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THE UNIVERSITY OF NEBRASKA
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Well-Planned Meals

Mary Alice is the healthy, normal girl who was given well-planned meals at the Home Economics Practice House of the University of Nebraska.

UNITED STATES
DEPARTMENT OF AGRICULTURE
COOPERATING

Well-Planned Meals

WRITTEN BY JULIA VANCE, 1917

REVISED BY MATILDA PETERS, 1926

Every woman who has the responsibility of a family needs to know how to select the right foods in proper amounts. A woman may know that she is feeding her family correctly if the adults maintain normal weight, if the children make satisfactory gains, and if all the members of the family are mentally and physically active and have no digestive disturbances. If on the other hand, the children are pale, listless, irritable, or under weight, or if the adults are anemic, constipated, and either decidedly under or over weight and show signs of indigestion, the housewife needs to study her meals to find out what is wrong and make an effort to correct it. If the last named symptoms manifest themselves, it is probable that the housewife is either making a poor selection of foods or is preparing them in such a way as to make them unappetizing or difficult to digest.

The aim of this circular is to consider the food needs of the average family and so aid the housewife in selecting an adequate, economical, and attractive diet. It will also discuss what the body should obtain from its food and what food materials are best to choose in the daily food supply to meet the body's needs.

The first part of the circular deals with the classes of food stuffs and the principles of meal planning. The latter part contains types and plans of practical meals for the average family.

THE FOODSTUFFS

The body needs food materials for the following purposes:

1. Building material during the period of growth and for repair and upkeep of body tissues throughout life.
2. To yield energy for
   (a) Internal work,— life processes such as breathing, circulation and digestion
   (b) External work,— muscular activity
   (c) Maintenance of body temperature
3. To regulate body processes, such as maintenance of neutrality of the blood, building up resistance against disease, elimination of waste products, etc.

The foodstuffs or "food principles" which supply these materials are grouped under seven headings, (1) proteins, (2) fats, (3) carbohydrates, (4) water, (5) ash constituents, (6) vitamins, and (7) a miscellaneous group consisting of extractives and organic acids. Most foods consist of several of these foodstuffs. The classes of foodstuffs, the elements comprising them, their functions, and their sources are as follows:

Proteins are composed of nitrogen, carbon, hydrogen, oxygen, sulphur, and sometimes phosphorus and iron. The chief function of proteins is to build tissues, but they also yield heat and energy. Proteins are the only source of the element nitrogen and they are an expensive source of energy. The chief sources of proteins are meats, fish, milk, cheese, eggs, legumes (ripened beans, peas, peanuts) grains, and nuts. (See Table 1.)

Fats are composed of carbon, hydrogen, and oxygen. Their function is to yield energy in a most concentrated form. Some fats are especially valuable because they are carriers of the growth-promoting, fat-soluble vitamins. The chief sources of fats are butter, cream, olive oil, nuts, cheese, egg yolk, meat fats, bacon, and grains. (See Tables 2 and 11.)

Carbohydrates are composed of carbon, hydrogen, and oxygen. They are simple sugars, or they may be changed to simple sugars in cookery and digestive processes. Carbohydrates include starches, sugars, and cellulose, and are widely distributed in nature. The functions of starches and sugars is to yield energy in its most economical form. Cereals and starchy vegetables are sources of starch. Milk, fruits (fresh, dried, or canned), honey, and vegetables are sources of sugar. (See Table 3.)

The functions of cellulose is to give bulk to the food, to furnish mechanical stimulation to the muscular walls of the digestive tract, and to promote and increase peristalsis (the movement of the intestinal walls), and thus prevent constipation. Cellulose gives form to fruits and vegetables and to every part of the plant. The bran coats of the grains are chiefly cellulose. Cellulose is not digestible in the human digestive tract. (See Table 6.)

Water, composed of hydrogen and oxygen, has the function of reducing body temperature, diluting the digestive juices, and dissolving the food materials. Water regulates the concentration of the ash constituents. It is the distributing agent of all the foodstuffs to all the cells of the body, and finally eliminates the waste materials in solution through the kidneys and the skin. One should drink water freely, eight to ten glasses a day, unless water is combined freely with other foods. (See Table 6.)

