13.31	13.19	13.55	9.02	12.13	8.13	9.33	13.13	11.04
Milk, cheese, eggs	5.42	9.01	10.87	8.59	8.91	10.87	10.55	13.66	12.87	10.27
Meats, fish, fowls	14.07	13.32	16.53	14.05	14.28	19.76	21.04	17.95	15.49	14.49

Table B, part first, answers the question, Where did the proteins come from? There is some irregularity, as would be expected in a summary of this kind. It will be noted, however, that, on the average, most of the protein, namely, 37.91 per cent, comes from the cereals, including, of course, bread. This is as it should be. The next source of protein is beef, mutton, etc., which yield 20.65 per cent of the protein; and the third is cheese, milk and eggs, which yield 17.17 per cent of the protein. Dry beans yield 6.21 per cent and the fruit and vegetables 6.12 per cent. Potatoes, which are very poor in protein, yield 5.28 per cent. Pork yields a very little protein, namely, 4.06 per cent. A suggestion will be made in regard to the protein in the final discussion of results. It is interesting to note that the average per cent of protein for the ten months from animal sources is approximately 44 per cent, and from vegetable sources 56 per cent. S'nce vegetable proteins are generally cheaper than those from animal sources, this proportion is in the interest of less expense.

Table B, part second, answers the question, What is the source of the fats in the diet? An examination of this table shows that the largest amount, namely, 24.68 per cent, comes from oleomargarine. This is closely followed by beef and mutton, which furnish 20.64 per cent of the fat. The milk, cheese and eggs yield 17.41 per cent of the fat, while pork yields 15.93 per cent of the fat, compound lard and sausage 11.47 per cent of the fat, and other sources are negligible.

An examination of table C will give some idea of the regularity or irregularity of the supply of materials. In some cases this may be slightly misleading, as, for instance, only a small quantity of Irish potatoes was dispensed in October. This is no doubt made up for by the larger amount in September, and also by the issuance of more sweet potatoes than in any other month. It is interesting to note that the amounts of sugar per capita began to decrease in November and continued to decrease until the end of the period. The average was 1.38 ounces per day per capita. The less amount, 0.92 ounce, as reported for April, is just about the amount at present allowed—that is, two pounds per month per capita—by the Food Administrator. I have no doubt that this low consumption of sugar is continued at the present time. A part of the sugar is replaced by sirup, as during April, with the lowest sugar report, we find the highest amount of sirup used.

The amount of beef and mutton used is fairly uniform, with the exception of January. It is possible that in this case the figures refer to the amount put in storage rather than to the amount actually consumed. In regard to the use of milk, every effort should be made to increase as much as possible the amount used. In the system of dietetics now recommended a larger amount than the 13 ounces here dispensed would be advisable, to preserve, as far as possible, the health of the patients. In regard to dried fruits, also, the amount used should be increased as much as possible.

A study of table E shows several interesting points. First is the grams of the protein per capita. This runs from 72 grams in July to 95 grams in January. This is probably a little low for patients of this class. The protein is higher in the later months, which is a commend-

OSAWATOMIE STATE HOSPITAL.

TABLE E.—Summaries of dietaries for ten months.—Per capita use of food.

Dietaries.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost per day per capita.
1917.						
July	2.45	72	75.0	414	2,641	$0.197
August	3.12	81	95.0	403	2,925	.222
September	3.58	77	108.0	390	2,880	.220
October	3.18	77	117.0	403	2,973	.208
November	3.51	89	104.0	562	3,047	.226
December	3.52	90	122.0	403	3,114	.239
1918.						
January	3.23	95	101.0	409	2,928	.205
February	3.36	81	95.0	381	2,603	.221
March	3.64	90	117.0	412	3,102	.249
April	3.17	81	95.0	412	2,901	.211
Average	3.27	83	102.9	412	2.911	$0.219

able feature of the diet. In the next to the last column is given the calories per capita. A comparison of this list shows a variation from 2,603 to 3,114, which, all things considered, is not too great a variation, and is higher in November, December and March than in other months. The February figure, 2,603, is a little low for a winter month. The average for the entire period corresponds fairly well with the best practice, and is probably high enough, but the protein ratio should be changed a little so that more protein would be dispensed and less fat or carbohydrates. This protein could readily be made up if the amount of milk, cheese and eggs could be increased, or by the use of a little more animal food. Table E also allows a comparison in grams of the protein, fat and carbohydrates, but, in addition, the fact is brought out that the protein should be slightly increased at the expense either of the fats or of the carbohydrates. In regard to the cost per month, when the high cost of food is considered, the average per capita per day of 21.9 cents seems to be very satisfactory.

SUMMARY.

1. The first conclusion is that in general the food supplied is sufficient in quantity.

2. Comparing the proportion of the different materials to make a well-balanced ration, it is suggested that more protein be furnished and that at the same time the amount of fats and carbohydrates be diminished so that the total number of calories furnished shall not be any greater.

3. The protein may be increased by using more milk, cheese and eggs; or if this is not practicable, by the use of a little more lean meat.

4. The cost of maintenance seems to be as low as could be expected when the increased cost of all staples is considered.

5. The superintendent or the dietician who has charge of the food should so dispense it that the amount of all food be somewhat increased in the winter months. This applies especially to the fat and carbohydrates. Table D shows that more of the energy of the food was obtained from meats during December, January and February than during any other months, and that is as it should be.

6. The amount of fruit, fresh and dried, should be increased as much as possible. An average of six per cent of the total calories (energy) was obtained from this source.

7. The amount of milk used should be increased. It is well to note that a quart of milk has a food value of 650 calories and is equal to more than a half pound of bread, to a pound of baked beans, or to six pounds of potatoes. It should be regarded as a food and not a beverage. Milk has also exceptionally valuable properties which stimulate growth and bodily vigor.

8. In the interests of economy, continue to use butter substitutes made from vegetable oils, lard substitutes from the same source, and sugar substitutes made from cornstarch.

9. If fresh, salted or frozen fish could be obtained for use during a portion of the year the diet would be improved without increased cost.

Supplementing this report, a study was made of each food served for the three meals both on the patients' and the employees' table for three days during the summer of 1918. As an illustration, to the patients for breakfast was served oatmeal, milk, meat and potato stew, bread, sirup, coffee; for dinner, cold sliced ham, mashed potatoes, stewed tomatoes, bread, butter and tea; for supper, boiled rice, apple sauce, cheese, sweet crackers, bread, butter and tea. The average of protein for patients was 91.05 grams, and for employees, 111.85 grams. This is not a larger difference than would be expected between the two classes of people. The calories were 2,905 and 3,278, respectively.

IV.

GIRLS' INDUSTRIAL SCHOOL, BELOIT.

(Abstract of Report.)

LAWRENCE, KAN., December 24, 1918.

The dietary for this institution from September 1, 1917, to August 31, 1918, both inclusive, was sent me by T. E. Baird, steward. In making the abstract of the report I have given in detail only that for October, 1917, which is as follows:

GIRLS' INDUSTRIAL SCHOOL.

TABLE A.—Dietary for October, 1917.

ARTICLES OF FOOD.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, canned	396.00	0.79	3.16	147.31	289,080
Apricots	180.00	1.62	.00	31.14	61,200
Baking powder	40.00	.00	.00	12.00	21,760
Beans, string	120.00	1.32	.12	4.56	11,160
Beef	613.00	88.88	102.98	.00	600,740
Beets	42.00	.54	.04	3.23	7,014
Blackberries	60.00	.48	1.26	33.84	67,440
Butter	145.00	1.45	123.25	.....	505,760
Butterine	120.00	1.44	99.60	.00	409,760
Carrots	264.00	2.37	.52	19.53	41,976
Catsup	18.00	.27	.03	2.21	4,770
Cherries	72.00	.64	.57	11.44	24,336
Cheese	76.00	21.88	27.28	.22	151,544
Chocolate	36.00	4.74	17.53	10.90	99,792
Corn flakes	378.00	20.79	5.67	306.18	616,518
Cornstarch	48.00	.00	.00	43.20	78,336
Crackers, soda	309.00	30.28	28.11	225.87	579,375
Eggs	106.50	12.67	9.90	.00	63,367
Flour, white	1,000.00	112.00	10.00	749.00	1,603,000
Flour, Graham	200.00	27.60	3.80	143.80	326,600
Gelatin	180.00	164.52	.18	.00	299,160
Gooseberries	90.00	.99	.00	18.99	37,350
Hominy	399.00	33.11	2.39	315.21	614,532
Lard	400.00	.00	400.00	.00	1,632,800
Macaroni	35.00	4.69	.31	25.93	56,840
Meal, corn	300.00	27.60	5.70	226.20	483,900
Milk	9,647.50	318.36	385.90	482.37	3,029,315
Oysters	90.00	7.92	2.16	3.51	19,980
Peaches	270.00	1.89	.27	29.16	57,510
Pears	180.00	.54	.54	32.40	61,920
Peas	330.00	11.88	.66	32.34	82,830
Pineapple	180.00	.72	1.26	65.52	125,280
Pork, fresh	311.00	23.32	170.42	.00	763,505
Potatoes, Irish	1,140.00	20.52	1.14	167.58	346,560
Potatoes, sweet	50.00	.70	.30	10.95	22,350
Pumpkins	99.00	.79	.19	6.63	14,850
Salmon	240.00	46.80	18.00	.00	158,400
Sardines	60.00	13.80	11.82	.00	73,260
Sugar, brown	300.00	.00	.00	285.00	517,200
Sugar, granulated	800.00	.00	.00	800.00	1,451,200
Sirup	180.00	.00	.00	144.90	261,180
Tomatoes	296.00	4.75	.79	15.84	40,788
Yeast	16.00	1.87	.08	3.36	9,760
Totals	19,817.00	1,014.53	1,435.93	4,410.32	15,694,058
Amount per day per capita	3.41	.....	.....	.....	2,707

SUMMARY AND DISCUSSION.

Referring to the tables herewith submitted of the dietary for each month from September, 1917, to September, 1918, these tables show considerable irregularity in the amount of food issued. I called your attention to this fact and learned, through the superintendent, that this was due to the peculiar conditions at this institution, as they had no storeroom where it was possible to keep a large proportion of the stock on hand. Such items as fruit, vegetables, etc., must be kept in the refrigerators in the kitchens, so they were at all times accessible to the steward and could not be issued, as in most of the other institutions, on a daily requisition to the storeroom. This accounts for many of the irregularities appearing in the tables.

In reference to the use of butter and butterine (table A), it is noticed that the use of butterine increased from the beginning of the year, so that it was from twice to three times as much as butter. This practice is to be commended. Although considerable butter should be used, it is by no means necessary to have more than one-third of the butter fat in that form.

The amount of milk decreased from 2,054 gallons in January to 777 in August. The larger amount used should be kept up if possible.

The calories obtained from the sugar were much more than those from the sirup. The sweetening is of practically equal value, whether obtained from sugar or sirup, and in many of the institutions a large proportion of the sweetening is obtained from sirup on account of its cheapness.

The use of corn meal began to increase in the spring months. The increasing use of this carbohydrate is to be commended.

GIRLS' INDUSTRIAL SCHOOL.

TABLE B.—Summaries of dietaries for twelve months.—Per capita use of food.

Dietaries	Attendance.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost per day.
1917.							
September	5,490	4.47	95	86	549	3,404	$0.16
October	5,797	3.41	77	108	344	2,707	.18
November	5,670	5.21	104	151	462	3,821	.21
December	5,797	5.39	99	131	462	3,483	.16
1918.							
January	5,859	5.85	104	145	494	3,742	.29
February	5,292	5.55	104	118	408	3,109	.17
March	5,735	4.69	81	86	381	2,685	.11
April	5,520	5.72	108	86	553	3,511	.18
May	5,859	4.59	108	95	462	3,267	.17
June	5,850	3.39	81	99	385	2,820	.12
July	6,907	3.74	72	81	385	2,574	.13
August	6,138	3.04	68	91	276	2,234	.23
Average		4.58	91	106	430	3,113	$0.175

From table B it is noted that the protein varies from 68 grams to 104 grams. This variation may be partly due to the irregularities of issuing the food as noted above. The fat per day per capita varies from 81 grams in July to 151 grams in November. This variation is in the

right direction, and it is noticed that in general more fat was supplied in the fall and winter than in the summer, as should be the case.

Table B is a summary of the dietaries for the twelve months, and this also shows considerable irregularity, but that would have but little bearing on the average. The weight of food is 4.58 pounds per day per capita, and the protein shows an average of 91 grams. This amount is a little low, as most authorities agree that for growing girls—although as much may not be required as for men at ordinary labor—something over 100 grams should be provided. The proportion of fat to protein, an average of 106 to 91, is fairly satisfactory. This fat comes from butter, oleomargarine, lard, milk and beef. It is important that milk and butter should be retained at as high a proportion as possible. The calories as noted on this table are quite irregular in the different months, varying from 2,234 to 3,821. I am convinced that this variation in the amount of energy in the food dispensed does not represent the actual condition at the institution, for the variation is greater than could be expected. The average of 3,113 is fairly satisfactory, considering the character of the inmates, but a variation of over 60 per cent in the calories from August to November would not be expected.

Table C gives the amount of some of the important staples used for each month. The per cent by months is of no value, for the reason above stated, but the average in ounces per day per capita can be stated. This is shown in the last column. This indicates, among other things, that 6.08 ounces of flour is used by each person per day. The amount of sugar decreased during the year, the average being 1.75 ounces per day, or 3.25 pounds per month per capita. This is more than the ration which was in effect under the Food Administration of two pounds per month per capita. The sirup, in terms of sugar, amounted to 3.75 pounds for the month. This might well have been decreased so as to bring the sugar down to the two pounds per month, as required by the Food Administration. The amount of milk, an average of 31.22 ounces, nearly a quart per day, is quite satisfactory. It is possible that the three-fourths pound of potatoes used daily might have been somewhat increased to take the place of some of the flour or other cereals used.

GIRLS' INDUSTRIAL SCHOOL.

TABLE C.—Comparison of the per capita use of some of the important staples for each of twelve months.

Staples Used.	September, oz.	October, oz.	November, oz.	December, oz.	January, oz.	February, oz.	March, oz.	April, oz.	May, oz.	June, oz.	July, oz.	August, oz.	Average, oz.
Flour, white and Graham	13.12	3.20	10.40	7.36	7.04	4.48	4.16	4.32	4.00	7.04	5.12	2.72	6.08
Hominy, corn meal	.80	1.92	1.20	1.68	2.40	2.88	4.00	5.28	5.12	5.92	3.68	1.80	3.05
Potatoes, Irish	2.56	3.04	5.60	16.48	8.80	14.51	16.68	34.72	14.72	.....	2.19	.....	11.92
Beans, dry	.28	.....	.49	.....	.....	.....	.....	.57	1.63	.....	.51	.83	.72
Sirup, in terms of sugar	.22	.40	.12	.52	.65	.52	.44	.68	.....	.....	.....	.....	.44
Sugar, brown and granulated	3.68	2.88	1.12	1.78	1.52	1.20	1.39	1.44	1.36	1.36	1.76	1.55	1.75
Beef	2.24	1.69	1.76	1.76	2.08	.33	.32	2.40	2.88	3.29	2.04	2.17	1.91
Pork, fresh and salt	.76	.86	.69	.41	1.18	.32	.....	.....	.....	.....	.....	.51	.67
Lard	.....	.37	1.12	.54	.48	.....	.....	.....	.....	.48	.46	.46	.70
Butter and oleomargarine	1.18	.72	1.55	1.72	1.72	1.37	1.40	1.28	1.37	1.60	1.12	1.08	1.34
Milk	25.28	26.56	42.24	44.32	47.68	47.04	36.96	22.88	24.32	20.80	19.52	17.12	31.22
Fruits, dried	.57	.....	1.12	.....	.....	.....	.....	1.44	1.36	.....	.25	.51	.87

TABLE D.—Classification of groups of foods.—Per cent of calories of total calories.

Classes of Foods.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	July.	August.
Breadstuffs	44.05	27.97	34.67	29.74	31.48	24.76	27.46	31.37	31.80	45.64	32.67	23.89
Vegetables	7.52	3.64	9.19	10.90	6.47	15.15	17.89	23.73	16.25	6.56	14.94	15.35
Fruits, dried and fresh	4.35	5.23	4.89	3.00	5.73	5.23	2.43	6.69	8.12	.61	7.28	7.62
Sugar, sirup	13.28	14.20	3.70	8.91	7.77	6.23	7.71	6.92	4.74	5.43	7.96	7.93
Lard, butter, oleomargarine	7.55	16.23	16.28	14.78	13.32	9.42	11.28	7.89	9.11	16.54	14.11	10.54
Milk, cheese, eggs	15.52	20.67	27.14	26.50	25.27	33.69	30.59	15.36	18.44	16.82	16.91	24.12
Meats, fish, fowls	7.92	12.18	6.70	6.14	9.64	5.56	2.39	6.56	8.43	7.10	6.12	13.49

Table D shows in a condensed form where the total energy expended comes from. Although this varies considerably in the different months, due to the cause previously mentioned, we can get a general idea from the figures given. It is noted that breadstuffs furnish from one-fourth to three-fifths of the energy, vegetables about 12 per cent, sugar and sirup a varying quantity from 3.70 to 14.20, with an average of about 8 per cent. The amount of energy furnished by milk, cheese and eggs is nearly one-fifth of the total energy. This proportion is to be commended. Meat, fish and fowls furnish a small proportion, considerably less than 10 per cent, of the energy. Comparing these groups, it should be noted that starch and other carbohydrates come from the breadstuffs and vegetables, fruits and sugar; lard, butter, oleomargarine, eggs, milk and meat furnish most of the fat; and the milk, eggs and meat furnish most of the protein. It would be possible to increase the protein, as previously suggested, by bringing up the amount of milk, cheese, eggs and meats.

Table B shows also the cost per day per capita. It is noted that the population varies within narrow limits, but the cost per month varies within wide limits. This is due to the conditions of storage, as previously noted, and affects the cost per day per capita from 11 cents to 29 cents. The average of this, 17.5 cents, no doubt represents the actual cost, and is commendably low.

RECAPITULATION.

1. The value of the monthly study of the dietaries at this institution is much impaired by the fact that the provisions cannot be issued daily from the storercom. An imperative need of this institution is a commodious warehouse and storeroom for taking care of the supplies issued. This will be a great saving in handling and also in preventing waste.

2. The amount of milk used is large, and this practice should be continued, with the attempt to keep up the maximum quantity throughout the entire year.

3. A part of the sugar used might be replaced by sirup with no loss to the nutritive ratio, and at less cost.

4. The protein used should be somewhat increased. Although, as above stated, the amount of milk used is large, the beef and vegetable protein like beans, peas, etc., should be increased to bring up the protein value to at least 105 grams.

5. The total amount of food is probably a little low for inmates of this character—that is, a little more generous feeding should be practiced, and this increase can be wherever most convenient, but some of it must be in meat and in vegetable proteins. It is possible that if greater regularity of calories furnished could be secured the total amount as it stands might be high enough.

6. The cost per month as compared with other institutions is, of course, low, and it would be advisable to improve the quality even if the cost is raised three or four cents.

V.

TOPEKA STATE HOSPITAL.

(Abstract of Report.)

LAWRENCE, KAN., November 11, 1919.

Following is an abstract of the report on the dietary of the Topeka State Hospital:

Table A represents the total food that was used during the year beginning October, 1917, with a study on the amount of nutritive material derived from each food. In all cases the weight of the food as purchased is used in making the calculations. On making an abstract of the report I have given in detail here only the figures for September, 1918.

Table A here given, which covers the dietary in the Topeka State Hospital for the year ending September 30, 1918, shows the actual weight of each food issued per month, the actual number of pounds of protein, fat and carbohydrates for each month, and the calories, denoting the energy value of each of the foods. This means that from the analysis of each of these foods we have the per cent of the protein, fat and carbohydrates, from which we can readily calculate the quantity of each of these nutrient substances. These different constituents are all necessary for the maintenance of bodily health and strength, and in addition to these, most foods contain mineral salts, which are also essential. The most important source of the protein foods, as will be seen by an examination of the quantities of protein shown in the table, are beef, milk, cheese and eggs. The fat evidently comes largely from the beef, butterine, lard compound, milk, pork and sausage, and the great source of carbohydrates is flour, crackers, green corn, oatmeal, Irish potatoes, rice, and the sugar and sirup compounds. Looking over the table, furthermore, it will be noticed that the greatest quantity of calories or energy available from these foods comes from the flour, the next in quantity from beef, followed by sugar or sirup, then by milk, pork, potatoes, eggs, butterine, and miscellaneous starchy foods. These evidently furnish the great bulk of the nutrients; the other foods used are, however, of primary importance because they give variety to the food, and many of them furnish mineral salts, which are also important.

The important food ingredients must be in the right proportions to produce what is ordinarily known as a balanced ration. It has been shown by many experiments that one variety of nutrients can, to a certain extent, take the place of another, but this cannot be carried on indefinitely in the diet without causing serious injury. Thus a diet consisting almost exclusively of starchy foods will ultimately produce a condition similar to starvation, and man cannot, in present civilized society at least, live "by meat alone," although some uncivilized tribes seem to live almost exclusively on fish.

A further consideration of comparisons in these tables is taken up in the summaries which follow.

TOPEKA STATE HOSPITAL.

TABLE A.—Dietary for September, 1918.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, fresh	616.00	1.84	1.84	66.52	131,824
Apples, dried	650.00	10.40	14.30	429.64	856,700
Apricots, canned	84.00	.75	.00	14.53	28,560
Apricots, dried	300.00	14.10	3.00	187.50	378,000
Bacon	335.00	31.82	198.99	.00	869,995
Baking powder	190.00	.00	.00	57.00	108,800
Beans, white	1,160.00	261.00	20.88	691.36	1,814,240
Beans, Lima	1,200.00	217.20	18.00	790.80	1,903,200
Beans, Mexican	900.00	198.99	11.79	591.75	1,545,075
Beans, string	30.00	.33	.03	1.14	2,790
Beans, green	100.00	2.10	.30	6.90	17,600
Beef	16,366.00	2,373.07	2,749.48	.00	16,038,680
Beets	385.00	5.00	.38	29.64	64,295
Blackberries, canned	86.00	.69	1.83	49.05	100,050
Butterine	2,760.00	33.12	2,290.80	.00	9,411,600
Beef, corned	1,000.00	143.00	238.00	.00	1,271,000
Carrots	325.00	2.92	.65	24.05	51,675
Cheese	501.00	144.28	179.86	1.50	998,994
Chickens	280.00	38.36	34.44	.00	210,280
Cocoanut	21.00	1.32	12.05	6.61	63,588
Corn, canned	840.00	23.52	10.08	159.60	373,800
Corn, green	7,377.00	88.52	29.50	568.03	1,313,106
Corn flakes	26.00	1.43	.39	21.06	42,406
Cornstarch	336.00	.00	.00	302.40	548,352
Crackers, cream	234.00	22.69	28.31	163.09	452,790
Crackers, Graham	375.00	37.50	35.25	276.75	714,000
Crackers, soda	552.00	54.09	50.23	403.51	1,035,000
Cucumbers	560.00	3.92	1.12	14.56	38,082
Eggs	2,612.00	310.82	242.91	.00	1,554,140
Pigs	600.00	25.80	1.80	445.20	862,200
Flour	24,800.00	2,777.60	248.00	18,575.20	39,754,400
Gooseberries	29.00	.29	.49	3.80	7,375
Grapes, canned	180.00	2.34	2.88	26.82	61,000
Grits	800.00	66.40	4.80	622.00	1,320,000
Ham	1,025.00	181.65	191.03	.00	1,113,774
Lard compound	360.00	.00	360.00	.00	1,469,520
Meal, corn	2,750.00	253.00	52.25	2,073.50	4,435,750
Meal, oat	2,670.00	459.24	200.74	1,820.50	4,958,250
Milk, fresh	43,163.00	1,424.37	1,726.52	2,158.15	13,553,782
Milk, condensed	48.00	4.60	4.46	5.37	36,336
Onions	6,462.00	90.46	19.38	575.11	1,285,938
Oysters	30.00	2.64	.72	1.16	10,050
Peaches, canned	90.00	.64	.00	9.85	19,186
Peaches, dried	450.00	21.15	4.50	281.25	567,000
Pears, canned	126.00	.37	.37	22.68	43,344
Pears, dried	350.00	9.80	18.90	255.15	572,250
Peas, canned	1,050.00	37.80	2.10	102.90	263,550
Pineapple	90.00	.36	.63	32.76	95,974
Plums, canned	225.00	2.25	.00	36.20	88,875
Pork, fresh	2,078.00	155.85	1,138.74	.00	5,101,490
Potatoes, Irish	18,290.00	329.22	18.29	2,688.63	5,560,160
Potatoes, sweet	5,230.00	73.22	31.38	1,145.37	2,337,810
Prunes	775.00	13.95	.00	482.05	899,775
Pumpkins	20,500.00	205.00	20.50	533.00	1,230,000
Raisins	575.00	13.22	17.25	393.87	809,025
Rice	1,700.00	136.00	5.10	1,343.00	2,704,700
Sausage	1,500.00	195.00	660.00	16.50	3,078,000
Spaghetti	610.00	73.81	2.44	465.43	988,200
Squash	5,460.00	38.22	10.92	245.70	562,380
Sugar, granulated	4,700.00	.00	.00	4,700.00	8,525,800
Sugar, powdered	25.00	.00	.00	25.00	46,350
Sirup	4,640.00	.00	.00	3,735.20	6,732,640
Tomatoes, canned	864.00	10.36	1.72	34.56	88,992
Tomatoes, fresh	25,984.00	233.85	103.93	1,013.37	2,676,352
Turnips	2,310.00	20.79	2.31	131.67	286,440
Wheat, cracked	200.00	22.20	3.40	151.00	328,200
Yeast	50.00	5.85	.20	10.50	30,500
Totals	220,990.00	10,910.08	11,030.25	49,019.43	154,363,497
Amount per day per capita	4.17	86 grams	90 grams	426 grams	2,920