The *ash constituents* needed by the body are calcium, phosphorus, iron, potassium, sodium, iodine, magnesium, sulphur, and chlorine. Their function is to build bone, teeth, muscles, nerves, and tissue; to enter into the composition of the living cell in every part of the body; and to regulate body processes. Some of them neutralize acid. In the selection of food we give special attention to calcium, phosphorus, iron, and iodine because if these four are present in the diet in sufficient amounts the other ash constituents are very certain to be adequate also. Calcium is needed for building strong bones and teeth, for the regulation of heart beat, and it is necessary for bringing about coagulation of the blood. The best sources of calcium are milk, skim milk, buttermilk, cheese, fruits, and vegetables. Meats and the cereal grains are poor sources of calcium. Phosphorus is found in every living cell in the body, in the bones, teeth, muscles, and fluids. It is involved in all cellular activity. The sources of phosphorus are meats, fish, whole grain cereals, milk, nuts, cheese, egg yolk, fruits, and vegetables. Iron is needed for the formation of hemoglobin in the blood (which is essential for carrying oxygen to the tissues). Anemia results when iron in the blood is deficient. The sources of iron are spinach, asparagus, carrots, egg yolk, whole grain cereals, meats, liver, legumes, prunes, and raisins. Although the iron content of milk is not high it is in such form that it is very efficiently used in nutrition. Iodine is essential to the normal functioning of the thyroid gland. When iodine in the diet is deficient, the thyroid gland enlarges and simple goiter results. The ocean is the great

source of iodine, so that sea foods and sea salt which has not been too highly purified contain it. Foods grown in a soil containing iodine are better sources of this element than foods grown in a soil deficient in iodine. In some sections of the country where goitre is prevalent, the administration of iodine to school children at certain intervals is used as a preventive measure. (See Table 7-9.) Iodized salt may now be obtained on the market and physicians recommend the use of this salt for growing children and normal healthy adults for the prevention of goiter. However, in the case of adults who have goiter or thyroid disturbance, there is danger in using the iodized salt because it may result in overstimulation of the thyroid gland.

FIG. 1. A group of project leaders in Colfax county studying meal planning.

The term *vitamins* is used to designate a group of chemically unknown substances which are present in natural foods, and which are necessary for normal growth and health. At least three vitamins are definitely known and it seems probable that several others exist. The vitamins are classified as vitamins A, B, and C with a possibility of vitamins D and E.

Fat-soluble A is necessary for normal growth and its lack results in eye diseases, infections of lungs, frontal sinus, ear, skin, and bladder. The appetite and digestion may also suffer. Vitamin A may be stored in the body to a greater extent than the other vitamins. The best sources of vitamin A are

cod liver oil, milk, cream, butter, cheese, egg yolk, liver, young tender leaves of plants, yellow vegetables, germs of seeds, and tomatoes.

Vitamin B is also necessary for growth. Its lack in the diet may result in nervous disorders, loss of appetite, lack of vigor, and digestive disturbances. Lack of ability to avoid some forms of infection may also result. Vitamin B is more widely distributed in foods than any of the vitamins. It is found in most fruits and vegetables, in milk, eggs, whole grain cereals, legumes, yeast, liver, kidney, and pancreas. In fact the only foods which are lacking or deficient in this vitamin are fats and oils, sugar, cornstarch, polished rice, and white flour.

Vitamin C, often called the fresh food vitamin, is also needed for growth and its lack in the diet results in scurvy. A deficiency of this vitamin may be detrimental to the proper development of the teeth and may result in irritability and lack of stamina. Vitamin C is more easily destroyed than A or B by heating. The body does not store vitamin C as it does vitamin A. Vitamin C is also destroyed by drying or aging of food. Therefore, it is well to provide for some uncooked food in the diet every day. The best sources of vitamin C are oranges, lemons, grapefruit, tomatoes (raw and canned), cabbage, and lettuce. The best way of insuring a sufficient supply of vitamin C in the diet is through the liberal use of fruits and vegetables. Meat and eggs contain but little. The amount of vitamin C in milk depends upon the amount present in the food of the cow. Summer milk is richer in vitamin C than milk produced in the winter when the cows are fed wholly upon cured hay and dry grain.

There seems to be present in cod-liver oil a fat-soluble substance which is different from fat-soluble A and which is concerned with the prevention of rickets in infants. This substance has been designated as vitamin D by some authorities. This substance seems to be present in egg yolk, leafy vegetables and to a less extent in butter fat. Exposure of the skin to direct sunlight is an effective means of preventing rickets.

Some authorities on nutrition believe that certain natural foods contain a substance which for the present they designate as vitamin E that is essential for normal reproduction. They have found this substance in lettuce, alfalfa, meat, whole-wheat, wheat germ, milk fat, and rolled oats. The

study of this vitamin has received scarcely more than a preliminary investigation.