TOPEKA STATE HOSPITAL.

TABLE B.—Summaries of dietaries for twelve months.—Per capita use of food.

Dietaries.	Weight of food, pounds.	Proteins, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost per day.
1917.						
October	4.22	86	93	444	3,197	$0.213
November	3.32	84	104	312	2,500	.192
December	3.54	90	99	430	3,043	.226
1918.						
January	2.63	90	77	403	2,777	.213
February	3.09	90	122	399	3,109	.235
March	2.85	86	95	408	2,865	.230
April	3.36	93	95	456	3,156	.228
May	3.23	86	86	421	2,879	.257
June	3.11	86	136	399	3,194	.257
July	3.33	92	77	449	2,888	.244
August	3.95	82	82	376	2,596	.257
September	4.17	86	90	426	2,920	.278
Average	3.40	87	96	410	2,927	$0.236

The column marked "Calories," in table B, is of great interest, because this shows the total energy consumed, and the different months are strictly comparable. There is considerable variation in this table from a minimum of 2,500 pounds in November, 1917, to a maximum of 3,197 pounds in October, 1917.

The best information in regard to the number of calories per capita needed seems to point to the fact that something between 3,000 and 3,500 calories of food are needed for a man occupied with ordinary work. It is true, however, that the inmates of this institution would hardly come under this class, so that it is quite right to consider that this figure might with safety be appropriately reduced.

Some interesting data may be obtained from the total calories for the twelve months, which is 1,857,673,110. This represents the total food served during the year, and if we divide the total cost for the year by this figure and multiply by 1,000 it gives us the cost of energy units per thousand calories. This is .0812 cents. This is valuable for comparison with the data obtained from other institutions, although with the growing cost of living this figure will sensibly increase from year to year.

It will be noticed that the weight of food used varies from 2.63 pounds per day for each of the inmates in January, 1918, to 4.22 pounds per capita in October, 1917.

There is also shown in this table considerable variation in fat, which is brought out more especially in the per capita calculation. This runs through a rather large range, from 77 grams in January and also through July, to 136 grams in June.

The amount of carbohydrates used varies between 312 grams in November, 1917, and 456 grams in April.

TOPEKA STATE HOSPITAL.

TABLE C.—Comparison of the per capita use of some of the important staples for each of twelve months.

Staples.	October, oz.	November, oz.	December, oz.	January, oz.	February, oz.	March, oz.	April, oz.	May, oz.	June, oz.	July, oz.	August, oz.	September, oz.	Average, oz.
Flour, white	8.80	3.52	8.48	9.12	8.80	8.64	9.12	9.28	7.04	9.44	6.88	7.36	8.04
Corn-meal grits	.88	.62	.40	1.47	.16	.64	.16	.28	1.92	1.26	1.20	1.07	.84
Potatoes, Irish	6.24	8.32	14.88	1.48	5.92	4.48	10.88	11.30	5.44	2.72	4.16	5.44	6.77
Potatoes, sweet	.....	5.12	.88	.....	.....	.....	.....	.....	.....	.....	.....	1.56	.63
Beans, dry	.35	.16	.52	.57	.70	.59	.61	.59	.46	1.08	.81	.97	.62
Sugar, granulated and powdered	2.32	1.45	1.39	1.48	1.48	1.37	1.71	1.47	1.64	1.76	1.29	1.42	1.44
Sirup, terms of sugar	.96	.27	.96	.68	1.05	1.34	1.47	1.39	1.16	.92	1.08	1.12	1.03
Beef	5.60	5.12	5.28	5.44	5.44	5.44	5.12	5.44	5.92	4.96	5.44	4.96	5.35
Pork, fresh and salt	.57	.68	.70	.50	.68	.59	.78	.67	.96	.64	.57	.62	.66
Lard and compound	.35	.48	.24	.22	.38	.22	.35	.24	1.39	.....	.....	.09	.33
Sausage	.48	.60	.73	.59	.64	.59	.76	.....	.....	.....	.....	.44	.40
Oleomargarine	.73	.73	.59	.41	.78	.88	.72	.70	.91	.70	.80	.83	.72
Milk, fresh	10.56	12.32	12.80	12.64	15.52	12.96	13.12	11.04	11.20	10.88	9.92	12.96	12.24
Fruits, dried	1.44	1.26	1.28	1.53	1.44	1.37	1.52	1.23	1.15	1.28	.88	1.10	1.29

Table C is a comparison of the per capita use of some of the important staples. For the sake of easier comparison these amounts are reduced to ounces per capita and the important staples selected are those which represent very large averages of the food value. In some cases it is quite possible that a larger amount was charged to the kitchen than was actually used, and so some of it was held over in the kitchen. That would seem to be indicated by the low amount of flour in November, 3.52 ounces, as compared with the average of the twelve months of 8.04 ounces.

The amount of corn-meal grits used varies considerably, but as the total amount was comparatively small, that is not of much importance. It would have been better, perhaps, not to have used so much in June, July and August.

In regard to Irish potatoes, what was said previously in regard to issuing flour to the kitchen may also apply here, as a very large quantity was issued in December and a very small amount in January; probably this should be distributed between the two months. July is exceptionally low, due, probably, to the scarcity of potatoes during that month and the month of August. Sweet potatoes are only issued during November and December, when they are abundant and readily obtainable.

The amount of granulated sugar is 1.44 ounces, or a per capita consumption of 2.7 pounds per month. The allowance which was made during the scarcity of sugar by the government was an amount of two pounds per capita per month, and it is interesting to note that the amount used here is not very much above that recommended by the Food Administration. As will be noticed by comparison with the other state institutions, it is not as much as was used in some of the others. The sirup may be made to take the place, to a certain extent, of the sugar, and there was a notable increase in the amount of sirup used during the spring months. Of course, if we consider sirup and sugar together, the amount of saccharine material used is considerably larger than the Food Administration had recommended.

In regard to beef, the quantity is quite uniform throughout the year, with an average of 5.35 ounces per day. The same thing in regard to uniformity may be said of pork, which shows an average of .66 per day.

Considering the lard and lard compound, which comes under the head of fat, the same discrepancy is again noticed for the month of June as is referred to in a previous table, but as there seems to be none mentioned in July or August, no doubt the amount issued in June was used during the following months.

The average amount of milk used per day is 12.34 ounces, or about three-fourths of a pint. It is always well to increase the quantity of milk to the highest amount possible. The same thing may be said of fruits. For the health of the patients as large a quantity of fruits should be used as can be furnished without additional expense.

TABLE D.—Classification of groups of foods.—Per cent of calories of total calories.

Classes of Foods.	October, Per cent.	November, Per cent.	December, Per cent.	January, Per cent.	February, Per cent.	March, Per cent.	April, Per cent.	May, Per cent.	June, Per cent.	July, Per cent.	August, Per cent.	September, Per cent.	Average, Per cent.
Breadstuffs	36.61	24.43	36.58	46.86	37.85	40.66	38.63	40.75	35.12	43.25	38.92	37.17	37.99
Vegetables	7.58	15.83	12.04	3.87	7.33	5.79	9.35	10.41	6.41	9.92	9.35	13.87	9.31
Fruits	4.42	3.96	5.49	5.35	4.91	4.93	4.84	4.24	3.97	5.30	6.91	3.61	4.83
Sugar, sirup	14.39	7.63	8.88	8.89	9.87	10.62	11.43	11.19	9.96	11.06	10.43	9.90	11.21
Lard, butterine, lard compound	7.72	11.17	6.23	5.31	9.06	8.51	7.81	7.41	17.16	5.90	6.58	7.04	8.33
Milk, cheese, eggs	12.66	11.66	9.32	10.11	11.60	10.14	9.54	9.28	8.62	8.97	9.45	10.45	10.15
Meats, fish, fowls	16.49	22.69	17.61	19.58	19.98	19.03	19.31	16.68	18.74	15.58	18.33	17.91	18.49

The classification of groups of foods used and per cent of calories is shown in table D. These figures are obtained by comparison of the total calories of the food with the calories contained in each one of these groups of foodstuffs. Referring to the column marked "Average," it will be noticed that more than one-third of the calories, namely, 37.99 per cent, are obtained from the breadstuffs; and next in order, 18.49 per cent from meats, fish, etc., while sugar and sirup follow with 11.21 per cent, and milk, cheese and eggs with 10.15 per cent. Thus it will be seen that these four classes of staples furnish 77.84 per cent of the calories, or more than three-fourths.

An attempt should be made to increase the amount of vegetables and fruits during the portion of the year in which these are abundant. Comparing the quantity of vegetables used in each month, it will be seen that to a certain extent this has been done. The cost per day is shown in table B. The total population was very uniform for the year, with an average of 1,747.4. There seems to be little relation between the cost per month and the total attendance. This probably could not be expected, however, when food is carried over from month to month.

The cost per day per capita is interesting, as it shows a gradual increase from 19.2 cents to 27.8 cents in September, following the rise in the prices of foodstuffs on the market. No doubt a comparison made during the current year would show still greater increase. The average for the year was 23.6 cents, which is certainly as low as could be expected, considering the cost of foods.

SUMMARY AND REMARKS.

The dietary for an entire year has been studied so that any inaccuracies of any particular month may be equalized in the average.

1. If great care is used in issuing supplies to the kitchen, so that what is issued is actually consumed during the given month, it will make it much easier to make comparisons.

2. It would be well to so regulate the diet that more food, and especially more fatty food, should be used in the winter months than in the summer. The report of the steward does not show this to have been the case.

3. A more careful study of the character of the individuals would be necessary to decide what amount of calories per capita per day would be sufficient, but, all things considered, it is probable that the amount in this institution might be somewhat diminished without impairment of the physical health.

4. Although potatoes contain less than 22 per cent of nutritive material, and even if somewhat expensive as compared with former years, on account of their dietetic value, and because they can be prepared in such a variety of ways to stimulate the appetite, the quantity of potatoes used should be kept as high as possible.

5. The amount of corn meal used might be increased during the winter months and decreased in the summer. A large amount of corn products should be used, on the score of cheapness, but care must be exercised

not to push their use to a point where the appetite becomes surfeited with them, for in many respects wheat products are better food.

6. On account of the high price of sugar, it is advisable to keep this down to 2.5 pounds per month per capita. If more saccharine material seems to be desired it can be made up by the use of sirup.

7. Increase the quantity of milk as much as possible, for according to the latest theories of dietitians there is no food that will tend to improve the health of the patients more than an abundance of milk. Very few realize that the cost of milk per 100 calories is usually only one-half the cost of beef. As an illustration, it was found in New York City, on January 1, 1919, that 1,000 calories of energy cost as milk 24 cents, and as beef 45 cents.

8. It goes without saying that the more vegetables that can be used the better for the quality of the dietary. As a well-known author says, "Scurvy appears when the diet contains no antiscorbutic vitamines, *i. e.*, by using diets which are free from fruits, fresh vegetables, and tubers such as potatoes."

9. The management is to be commended for keeping the cost of the food low. The gradual increase from 19.2 cents to 27.8 cents is no more than could be expected with the general increase of the cost of living.

It is hoped that this data and the suggestions made from the study of the food in actual use at this institution may be of value in increasing the efficiency of the management and keeping the cost of the food as low as possible, considering at the same time the health of the patients.

VI.

STATE HOSPITAL FOR EPILEPTICS, PARSONS.

(Abstract of Report.)

LAWRENCE, KAN., May 17, 1920.

The examination of the dietary of the Parsons State Hospital was undertaken with the object of ascertaining whether the quantity of food used is sufficient for the inmates; is the quality satisfactory? are the different nutritives so distributed that there is a sufficient proportional quantity of carbohydrates, fats and proteins for complete nourishment? whether it is possible to substitute cheaper foods for those issued and still keep up the proper dietary; could any other foods or a greater variety be added to the menu with advantage to the inmates? is there any unnecessary waste in preparing, dispensing or serving the food? are all the waste products utilized as far as possible by feeding to animals and in similar ways? can the cost be decreased without loss of food value or satisfactory service?

With these objects in view the steward has been asked to furnish the quantity of each kind of food issued per month, and this investigation has been carried through from October 1, 1918, to September 31, 1919, thus covering an entire year and including both the winter and summer dietaries.

The results given in table A have been compiled from the steward's report, and the following tables contain a discussion of the results, with suggestions in regard to any possible improvements that might be made.

In order to eliminate from this abstract most of the details of the work, the tabulation for the month of September, 1919, only, is given.

In table A is shown the weight in pounds, the protein, fats and carbohydrates in pounds, and the calories. A glance at the column headed "calories" shows where most of the energy of the food comes from, the highest numbers being bread, beef, butterine, beans, flour, lard, corn meal, milk, potatoes, rice and sirup.

That there is a variety in the food may be inferred from the list of food materials given in the left-hand column. These for each month are as follows:

Month.	*Varieties.*	*Month.*	*Varieties.*
October	59	April	61
November	53	May	60
December	49	June	52
January	53	July	48
February	55	August	55
March	53	September	52

STATE HOSPITAL FOR EPILEPTICS.

TABLE A.—Dietary for September, 1919.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples	144	.28	1.14	53.56	105,120
Apple butter	180	2.16	.18	105.30	200,700
Apricots	168	3.19	2.18	81.98	168,000
Apricots, dried	200	9.73	2.00	125.00	252,000
Bacon	234	22.23	138.99	.....	507,698
Beans, green	861	18.08	2.58	59.41	151,536
Beans, Lima	425	76.92	6.37	280.07	674,050
Beans, navy	800	180.00	14.40	476.80	1,251,200
Beans, Mexican	600	131.40	7.80	390.60	1,005,000
Beef	7,824	1,134.48	1,314.43	.....	7,667,520
Bread	10,952	1,018.53	131.42	6,771.70	12,857,698
Breakfast food	108	5.94	1.62	87.48	176,148
Butterine	1,020	12.24	846.60	.....	3,478,200
Cabbage	600	8.40	1.20	28.80	72,600
Carrots	700	6.30	1.40	51.80	111,300
Cherries	120	1.32	.12	25.32	28,840
Corn	1,170	32.76	14.04	222.30	520,650
Crackers, soda	266	26.06	24.20	194.44	498,750
Cucumbers	600	4.20	1.20	15.60	40,800
Eggs	270	32.13	25.11	.....	160,650
Figs	50	2.15	.15	37.10	71,850
Fish	660	76.56	109.56	.....	575,080
Flour, white	2,500	280.00	25.00	1,872.50	4,007,500
Gooseberries	150	1.95	2.25	28.65	67,500
Grapes	224	2.24	2.92	35.13	80,032
Grits	200	23.00	16.80	144.60	383,000
Hominy	192	4.20	.36	34.16	72,960
Lard	1,000	.....	1,000.00	.....	4,082,000
Lemons	40	.28	.20	2.36	5,600
Macaroni	220	29.48	1.98	163.02	357,280
Meal, corn	600	55.20	1 .4	452.40	1,027,800
Milk	31,100	1,026.33	1,244.04	1,555.05	9,765,714
Onions	627	8.77	1.88	55.80	124,773
Oysters	30	2.64	.72	1.17	10,050
Peaches	225	1.57	.22	24.30	47,925
Peanut butter	50	14.75	23.25	8.55	137,050
Pears	90	.27	.27	16.20	30,960
Pears, dried	250	7.00	13.50	182.25	408,750
Peas	1,080	38.88	2.16	105.84	271,081
Peas, split	180	44.28	1.80	111.60	290,160
Plums	378	3.78	.....	75.96	114,774
Potatoes, Irish	7,920	142.56	7.92	1,164.24	2,407,680
Potatoes, sweet	700	9.80	4.20	153.30	312,900
Pumpkin	48	.38	.09	3.21	7,200
Pudding	120	6.60	5.76	33.00	97,812
Rice	800	6.40	2.40	632.00	1,272,800
Salmon	120	23.10	9.00	.....	79,200
Spaghetti	70	8.47	.28	53.41	113,400
Sugar	2,500	.....	.....	2,500.00	4,535,000
Sirup	2,320	.....	.....	1,767.60	3,366,320
Tomatoes, canned	2,050	24.60	4.10	82.00	211,150
Tomatoes	2,072	18.64	8.28	80.80	213,416
Totals	85,895	4,591.17	5,037.55	19,349.64	64,585,125
Amount per day per capita	4.49	109 grams	118 grams	458 grams	3,381

STATE HOSPITAL FOR EPILEPTICS.

TABLE B.—Summaries of dietaries for twelve months.—Per capita use of food.

Dietaries.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost per day per capita.
1918.						
October	4.31	99.0	113.0	508	3,474	$0.34
November	3.99	90.0	117.0	435	3,199	.31
December	4.20	95.0	72.0	512	3,076	.31
1919.						
January	4.03	99.0	122.0	499	3,545	.29
February	4.16	104.0	104 0	462	3,2?4	.32
March	4.20	9.0	104.0	449	3,191	.31
April	5.21	118.0	127.0	544	3,847	.38
May	5.08	95.0	109.0	499	3,407	.37
June	5.82	109.0	108.0	463	3,310	.34
July	5.70	104.0	113.0	472	3,312	.32
August	5.26	95.0	109.0	472	3,284	.35
September	4.49	109.0	118.0	458	3,381	.32
Average	4.70	100.5	109.6	481	3,355	$0.33

The minimum "attendance" for the year was 17,508 for February and the maximum was 19,719 for May. Average for the twelve months, 628.5.

Table B gives an opportunity to look at the dietary of the institution for the entire year. The protein or nitrogenous foods (such as meat, milk, eggs, etc.) are the most expensive, and there is this remarkable fact shown in the table, although it may be only a coincidence: In November the weight of protein purchased was 3,723.21 pounds, the smallest of any month, and the same month was one of the lowest in per capita cost. A similar comparison for the highest protein named, that for April, shows that the cost per capita for this month was the greatest of any month. Considering this table further, under the head of "Calories per capita" (one of the fairest methods of comparison of the several months), it is noticed that these vary from 3,096 in December to 3,847 in April. Here again April shows a higher feeding than any of the other months. From what we know of calorie requirements, the amount of food issued in even the lowest months is sufficient for the wants of the inmates. An adult doing a fair amount of work each day expends not more than 3,300 to 3,500 calories, and these inmates at this institution are quite a distance below the normal man in physical activities. The average of 3,355 should keep the patients in good condition and leave a margin to build up the body and add to their feeling of well-being.

The weight of food here shown is interesting. In considering this it is well to remember that some of the food, as fats, sugar, etc., are very concentrated nourishment, while the meats and cereals contain 50 to 75 per cent of water and the vegetables contain from 70 to 95 per cent of water. The four to six pounds of food issued is, therefore, not all nutritive materials, as fruit and vegetables contain so much water, and these are more extensively used in the summer. Other things being equal, the food supplied during the summer should be greater in weight to give the same amount of energy. Notice that the six months from April to September are all higher than the other half of the year. As to the amount of food needed, 50 to 60 ounces is usually considered

STATE HOSPITAL FOR EPILEPTICS.

TABLE C.—Comparison of the per capita use of some of the important staples for each of the twelve months.

Staples.	October, oz.	November, oz.	December, oz.	January, oz.	February, oz.	March, oz.	April, oz.	May, oz.	June, oz.	July, oz.	August, oz.	September, oz.	Average, oz.
Flour, white	1.75	1.37	2.00	1.47	1.55	1.47	1.58	1.47	1.34	1.88	1.05	2.08	1.58
Corn meal, grits	.43	.65	.36	.30	.72	.32	.57	.40	.16	.....	.89	.67	.45
Potatoes, Irish	10.14	10.20	12.08	8.73	10.12	9.45	9.88	5.00	9.69	4. 6	6.49	6.62	8.57
Potatoes, sweet	2.67	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.56	.27
Beans, dry	.80	.68	.41	1.55	.70	1.00	1.23	.91	.49	.89	1.00	1.52	.93
Sirup, terms of sugar	3.08	2.38	3.07	2.91	1.15	2.09	3.05	2.36	2.46	2.03	2.28	2.08	1.89
Sugar	1.80	1.53	2.08	1.31	3.00	1.55	2.33	1.93	1.42	1.96	1.72	1.47	2.36
Beef	4.50	2.19	6.04	4.00	5.08	4.65	5.16	3.07	4.35	3.87	3.80	6.54	4.43
Pork, fresh and cured	.51	.20	.....	.49	.19	.51	.....	.40	.20	.20	.17	.19	.25
Lard	1.08	.81	.38	1.45	.33	.68	.96	.68	.67	.75	.68	.83	.78
Sausage	.....	.41	.....	.....	.17	.11	.32	.40	.....	.....	.....	.....	.11
Butterine	.81	1.72	.....	.80	.91	.83	.84	.81	.43	.83	.83	.84	.80
Milk, fresh	18.09	21.64	21.80	23.05	23.20	26.20	30.81	31.05	30.60	33.10	30.49	26.04	26.34
Fruits, dried	1.26	.46	3.50	1.32	1.82	1.92	1.79	1.08	.33	.17	1.04	.36	1.25
Fish, canned and fresh	1.08	1.21	.41	.59	1.16	.38	1.90	.72	1.85	.86	.81	.67	.97
Bread	8.59	8.33	8.19	7.98	8.08	8.36	8.80	9.29	8.52	8.78	8.62	9.16	8.56

enough. Amounts here vary from 64 to 93 ounces, which is certainly ample.

Comparing the different months, three seems to be little relation between the cost and the attendance. The per capita cost per day is low, considering the increasing cost of living during the year. As previously noted, the month of April, when the protein was highest, shows the greatest per capita cost for food.

Table C shows the amount per day of some of the most important foods used by each person in each month, and, for convenience, is calculated to ounces. The average quantity of flour is 1.58 ounces; of potatoes, 8.57 ounces. This is rather low during the months of May, July and August, when potatoes were perhaps scarce. Even at prevailing prices, the amount of potatoes used should always be as high as the dietary will stand.

The sugar used was 4.4 pounds per month, and this is supplemented by 3.5 pounds of sugar in sirup used, making a total of 7.9 pounds of saccharine substances. During the period when sugar was very scarce, the Food Administration allowed two pounds per month per capita, so the amount of sugar used here is much larger than is positively necessary. Whether it can be reduced, considering the abnormally high price of sugar this year, and thus decrease the cost of food, is for the authorities of this institution to consider.