Of this miscellaneous group of foodstuffs, *organic acids* are found chiefly in fruits and vegetables. They are stimulating in their effect, they are to a slight degree antiseptic and carry with them a large amount of ash constituents. These latter aid in keeping the blood neutral.

Flavors or extracts (extractives), give the characteristic taste and odor to foods, such as meats, and are stimulating to the digestive flow, both psychologically and chemically.

HOW FOOD IS MEASURED

The large Calorie is the unit of measure used for foods taken into the body and corresponds to a definite measure as does the pound measure. A large Calorie is the amount of heat required to raise the temperature of one kilogram of water one degree Centigrade, or one pound (one pint) of water four degrees Fahrenheit. By very careful estimate of losses in digestion and metabolism, it has been determined that protein and carbohydrates will each yield 4 Calories per gram or 1800 Calories per pound, and fat 9 Calories per gram or 4000 Calories per pound. There is great loss in the digestion and utilization of protein, and to a less degree in the digestion of carbohydrates and fats. For convenience, a 100 Calorie portion, or standard portion, is taken as a standard unit, because it equals in measurement the usual individual serving of a great many foods, a much easier division for the housewife than the pound. Or, more graphically speaking, it is the amount of heat or energy an average-sized man sitting still will spend in one hour. A limited number of 100-Calorie portions are found in this bulletin. (See Tables 1-9.) Mrs. Rose's " Feeding the Family " (Revised Edition), pp. 362-455, contains a very complete list. From these measures one can, if desired, readily estimate the relative cost of different foods per standard portion. Cost has little relation to food value — milk at 10 cents per quart yields about 675 Calories while oysters at 80 cents per quart yield 465 Calories. In paying for fresh vegetables, however, one pays a high price per Calorie yield, but the special value in the diet lies in the choice of ash constituents and vitamins. On the farm, the garden, the orchard, and the dairy form the strongest of assets in the contribution to health. Although water, ash constituents, and vitamins cannot be estimated in Calories, their value should not be overlooked, as has already

been shown. A shortage of any of these substances may after a time show serious disorders, such as anemia, stunting of growth, lack of resistance or muscle tone, or the so-called deficiency diseases.

CONDITIONS INFLUENCING THE INDIVIDUAL REQUIREMENTS

The amount of energy required in the body, and supplied by proteins, fats, and carbohydrates, depends upon age, size, temperament, activity, and sex of the individual, as well as upon climate. Age has direct relation to size and growth and muscle tone, and implies large differences. A normal baby doubles its birth weight in six months and triples it in one year. All change, all activity is dependent upon adequate food suited to the child's needs. He needs more protein to supply material for growth and repair, while the adult no longer needs to provide for growth, but must keep up tone and well-being. A child under weight should be fed according to what his weight should be, not his actual weight; while a child over weight should be fed according to his weight, unless he seems excessively fat. Normal development can be determined by parallel physical and mental growth and may vary rather widely. Heredity is a factor which must receive some consideration. Temperament, body tension, and activity may more than double energy requirement. The difference in energy requirement due to sex is often questioned. However, there seems to be a higher expenditure in boys because they are more restless, are more active, and have greater body tension. In general, women require 5% less than men and athletes 5% more than average men, both variations being due to muscular differences.

A satisfactory table for estimating the energy requirement of children during growth is as follows:

Age	Calories per day for each pound of body weight
Under 1 year	45 or more
1 to 2 years	45 to 40
2 to 5 years	40 to 36
6 to 9 years	36 to 32
10 to 13 years	34 to 30
14 to 17 years	30 to 23
17 to 25 pears	23 to 20

Men require more food than women, because women, as a rule, are less active and less muscular. Requirements for both men and women are determined by work. The follow-

ing table may be used for estimating the energy requirement for young and middle-aged adults:

Type of Activity	Calories per pound
Without exercise	14 to 16
With light exercise	16 to 18
With moderate exercise	18 to 20
With hard muscular labor	20 to 23
With very severe labor	23 to 27

The following tables have been prepared for men and women of average weights, engaged in different types of work:

Adult woman's requirement (average weight — 130 pounds)

	Calories per day
Hand sewer	1500 to 1700
Machine sewer	1800 to 2250
Housewife	2400 to 3000
Laundress	2800 to 3350

Adult man's requirement (average weight — 154 pounds)