Beef is always an expensive item, but an excellent source of protein and fat. Over one-fourth pounds per day per person seems to be an abundance, and possibly some might be replaced by beans and protein-yielding food. The meat used here, however, is not as much as at some of the other state institutions.

From 18 to 31 ounces of milk for each of the inmates, or an average of a little less than a quart, is a good showing. This is one of the most valuable foods that can be used in this institution, and the quantity should be kept at as high a figure as possible.

If some arrangement could be made so that even more fish could be used, it would lower the cost and increase the variety of foods. The fish should be fresh if possible, but if not, either salted or dried.

Table D shows the source of the energy derived. Of the total calories nearly one-third comes from breadstuffs, and next in abundance is that from milk, cheese and eggs. This is satisfactory, for it is not advisable in this institution to depend too largely on meat for the protein and fat. More than one-seventh of the energy comes from the sugar and sirup. There is always a tendency to use large quantities of sugar because of its agreeable taste. The amount of fruit used should be kept as high as possible.

In comparing the different state institutions so far studied, the Osawatomie and Topeka hospitals are the only ones that are at all comparable with the Parsons institution, and the comparison should not be carried too far even with them. The amount of food used is greater at Parsons, and this gives a higher calorie and protein value per capita. Possibly the character of the inmates in Parsons necessitates this. The cost is also more, but these figures are made on a rising food market, the Parsons institution being the latest of the series examined.

STATE HOSPITAL FOR EPILEPTICS.

TABLE D.—Classification of groups of food.—Per cent of calories of total calories.

Classes of Food.	October, 1918, per cent.	November, per cent.	December, per cent.	January, 1919, per cent.	February, per cent.	March, per cent.	April, per cent.	May, per cent.	June, per cent.	July, per cent.	August, per cent.	September, per cent.	Average, per cent.
Breadstuffs	31.18	32.53	31.41	31.05	35.03	30.89	29.32	33.60	28.43	31.67	30.64	32.19	31.49
Vegetables	13.15	10.47	12.15	12.06	11.08	10.89	7.91	10.13	15.23	12.70	10.61	11.98	11.53
Fruits	3.97	2.11	11.03	4.04	5.38	5.60	4.06	4.05	2.06	1.81	5.68	2.67	4.37
Sugar, sirup	10.25	14.25	18.81	10.57	11.88	13.28	16.71	14.67	13.72	13.80	13.83	12.23	13.66
Lard, butterine	13.03	18.10	3.25	15.45	8.92	11.17	11.84	10.34	8.00	10.99	10.72	11.70	11.12
Milk, cheese, eggs	11.33	13.83	14.45	14.44	14.94	16.58	16.66	18.17	18.49	19.58	19.20	15.37	16.09
Meats, fish	11.31	8.67	9.39	9.43	13.52	11.56	12.72	9.02	14.02	9.96	9.29	13.84	11.10

RECAPITULATION.

1. As the food at this institution is prepared in the kitchens of fifteen or more different cottages, there are some advantages not possessed by those institutions where the food is all prepared in one or two kitchens.

2. An examination of the food supplied indicates that the quality is good. In a few cases where a question arose as to the quality, samples were taken and examined at the State Food Laboratory in Lawrence. The report on these is as follows:

Tomatoes: Refraction of filtered juice, 33.6; acidity as lactic acid, 0.73; appearance of content, good.

Catsup: Appearance, good; no artificial color or preservatives detected.

Rice: Appearance, good; glucose, none detected; talc, present. This latter ingredient is unnecessary, but is often used to improve the appearance of the product.

Vanilla flavor: No adulteration found.

Prunes: These had a soured or moldy odor, and on examination showed that insects were present. If used they should be thoroughly washed several times and the water thrown away.

3. The necessary waste from the preparation of the food and leftovers not edible is fed to hogs, and the hogs are sold, so that it is probable that a much smaller actual waste occurs here than in the ordinary city household.

4. The food given out by the storekeeper is used for the patients, administrative force and helpers, and as the latter force is large, this brings up the necessary amount of food above what it would be if patients alone were fed.

5. Farm products are used as much as possible. This not only diminishes the cost, but it affords a greater variety of food.

6. The examination of the dietary indicates that one practical method for reducing expenses is to decrease the protein, especially that from meat.

7. The energy of the food, as shown by the calories per capita, is sufficiently high for an institution of this class. In fact, the amount of food might be slightly decreased without any injury to the patients.

8. Although the weight of the food served is greater in the summer months, there is no increase in calories at that time—a condition which is satisfactory.

9. If the amount of sugar and saccharine substance can be reduced during the present high price of sugar, it should be done, and the patients will not suffer. It may be possible to substitute sorghum for some of the sirup in the fall.

10. The amount of milk used is to be commended. It should be kept as high as possible.

11. That the institution has been able to use so much fish to replace a part of the meat is to be commended. Most fish is readily digested and adds variety to the diet.

12. Table D shows that 11.1 per cent of the total calories comes from meat and fish. All things considered, this is sufficiently high and would allow a small decrease without injury to the diet.

13. The cost per day per capita did not rise during the year, but this may be largely due to the purchase of most of the food by contract. If food had been bought on the open market a gradual increase would have probably been shown.

14. The calories and the cost of food are greater at the Parsons Hospital than at either the Osawatomie or the Topeka Hospital, but it must be remembered in comparing cost that the Parsons institution was studied a year later than the other two and during the time of a rising food market.

15. In the comparison of tables it should be noted that the bread was purchased at the Parsons institution, so the amount of flour is low. The high milk and low pork consumption is well shown here. The quality of the bread used in the Parsons Hospital might be improved. The process of raising is carried too far, thus giving a larger loaf for the amount of flour used, but producing slight acidity in the bread.

16. The cost for 1,000 calories represents the actual cost of energy supplied by the food. The increase of the Parsons institution over the other two hospitals can be accounted for by the later date of this investigation.

VII.

STATE SCHOOL FOR THE BLIND, KANSAS CITY..

(Abstract of Report.)

LAWRENCE, KAN., March 3, 1921.

An abstract of the report on the dietary of the Kansas State School for the Blind, at Kansas City, Kan., is herewith submitted. The objects of the investigation were the same as for the institutions already studied.

With these objects in view, the steward has been asked to furnish the quantity of each kind of food issued per month, and this investigation has been carried through from January, 1919, to December 31, 1919, thus covering an entire year and including both the winter and summer dietary.

In this abstract the report for the month of October, 1919, only is given, and is designated as table A.

The results given in table A have been compiled from the steward's report, and remarks follow each at the end, and there is a discussion of the results, with suggestions as to any possible improvements that might be made.

As in most of these institutions, the steward issues the needed foods daily to the different kitchens (at the Penitentiary there are four), an accurate account is kept of the daily population, or those who use this food, and from this data, at the end of the month, we have what the inmates have lived on for that month. The waste from most of these kitchens is fed to chickens or hogs, so that the actual loss of food material is small. The fruits, vegetables, etc., raised on the institution farm are accounted for and issued to the inmates as if purchased at the market price. This practice, of course, greatly lowers the actual cost to the state of keeping the inmates of these institutions.

It will be noted that from the steward's report for each month the actual weight of the food as given out is stated; then from the standard table of food values the protein, fat and carbohydrates is calculated; and in the last column the calories or energy value of that amount of food. Thus, 24 gallons of apple butter, weighing 240 pounds, yields only 2.88 pounds of protein and 0.24 pounds of fat; but its value is mostly in the 140.40 pounds of carbohydrates, and the whole yields 267,600 calories; this is its energy value.

STATE SCHOOL FOR THE BLIND.

TABLE A.—Dietary for October, 1919.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, fresh	3,447.00	10.34	10.34	342.27	737,658
Apricots	126.00	1.13	.....	21.79	42,840
Baking powder	10.00	.....	.....	3.00	5,440
Buttermilk	400.00	12.00	2.00	19.20	64,800
Breakfast food	216.00	11.88	3.24	174.96	352,296
Beans, Lima	90.00	16.29	1.35	59.31	142,740
Beans, pinto	95.00	20.80	1.23	61.84	159,125
Crackers	356.00	34.88	32.39	260.23	667,500
Cabbage	620.00	8.68	1.24	29.76	74,772
Cherries	60.00	.66	.06	12.66	24,420
Corn	180.00	5.04	2.16	34.20	80,100
Cream	10.00	.25	1.85	.45	8,819
Celery	24.00	.21	.02	.62	1,632
Flour	1,600.00	179.20	16.00	1,198.40	2,564,800
Ham	159.00	27.82	29.31	.....	170,607
Lard	150.00	.....	150.00	.....	612,300
Meal, corn	100.00	9.20	1.90	75.40	161,300
Milk, fresh	4,539.00	149.78	181.56	226.95	1,425,246
Milk, condensed	144.00	42.48	51.51	64.38	404,352
Macaroni	30.00	4.02	.27	22.23	48,720
Onions	50.00	.70	.15	4.45	9,950
Potatoes, Irish	3,005.00	54.09	3.00	441.73	913,520
Peas	60.00	2.16	.12	5.88	15,060
Pears	90.00	.26	.26	16.20	30,960
Potatoes, sweet	752.00	10.52	4.51	164.68	336,144
Pears, fresh	45.00	.22	.18	5.71	11,520
Pork, salt	27.00	1.59	21.27	.....	92,745
Prunes	100.00	1.80	.....	62.20	116,100
Peaches dried	100.00	4.70	1.00	62.50	126,000
Sugar	500.00	.....	.....	500.00	907,000
Salmon	120.00	23.40	9.00	.....	79,200
Smearcase	25.00	5.20	.25	1.05	12,450
Sausage	125.00	15.25	55.00	1.37	256,500
Sirup	820.00	.....	.....	660.10	1,189,820
Tomatoes	295.00	3.50	.55	11.80	30,385
Tapioca	40.00	.16	.04	35.20	64,320
Totals	18,510.00	659.21	581.76	4,610.52	11,941,132
Amount per day per capita	4.42	71 grams	63 grams	499 grams	2,853

The first thing that the inspection of this dietary suggests is its many irregularities, as shown by a comparison of the food of different months. As will be seen later, this is probably more apparent than real, but it is very forcibly brought out in the summaries. For instance, the pounds of food per day for each of the pupils seems to be as follows for the twelve months: 2.6, 8.88, 2.58, 2.21, 1.76, 4.31, 2.52, 3.53, 2.74, 4.42, 6.64 and 2.44. That this should be true is absurd, but a glance at the individual months shows that 240 pounds of apple butter was dispensed in January and none after that; 469 pounds of beef was dispensed in September and none in October. The potatoes were stored in October, November and February and only small quantities at other times. I am told that these irregularities are due to lack of storage facilities, but they certainly vitiate any attempt to arrive at the actual monthly dietary, and make it necessary to confine our conclusions to the general averages of the year.

The wide variation as shown for protein in table B is, of course, incorrect, as it would not be 126 grams in February and only 42 per capita in May. The same remark applies to all the other figures in this table. Nor would the calories vary from 1,630 per capita in May to 4,347 in February. Although there are very few pupils in the summer months,

STATE SCHOOL FOR THE BLIND.

TABLE B.—Summaries of dietaries for twelve months.—Per capita use of food.

Dietaries.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost per day per capita.
1919.						
January	2.06	53	75	202	1,7 2	$0.23
February	8.88	126	95	739	4,347	.38
March	2.58	78	94	291	2,342	.27
April	2.21	61	82	223	1,892	.23
May	1.76	42	68	211	1,630	19
June	4.31	106	115	612	3,813	.40
July	2.52	44	147	177	2,214	.57
August	3.53	77	81	470	2,871	.65
September	2.74	49	69	276	1,925	.24
October	4.42	71	63	499	2,853	.28
November	6.64	100	112	508	3,452	.36
December	2.44	58	103	198	1,962	.27
Average	3.67	72	92	366	2,668	$0.38

the per capita consumption of food should only be a little higher than during the rest of the year.

In this table, however, appear the average of the different nutrients for the entire year. The average age of the girls in this school for 1920 was 14½, and of the boys 13⅞. As the teachers and employees were also fed from this supply, this would raise the average food requirements somewhat. It is evident that the cost per day, as shown in this table, is of no value. The average cost, however, for the year of 38 cents per day for each of the inmates is perhaps not higher than would be expected considering the rapidly mounting cost of living during this year.

Table C attempts to answer the question, What is the source of the energy derived from the food? The averages in the last column are the only figures to be considered, and it will be noticed that although breadstuffs furnish the largest part of the energy, on the whole, the amounts are fairly distributed between the seven classes.

How many ounces of each class of food did the inmates use daily? (Table D.) Potatoes and milk constitute the largest amount, but these both contain large quantities of water, while such foods as sugar contain practically no water. Flour is the next staple in quantity, and this contains less water than does the butter.

What is the source of the protein (the material that builds up the tissues). The following averages for the year were obtained: Vegetables, fresh and dried, 12.64; vegetables, canned, 1.59; cereals, breadstuffs, 26.10; meat, fresh, 17.34; fish and canned meat, 10.96; milk, condensed, fresh, and buttermilk, 24.59; fruits, fresh, dried, canned, 2.72; butter, oleo, eggs, cheese, 4.39. Average of protein from animal sources, 57 per cent; from vegetable sources, 43 per cent.

RECAPITULATION.

1. With reference to the quality of the food furnished, it seems to be excellent, as is the case with the other institutions studied. Although not "extra fancy," it is, as a rule, good, substantial and wholesome. The following samples, which it was though might be unsatisfactory, were examined at the University Food Laboratory:

STATE SCHOOL FOR THE BLIND.

TABLE C.—Classification of groups of foods.—Per cent of calories of total calories.

Classes of Foods.	January, per cent.	February, per cent.	March, per cent.	April, per cent.	May, per cent.	June, per cent.	July, per cent.	August, per cent.	September, per cent.	October, per cent.	November, per cent.	December, per cent.	Average, per cent.
Breadstuffs	27.34	17.62	31.63	29.93	30.32	33.18	33.71	29.64	23.20	32.36	18.97	18.87	19.73
Vegetables	6.28	47.03	9.09	1.51	6.39	4.58	3.10	3.11	8.11	14.76	40.91	13.77	13.22
Fruits	10.03	.68	2.53	6.81	1.67	1.51	7.26	8.56	11.11	9.12	.59	8.03	5.66
Sugar, sirup	5.49	8.97	9.68	10.08	14.72	24.38	18.88	27.18	20.62	17.56	3.98	9.64	14.28
Lard, butterine	13.07	7.80	12.87	13.49	23.07	8.08	31.97	5.10	12.82	7.12	14.27	20.43	14.17
Milk, cheese, eggs	17.46	9.07	16.34	17.96	16.87	20.14	10.50	12.95	11.17	16.04	9.94	19.90	14.86
Meats, fish	20.30	8.71	17.00	19.85	6.94	8.14	24.55	13.53	13.90	5.01	11.47	8.03	13.12

STATE SCHOOL FOR THE BLIND.

TABLE D.—Per capita use of some of the important staples used.

Staples.	January, ounces.	February, ounces.	March, ounces.	April, ounces.	May, ounces.	June, ounces.	July, ounces.	August, ounces.	September, ounces.	October, ounces.	November, ounces.	December, ounces.	Average, ounces.
Flour, white and Graham	3.25	6.72	6.40	3.68	4.80	10.08	.....	6.88	4.16	5.92	6.24	3.36	5.12
Potatoes, Irish and sweet	.20	102.80	.....	.....	.....	.....	.....	3.44	6.02	14.24	70.72	.35	16.46
Sugars	.81	2.35	2.00	1.66	2.11	8.16	3.68	6.88	3.36	1.92	1.30	1.50	2.98
Beef, fresh and dried	3.04	4.16	3.48	3.60	.41	2.40	3.52	4.32	1.76	.....	3.36	1.92	2.66
Milk, fresh, condensed, buttermilk	15.04	19.04	16.16	16.64	13.92	28.32	11.36	16.32	7.52	19.36	15.68	18.56	16.49
Butter, oleomargarine	.60	.94	.96	.73	1.08	1.34	1.12	.68	.62	.....	1.84	.97	.90
Pork, fresh and cured	.51	.83	1.20	1.05	.52	.96	2.56	1.15	1.07	.70	1.20	1.12	1.07
Sausage	.29	.14	.35	.14	.02	.....	.....	.....	.11	.46	.....	.80	.23
Fruits, dried	.36	.....	.....	1.04	.....	.....	.....	.....	.....	.76	.....	.96	.26

A. *Vanilla*—"Fine Flavoring Extract." This was found to contain 37 per cent of alcohol, and there was nothing to indicate that it was not of good quality.

B. *Tomatoes,* complained of as containing some "swells." The sample examined was normal in appearance, taste and color. It contained no added water.

C. *Loose muscatel raisins* were found to contain living insects and to have a musty odor. Stems and disintegrated fruit were present, all of which indicated inferiority.

2. At the end of each monthly table is a summary for that month. As previously stated, the method of issuing supplies to the kitchen is not satisfactory, and storage facilities should be such that an accurate account can be kept of what food is issued and used, at least for the month, if not daily.

3. The wide variation in calories, protein, fat and carbohydrates is brought out very clearly in table B. The averages on the lower line are the only figures worthy of consideration. It will be noted that if we consider the estimate of the interallied Scientific Food Commission (1918), that 3,410 calories per day is sufficient for the adult, and that growing boys and girls of the average age of these pupils (13 to 14) need 83 per cent of the above; that would require 2,830 calories. The average for the year was 2,668. This appears to be rather low when we consider the fact that the population of the three summer months was practically all adults, and these would need more food. On the other hand, it was learned that some of the pupils spend the week-end at home, which would increase the calorie value for the total population.

4. The average protein (72 grams), as shown by table B, appears to be somewhat low for this class of inmates, 10 per cent of whom were adults.

5. The average cost of living, 38 cents per day per capita, is not higher than would be expected when the rapidly increasing cost of food during this period is considered. It was higher during the summer months, when adults only were fed, than during the rest of the year.

6. The energy derived from the different classes of foods, as shown by table C, is quite well distributed. The quantity of milk used should be increased, especially for growing children. This was about a pint per day for each of the inmates, but varied greatly during the different months. One thousand calories obtained from milk usually cost only half as much as the same amount of energy obtained from meat.

7. The protein from animal sources was 57 per cent of the diet, and that from vegetable sources 43 per cent. It is well to increase the vegetables in the diet as much as possible.

8. On account of the proximity of the Kansas City markets, it would seem to be possible to substitute fresh fish in season for a part of the meats.

VIII.

STATE TRAINING SCHOOL, WINFIELD.

LAWRENCE, KAN., April 25, 1921.

In the continuation of the study of the dietaries of the state institutions under the care of the Board we have taken up the food supply of the State Training School at Winfield. As collaborative investigations are being made by another department on this institution, we have confined our study to the limited period from July 1, 1920, to December 31, 1920, without a special study of each month. The entire food supply for this half year is therefore considered. This supply, calculated to weight, pounds of protein, of fat and of carbohydrates, and in the terms of calories, is stated in table A.

In regard to the weight of different foods as shown by table A, column 1, the largest quantities used are as follows:

	Weight pounds.	*Per cent of water.*	*Calories.*
Fresh milk	236,102	87	74,136,028
White flour	81,707	12	130,976,321
Irish potatoes	27,630	18	8,399,520
Fresh beef	19,716	50	19,321,680
Tomatoes (canned)	16,697	94	1,719,791
Corn (canned)	13,696	23	6,094,720
Tomatoes (fresh)	11,911	94	1,226,833
Sugar	10,000	10	18,140,000
Corn (fresh)	9,882	90	1,758,996

In the first column these foods are arranged in the order of their weights; but on account of the vastly different water content, the per cent of which is shown in the second column, the arrangement of their food value, as shown by the calories in the last column, is very different.

This table also shows that the per capita amount of protein per day is 96.49 grams, which seems to be satisfactory, as it is not very much below what would be required for adults in good health engaged in ordinary work.

The calories per day per capita, 3,188, is a little less than the average amount required for adults ordinarily employed (3,300 to 3,500), but it seems to be ample considering the physical condition and exercise of those who are fed from this diet.

The cost per day per capita ($0.29) seems to be very reasonable, considering the cost of living during the period studied.

STATE TRAINING SCHOOL.

TABLE A.—Dietary from July 1, 1920, to December 31, 1920.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, canned	1,740.00	3.48	13.92	647.28	1,270,200
Apples, dried	4,950.00	79.20	108.90	3,271.95	6,524,100
Apple butter	120.00	1.44	.12	70.20	133,800
Apples, fresh	2,220.00	6.65	6.65	239.75	475,180
Apricots, canned	672.00	12.76	8.73	327.93	672,000
Apricots, dried	500.00	23.50	5.00	312.50	630,000
Bacon	458.50	43.55	273.34	.....	1,190,724
Baking powder	200.00	.....	.....	60.00	108,800
Beans, Lima	3,580.00	647.98	53.70	2,359.22	5,677,880
Beans, Mexican	2,800.00	613.20	36.40	1,822.80	4,690,000
Beans, string, canned	4,830.00	53.13	4.83	183.54	449,190
Beans, string	2,568.00	53.92	7.70	177.19	451,968
Beets	780.00	10.14	.78	60.06	130,260
Beans, navy	6,300.00	1,417.50	113.40	3,754.80	9,853,200
Beef, fresh	19,716.00	2,858.82	3,312.28	.....	19,321,680
Blackberries	420.00	3.36	8.82	236.88	483,000
Bread	600.00	55.80	7.20	316.20	704,400
Cabbage	4,975.00	69.65	9.95	238.80	597,000
Carrots	456.00	4.10	.91	33.74	72,504
Cantaloupes	720.00	2.16	.....	33.12	64,008
Catsup	99.00	1.48	.19	33.12	64,008
Celery	300.00	2.70	.30	7.80	20,400
Cherries, canned	240.00	2.64	.24	50.64	99,600
Cheese	1,025.00	295.20	367.97	3.07	2,043,850
Chocolate	12.00	1.54	5.84	3.63	33,264
Chowchow	53.00	.21	.05	10.97	20,935
Corn	13,696.00	383.48	164.35	2,602.24	6,094,720
Corn, fresh	9,882.00	118.58	39.52	760.91	1,758,996
Corn meal	505.00	46.46	9.59	380.77	514,565
Cucumbers	2,049.00	14.34	4.81	62.63	163,812
Cornstarch	1,248.00	.....	.....	1,123.20	2,036,736
Crackers, cream	308.00	29.87	37.26	214.67	595,980
Crackers, Graham	352.00	35.20	33.08	259.77	670,208
Crackers, soda	2,000.00	196.00	182.00	1,462.00	3,750,000
Corn flakes	72.00	3.96	1.08	58.32	117,432
Cranberries	200.00	.80	1.20	19.80	42,200
Currants	1.00	.01	.....	.12	259
Candy	370.00	.....	.....	355.20	660,450
Cabbage	2,646.00	37,04	5.29	126.92	317,520
Chickens, dressed	122.00	16.71	15.00	.....	91,622
Eggs	522.00	62.11	45.54	.....	310,590
Fish	540.00	62.64	89.64	.....	479,520
Figs	650.00	27.95	1.95	482.30	934,050
Flour, white	81,707.00	9,151.18	817.07	61,198.54	130,976,321
Flour, Graham	1,000.00	133.00	22.00	714.00	1,627,000
Gooseberries, canned	128.00	1.66	1.92	24.44	57,600
Grapes, canned	288.00	3.74	4.60	55.29	125,856
Grapenuts	36.00	4.14	.36	28.44	60,588
Ham	644.00	112.70	119.14	.....	691,012
Hominy	6,480.00	537.84	38.88	5,119.20	10,419,840
Kraut	360.00	6.12	1.80	13.68	45,000
Liver	51.00	10.30	1.58	1.27	27,438
Lemons	30.00	.21	.15	1.77	4,200
Lemon pudding	25.00	.82	.80	7.05	18,000
Life of Wheat	189.00	20.79	2.64	144.20	310,149
Macaroni	740.00	99.16	6.66	548.34	1,201,760
Mackerel	60.00	8.34	12.72	.....	67,080
Melons, water	300.00	.60	.30	8.10	17,100
Milk, fresh	236,102.00	7,791.36	9,444.08	11,805.10	74,136,028
Milk, condensed	288.00	2.76	2.67	3.21	386,016
Nuts	375.00	18.37	64.87	13.12	322,125
Onions	475.00	6.65	1.42	42.27	94,525
Oatmeal	8,835.00	1,475.44	644.95	5,848.77	15,929,505
Oranges	370.00	2.22	.37	31,49	62,530
Oleomargarine	8,340.00	100.08	6,922.20	.....	28,439,400
Oysters, canned	105.00	9.24	2.52	4.09	35,175
Peaches, canned	1,371.00	9.59	1.36	148.06	290,923
Peaches, dried	3,700.00	173.90	3.70	2,312.50	4,662,000
Peas, canned	6,816.00	245.37	13.63	666.96	1,710,816
Peas, dried	1,140.00	280.44	11.40	706.80	1,837,680
Pears, fresh	45.00	.22	.18	5.71	11,520

TABLE A.—Dietary from July 1, 1920, to December 31, 1920—Concluded.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Pears, canned	378.00	1.13	1.13	68.04	130,032
Pears, dried	390.00	10.92	21.06	284.31	637,650
Pineapple, canned	504.00	2.01	3.50	183.45	359,784
Pickles	450.00	2.25	1.35	12.15	31,500
Plums, canned	462.00	2.31	.46	103.02	198,660
Pork, fresh	1,094.00	82.05	599.51	.....	2,685,770
Pork loins	391.00	60.60	56.69	.....	341,343
Potatoes, Irish	27,630.00	497.34	27.63	4,061.61	8,399,520
Potatoes, sweet	5,624.00	78.73	33.74	1,231.65	2,513,928
Prunes	8,123.00	146.21	.....	5,052.50	9,510,803
Pumpkin, canned	816.00	6.52	1.63	54.67	122,400
Rhubarb	158.00	.63	.63	3.47	9,796
Raspberries, canned	222.00	3.77	2.22	27.97	66,600
Raisins	500.00	11.50	15.00	342.50	703,500
Rice	5,200.00	416.00	15.60	4,108.00	8,273,200
Salt pork	218.00	12.86	171.78	.....	749,830
Salmon	384.00	14.88	28.80	.....	253,440
Sausage, pork	403.00	52.39	177.32	4.43	826,956
Sardines	69.00	16.35	8.34	.....	63,756
Sugar	10,000.00	.....	.....	10,000.00	18,140,000
Shredded wheat	81.00	9.80	1.45	60.91	134,217
Shortening	6,000.00	.....	6,000.00	.....	24,492,000
Sirup	4,880.00	.....	.....	3,928.40	7,080,880
Tapioca	20.00	.08	.02	17.60	32,160
Tomatoes, fresh	11,911.00	107.19	47.63	464.52	1,226,833
Turnips	4,345.00	39.10	4.34	247.66	538,780
Tomatoes, canned	16,697.00	200.36	33.39	667.88	1,719,791
Water melons	7,106.00	14.21	7.10	191.86	405,042
Yeast	88.00	10.29	.35	18.48	53,680
Totals	669,141.50	29,304.98	30,384.17	142,481.49	437,589,642
Average for each of six months	111,523.68	4,884.16	5,064.03	23,746.91	72,931,607
Amount per day per capita	4.87	96.49 grams	100.11 gms.	470.21 gms.	3,188

Cost per day per capita, $0.29.
Cost per thousand calories, $0.091.

STATE TRAINING SCHOOL.

TABLE B.—Comparison of the per capita use of some of the important staples.

Staples.	*Ounces.*
Flour, white	9.44
Corn meal	0.06
Potatoes, Irish and sweet	3.84
Beans, dried	1.44
Sugar and sirup	1.44
Beef	3.24
Pork, fresh and cured	0.32
Lard	0.64
Sausage	0.04
Butterine	0.96
Milk	27.52
Fruit, dried	3.24
Fish, fresh and canned	0.14
Bread	0.06

Table B is interesting in that it shows what the staple foods were. Bread, potatoes, beef and dried fruits made up most of the diet. There was a generous use of milk—nearly a quart per capita per day. This is to be greatly commended. Only a detailed study of the daily menu will show how well the nutrients mentioned in this table are utilized for the best care of the inmates.

STATE TRAINING SCHOOL.

TABLE C.—Classification of groups of foods—Per cent of calories of total calories.

Classes of foods.	*Per cent.*
Breadstuffs	36.02
Vegetables	13.48
Fruits	6.91
Sugar, sirup	5.91
Butterine, lard	12.09
Milk, cheese, eggs	17.56
Meats, fish	8.43

The classification in table C tells the source of the energy derived from the food. It will be noticed that breadstuffs furnish more than one-third; next comes milk, cheese and eggs; then vegetables, followed closely by butterine and lard. The aim should be made to increase as much as possible the use of fruits and vegetables, for in an institution of this kind a stimulating diet is not needed.

STATE TRAINING SCHOOL.

TABLE D.—Per cent of protein compared with total protein from each of the following classes of foods.

Foods.	*Total protein, pounds.*	*Per cent.*
Vegetables, fresh and dried	4,000.92	13.65
Vegetables, canned	1,435.07	4.89
Fish	171.45	.58
Cereals	1,976.59	6.74
Breadstuffs	9,710.58	33.13
Meat, fresh	3,028.48	10.33
Meat, canned and salt	221.50	0.75
Milk	7,818.96	26.68
Fruits	568.06	1.93
Cheese and eggs	357.31	1.22
Butterine	100.08	0.34

Average per cent protein: Vegetable sources, 60.10 per cent; animal sources, 39.90 per cent. Cost per 1,000 calories, $0.091.

Table D shows where the protein comes from. Here again the breadstuffs have the lead, followed by milk, vegetables and meat. The total protein from vegetable sources, 60.34, is large, and accentuates again the fact that large quantities of vegetables are used, which is to the advantage of those using the food.

RECAPITULATION.

1. The study of the dietary for this half year has been taken up to determine the quantity of food used, and whether the nutrient material was so distributed as to be sufficient and satisfactory for the inmates, in order that their physical health and vigor may be conserved.

2. Another object was to determine the relative cost of the different food ingredients, and the comparison of this with that dispensed at other state institutions.

3. Both the total amount of food used per day per capita, as indicated by the calories, and the proportion of protein and of fat are satisfactory.

4. The cost of 29 cents is very moderate, considering the high cost of food on the market.

5. The large amount of milk used is to be commended. Not only is it valuable for growth and nourishment, but its cost is not so much higher than other foods as is often supposed.

6. This analysis of the diet shows a large quantity of vegetables used, which must be of great advantage, not only on account of the variety furnished, but because a vegetable diet will improve the health of the inmates. This is also brought out in table D.

7. The cost of 1,000 calories is an index of what the energy used, regardless of its source, actually costs. The figure, 91 mills, is very moderate, considering the cost of living.

8. The excellent report from the steward's office, furnished by Supt. W. W. Cooke, aided greatly in making this study of the dietary.

IX.

STATE SCHOOL FOR THE DEAF, OLATHE.

(Abstract of Report.)

LAWRENCE, KAN., May 26, 1921.

Herewith is presented a report on the dietary of the State School for the Deaf at Olathe.

At my request, the superintendent, Mr. Elwood A. Stevenson, has sent me a list of the foods used for the months of September, October, November and December, 1920. The month of December only is here given as table A. A discussion of each table follows.

As evidence of the variety of the food used, it is noted that more than 75 different articles appear in table A.

The advantage of a dietary covering a long period is shown in the irregularity of the following four months' table (table B). There is evidently some flour carried over from one month's account to the next. The same thing is true of the potatoes, beef and pork.

There is an important increase in the milk used after September. The average of these months might be computed, but it is not as definite a figure as if a longer period were studied. Considering the single month of December there was issued 6.11 ounces of fruit, fresh, canned and dried, daily per capita—an abundant quantity, which, while adding considerably to the expense, would also tend to improve the physical health of the inmates.

STATE SCHOOL FOR THE DEAF.

TABLE A.—Dietary for December, 1920.

Articles of Food.	Weight, pounds.	Protein, pounds.	Fat, pounds.	Carbohydrates, pounds.	Calories.
Apples, canned	216.00	0.43	1.72	80.35	157,680
Apples, fresh	250.00	.75	.75	27.00	52,800
Apple butter	180.00	2.16	.18	105.30	200,700
Apricots, canned	336.00	3.02	.....	58.12	114,240
Apricots, dried	25.00	1.17	.25	15.62	31,500
Bacon	834.00	79.23	495.39	.....	2,165,898
Baking powder	10.00	.....	.....	3.00	5,440
Bananas	8.00	.06	.03	1.14	2,320
Beans, Lima	187.00	33.84	2.80	123.23	296,582
Beans, navy	200.00	45.00	3.60	119.20	312,800
Beans, string	90.00	.99	.09	3.42	8,370
Beef, fresh	1,466.00	212.57	246.26	.....	1,436,680
Beef, dried	4.00	1.05	.27	.....	3,040
Blackberries	180.00	1.44	3.78	101.52	262,320
Bologna	111.50	20.29	21.96	.....	14,941
Butter	8.00	.08	6.80	.....	27,904
Butterine	600.00	7.20	498.00	.....	2,146,000
Cabbage	215.00	3.01	.43	10.32	25,800
Candy	37.00	.....	.....	35.52	66,045
Carrots	250.00	2.25	.50	18.50	39,750
Catsup	48.00	.72	.96	5.90	12,720
Celery	36.00	.32	.03	.93	2,448
Cherries, canned	192.00	2.22	.18	40.50	79,680
Cheese	104.00	29.95	37.32	.31	207,376
Chicken	106.00	14.52	13.03	.....	79,606
Citron	4.00	.02	.06	3.12	5,948
Corn flakes	18.00	.99	.27	14.58	29,358
Corn meal	25.00	2.30	.47	18.85	40,325
Cornstarch	48.00	.....	.....	43.20	78,336
Corn, canned	224.00	6.27	2.68	42.56	99,680
Crackers, soda	190.00	18.60	17.20	138.80	356,250
Currants	8.00	.19	.13	5.93	11,672
Dates	2.00	.03	.05	1.41	2,832
Eggs	192.00	22.84	17.85	.....	114,240
Flour, Graham	25.00	3.32	.55	17.85	40,675
Gelatin	.75	.68	.....	.....	1,246
Gooseberries	32.00	.41	.48	6.11	16,400
Grape fruit	48.00	.28	.04	4.08	8,112
Grapenuts	18.00	2.07	.18	15.88	30,294
Grapes, canned	64.00	.76	.06	37.44	71,360
Ham	333.00	58.27	61.60	.....	367,309
Jelly	60.00	.72	.....	35.88	68,100
Lemons	24.00	.16	.11	1.41	3,360
Lettuce	3.50	.03	.....	.87	252
Life of wheat	63.00	6.93	.88	48.06	106,155
Milk	10,344.50	341.36	413.78	517.22	3,248,173
Nuts	20.00	.98	3.46	.70	17,180
Oat flakes	90.00	15.03	6.57	59.58	162,270
Oranges	115.00	.69	.11	9.77	19,435
Oysters	15.00	1.32	.36	.58	5,025
Peaches, canned	90.00	.63	.09	9.72	19,170
Peaches, dried	50.0	2 35	.50	31.25	64,500
Pears, canned	90.00	.27	.27	16.20	30,960
Peas, canned	192.00	6.90	.36	18.81	48,192
Peanut butter	50.00	14.65	23.25	8.55	137,050
Plums, canned	126.00	1.26	.....	25.32	49,770
Pork, fresh	343.50	25.76	188.23	.....	843,292
Potatoes, Irish	1,920.00	34.56	1.92	282.24	583,680
Potatoes, sweet	250.00	3.50	1.50	54.75	111,750
Prunes	75.00	1.35	.....	46.65	87,075
Pudding	25.00	.82	.80	7.05	18,000
Raisins	56.00	1.28	1.68	38.36	78,792
Rice	25.00	2.00	.17	19.75	39,775
Salmon	120.00	23.40	9.00	.....	79,200
Saratoga wafers	36.00	3.52	3.26	26.30	67,500
Sardines	32.00	7.58	3.87	.....	29,568
Sausage	200.00	26.00	88.00	2.20	410,400
Sugar, granulated	1,200.00	.....	.....	1,200.00	2,176,800
Sirup	120.00	.....	.....	96.60	174,120
Tapioca	5.00	.20	.....	4.40	8,040
Tomatoes, canned	236.00	2.80	.44	9.44	24,308
Wheat flour	3,500.00	392.00	35.00	2,621.50	5,610,500
Yeast	8.00	.93	.03	1.68	4,880
Totals	26,409.75	1,498.28	2,219.59	6,294.53	23,193,949
Amount per day per capita	2.67	93 grams	139 grams	333 grams	3,225

STATE SCHOOL FOR THE DEAF.

TABLE B.—Per capita use of some of the important staples.

Staples.	September, ounces.	October, ounces.	November, ounces.	December, ounces.
Flour, white and Graham	7.15	8.89	9.26	7.84
Corn meal and grits	.04	.....	.04	.04
Potatoes, Irish and sweet	8.92	2.88	12.59	4.81
Beans, dried	.70	1.13	.44	.84
Sugar, sirup	3.05	3.10	2.52	2.88
Beef, fresh and dried	2.84	4.80	3.28	3.26
Pork, fresh and cured	2.54	3.07	2.04	3.36
Lard	.72	.88	.91	.....
Sausage	.35	.44	.44	.68
Butter and butterine	1.50	1.36	1.40	1.34
Milk, fresh	15.56	29.52	30.12	23.00
Fruit, dried	.22	.01	.....	.48
Fish, canned	.43	.49	.24	.36

STATE SCHOOL FOR THE DEAF.

TABLE C.—Per capita use of food for four months.

Month, 1920.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.
September	3.65	78	111	393	3,192
October	4.55	111	167	459	3,814
November	5.22	110	159	492	3,865
December	3.67	93	139	333	3,225

STATE SCHOOL FOR THE DEAF.

TABLE D.—Total attendance, population, cost, and cost per day.

Period of Study, 1920.	Total population.	Total attendance.	Total cost per month.	Cost per day per capita.
September	227	6,810	$2,348.49	$0.345
October	230	7,190	3,061.11	.425
November	230	6,900	2,778.36	.402
December	230	7,190	2,428.86	.335

Table C shows that the average protein (98 grams per day) is sufficient for inmates of this class, while the 3,524 calories afforded by the food is certainly abundant and might be slightly decreased without loss to physical well-being.

Table D refers to the cost per day, and is not high considering the high market price during this period.

Table E shows where the energy of the food comes from. Breadstuffs furnish more than a quarter, and the remainder is distributed between the other food products. Butter and its substitutes seem to furnish a large amount of energy, but it should be remembered that the fuel value of fats is very high. Fruits, although abundant, do not furnish much energy, as they contain so much water. Fruits canned in sirup, however, afford considerable nutriment on account of the high fuel value of sugar.

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TABLE E.—Classification of groups of food.—Per cent of calories of total calories in the groups given.

Classes of Foods.	September, per cent.	October, per cent.	November, per cent.	December, per cent.
Breadstuffs	25.37	24.44	29.14	28.31
Vegetables	10.65	6.40	10.24	7.34
Fruits	6.69	6.62	6.96	9.24
Sugar, sirup	10.60	9.22	7.46	10.13
Butter, lard, butterine	18.74	13.61	13.98	8.94
Milk, cheese, eggs	10.07	16.19	16.54	15.39
Meats, fish	17.34	19.84	16.19	21.43

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TABLE F.—Showing the total number of pounds and the per cent of protein obtained from each of the following sources.

Source.	September.		October.		November.		December.	
	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.
Vegetables, fresh and dried	145.69	12.42	141.63	7.99	158.83	9.45	122.51	8.17
Vegetables, canned	42.23	3.60	28.16	1.59	23.26	1.38	32.33	2.15
Fish	38.56	3.29	34.00	1.92	20.60	1.22	32.30	2.15
Cereals and breadstuffs	384.33	32.79	521.49	29.44	520.83	31.02	448.71	29.95
Meat, fresh	177.69	15.16	314.21	17.74	321.85	19.15	252.85	16.87
Meat, canned and cured	90.27	7.70	205.85	11.62	118.87	7.08	185.52	12.35
Milk	218.79	18.66	437.86	24.72	428.88	25.54	341.36	22.79
Fruit, fresh, canned, dried	31.36	2.67	23.62	1.33	24.79	1.47	22.63	1.51
Butter, cheese, eggs, butterine	43.15	3.68	54.47	3.07	61.34	3.65	60.07	4.01

Total calories for four months	99,028,235
Total attendance for four months	28,090
Total cost for four months	$10,616.82
Cost per thousand calories	$0.107
Average per cent of proteins from animal sources	56%
Average per cent of proteins from vegetable sources	44%

Finally, table F tells where the protein comes from. About one-third comes from cereals and breadstuffs. Meat, milk and eggs furnish nearly half the protein.

A study of the sources of the protein shows that 56 per cent is from animal and 44 per cent from vegetable proteins. Ordinarily we should say that it would be more satisfactory if there were more protein obtained from vegetable sources than from animal. In this case, however, the high animal protein is probably due to the large amount of milk, and it is of great advantage to the inmates to be able to have so much milk. A convenient method for comparing the cost of different dietaries is by comparing the cost per thousand calories, and 10.7 cents per thousand is not excessive.

RECAPITULATION.

1. There seems to be more difficulty in the smaller institutions to check up the actual food used per month or per day than in the larger ones, so this dietary is not as satisfactory as one covering six months or an entire year.

2. The protein used in this institution appears to be sufficient for this class of inmates.

3. The energy as shown by the 3,524 calories per day per capita is possibly somewhat in excess of the needs of persons not engaged in active physical work.

4. The cost of the food is not excessive.

5. The large amount of milk used—nearly a quart in October and November—is very satisfactory. It will add little to the expense and much to the health to keep the consumption of milk as high as possible. In November more calories were afforded by the milk than by any other product except wheat flour.

6. In general this dietary shows the use of abundant food, fairly well distributed as to materials. It is, of course, important that the daily menu be so varied that it is agreeable to the taste in order to keep up the appetite, and that it affords a well-balanced ration. Fresh vegetables and fruits should be used abundantly when they can be procured. It is advisable to keep the meat consumption low.

NOTE.—A partial study of the dietary at the State Orphans' Home in Atchison was also made, but the methods of issuing the provisions to the kitchens made it difficult to arrive at reliable conclusions in regard to the daily use of food, so that a further study was deemed advisable before making a final report.

COMPARISON OF THE DIETARIES OF NINE KANSAS INSTITUTIONS.

1. These dietaries cover different periods, from July, 1917, to December, 1920.

2. The character of the inmates is entirely different in the different institutions.

3. The three hospitals, that of Topeka, Osawatomie and Parsons (which is especially for epileptics), may be compared in some respects. It is noticed that the average protein used is quite similar in the Topeka and Osawatomie institutions, viz., 83-87. The Parsons hospital is higher (101), and very reasonably so. There happens to be a remarkable agreement between the calories used at the two hospitals, viz., 2,911-2,927, while the Parsons institution is higher, as it should be.

4. The high energy value of the food used at Lansing has already been referred to, and is probably higher than necessary. Comparing this, however, with some southern prisons, it is noticed that the calorie value of the food in 1915 in the Texas prison farms was 5,429 and the Louisiana farms 4,196. In the South the staple foods are bacon, beans, corn, flour, molasses, sugar and rice.

5. Comparing the Industrial School for Girls at Beloit with the Industrial School for Boys at Hutchinson, as these two institutions are somewhat alike, it will be noticed that the boys have a somewhat higher protein diet of the two institutions, but if we allow the girls 83 per cent of the amount given the boys (a proportion that is recommended by many authorities), the amounts furnished at the two institutions agree very satisfactorily. Recent investigation by Doctor Gephart and others have shown that the amount of food utilized by the growing boy is entirely beyond belief.

COMPARISON OF INSTITUTIONS.

TABLE I.—Comparison of the per day per capita use of some of the important staples at nine state institutions.

Institutions.	Flour, oz.	Potatoes, oz.	Sugars, oz.	Beef, oz.	Milk, oz.	Butter and oleo, oz.	Pork, oz.	Sausage, oz.
Penitentiary, Lansing	11.84	17.13	3.48	9.76	11.88	.76	3.79	4.03
Industrial School, Hutchinson	14.83	16.23	2.21	5.49	10.19	.62	1.89	.89
Hospital, Osawatomie	8.96	8.71	1.38	4.33	12.93	1.03	1.17	.29
Industrial School, Beloit	6.08	11.92	1.75	1.91	31.22	1.34	.67	.00
Hospital, Topeka	8.04	7.43	1.44	5.35	12.24	.72	.66	.
Hospital, Parsons	7.28	8.57	1.89	4.43	26.34	.80	.25	.11
School for Blind, Kansas City	5.12	16.06	2.98	2.66	16.49	.90	1.07	.23
Training School, Winfield	9.44	3.84	1.44	3.24	27.52	.96	.32	.04
School for Deaf, Olathe	8.28	7.30	2.89	3.54	24.55	1.40	2.75	.48

COMPARISON OF INSTITUTIONS.

TABLE II.—Per capita comparison of the average dietaries of nine state institutions.

Institutions.	Weight of food, pounds.	Protein, grams.	Fat, grams.	Carbohydrates, grams.	Calories.	Cost.	Cost per 1,000 calories.
Penitentiary, Lansing, July, 1917. to January, 1918.....	5.93	147	223	673	5,389	$0.395	$0.074
Industrial School, Hutchinson, July, 1917, to March, 1918.....	4.49	122	108	639	4,032	.270	.068
Hospital, Osawatomie, July, 1917, to May, 1918.....	3.27	83	102	412	2,911	.219	.076
Industrial School, Beloit, September, 1917, to September, 1918.	4.58	91	106	430	3,113	.175	.058
Hospital, Topeka, October, 1917, to October, 1918.....	3.40	87	96	418	2,927	.236	.081
Hospital, Parsons, October, 1918, to October, 1919.....	4.70	101	109	481	3.355	.330	.099
Blind, Kansas City, January, 1919, to January, 1920....	3.67	72	92	366	2,668	.380	.115
Training School, Winfield, July, 1920, to January, 1921.....	4.87	96	100	470	3,188	.290	.091
Deaf, Olathe, September, 1920, to January, 1921..	4.27	98	144	419	3,524	.377	.107

6. There are so many other items that have to be considered under the head of cost, that comparisons are difficult. Referring, however, to table II, a comparison of state institutions, the United States Department of Labor, Bureau of Labor Statistics, reports the following index numbers for retail prices of the principal articles of food in the United States. Starting with 100 as the average for 1913, the figures are as follows:

1913.....	100	1917.....	146
1914.....	102	1918.....	168
1915.....	101	1919.....	186
1916.....	114	1920.....	203

This shows a gradual rise in cost from 1917 to 1921, the period of the study. Applying this to the cost for 1,000 calories, the food at Lansing which cost .074 cents in 1917 should cost .103 cents in 1920. This in general agrees with the added cost in the later years.

7. It is hoped that a comparison of the dietaries of the institutions may be of value to the superintendents, and may help them to supply still more fully at each institution just the right proportions of the different foods adapted to the health and well-being of the inmates. It is only by mutual coöperation that we can hope to improve the service.

8. We fully realize that even with sufficient wholesome food purchased by your Board of Administration, unless the greatest care is taken in the *menu for each day*, and even for the individual meals, the best results cannot be attained. To serve only starchy food for one meal and an overbalanced protein menu for the next will not satisfactorily nourish the body.

9. The place and manner in which the food is served have much to do with stimulating the appetite and aiding digestion. A damp, poorly lighted basement should never be used as a dining room. Circumstances have made this necessary in some instances, but clean, well-lighted dining rooms should be provided.

10. My thanks are especially due to Miss Harriett M. Stevenson, a graduate of the department of home economics of the University of Kansas, for her very efficient service in working out the details of this work. The cheerful assistance offered by the superintendents of the various institutions in furnishing the data for this study is also thankfully acknowledged.

Respectfully submitted,

E. H. S. BAILEY.