	Calories per day
Clerk	2300 to 2600
Shoemaker	2700 to 2950
Carpenter	2800 to 3500
Painter	3500 to 3800
Farm Laborer	3150 to 4200
Lumberman	4900 to 5300

HOW TO CHOOSE THE FAMILY DIETARY

In general, for an average family of six, a man and woman and four children under 15 years, the requirements will run from 12,000 to 16,000 Calories per day, depending upon the amount of manual labor performed. Ten to fifteen per cent of this amount should be from protein (2 to 3 protein Calories per pound of body weight for the adult and 3 to 4 protein Calories per pound for growing children). This is from 75 to 112 grams of protein for a man of average weight requiring 3000 Calories per day. The fat and carbohydrate should stand about in the proportion of one part of fat to four parts of carbohydrate. A distribution of calories among the fuel foodstuffs usually advised is protein 15 per cent, fat 35 per cent, and carbohydrate 50 per cent. While calories are not everything in the diet, they are very important, because the body cannot make efficient use of protein, ash constituents, or vitamins unless the energy needs of the individual are met. Although they have no energy value, the ash constituents are of great importance and cannot be over-

looked. As has been said before, those which cannot be left to chance are calcium, phosphorus, iron and iodine. A satisfactory dietary standard provides for 0.67 grams of calcium per person requiring 3000 Calories or 0.023 grams of calcium for each 100 Calories in the dietary. For growing children this may be higher. The standard for phosphorus provides 1.32 grams per person, or 0.044 gram for each 100 Calories in the dietary and that for iron 0.015 grams per person or 0.0005 grams per 100 Calories. All these elements have important functions in the body. Iron is of special importance to the young girl in adolescence and to the pregnant mother. Foods rich in calcium should be specially provided for the pregnant and nursing mother to protect her teeth and bone supply at this time. (See Tables 7 to 10.)

In the normal mixed diet there is a tendency for some foods to produce an acid condition in the blood and tissues. Other foods may produce a basic (or alkaline) condition in the body. The normal reaction of the blood is neutral or slightly alkaline. For example, meat, fish, bread, cereals, and eggs produce an acid condition in the body. Fruits are acid to the taste, but the acids are not in the form of free acids but acid potassium salts. There is no evidence that harm results from a preponderance of base-forming elements, but free sulphuric acid and other acids and an acid condition of the blood and tissues have a direct connection with metabolic disturbance and diseases such as acidosis, nephrites, gout and rheumatism. Therefore, one would avoid a meal composed only of beefsteak, rice, and bread by adding green vegetables, fruits, and milk to neutralize the mineral acids produced in the metabolism of the first three foods. Even the fruit acids (with the exception of prunes, plums, and cranberries) yield an excess of bases, because they are chemically combined with base-forming ash constituents. With the liberal use of foods containing base-forming ash constituents and vitamins (milk, fruits, and vegetables), there is no longer any need for the old-fashioned "spring-tonics." However, care must be used to employ such processes in the preparation and cookery of fruits and vegetables that the ash constituents and vitamins are not lost. (See Table 10.)

McCollum says that the typical American diet consists largely of white bread, meats, potatoes, and sweets. Such a diet is deficient in the ash constitutents (particularly calcium), the vitamins, in cellulose, and in base-forming elements. When the above diet is supplemented by milk, fruits, and vegetables, the defiencies mentioned are overcome. Mc-

Collum has devised the following formula for a perfect daily diet; at least one fresh fruit, one uncooked vegetable, at least one other vegetable besides potatoes, one quart of milk to which should be added sufficient meat, bread, potatoes, and butter to meet the energy needs of the body.

Starch is the best form of carbohydrate to choose in the mixed diet. It should be made soluble by cooking. The best sources of starch are vegetables and cereals of all kinds. Sugar is used in flavoring foods, in fruits and vegetables, and in desserts of various kinds, and gives rapid return in energy. Sugar and properly cooked starchy foods digest very rapidly. The home-cooked whole grain cereals are very valuable as a source of starch, cellulose, phosphorus, iron, vitamin B and

FIG. 2. A group of project leaders in Lancaster county preparing vegetables in the demonstration given at a project leaders training meeting.

some A. Such cereals are of much higher caloric value for breakfast than the high-priced ready-to-eat cereal breakfast foods. One-half of the bread used should preferably be of the whole grain. Some carbohydrate food in the form of toast, stale bread, and uncooked vegetables is valuable because it promotes mastication, which is essential for the welfare of the teeth and gums.

Proteins vary greatly in their chemical composition. The proteins of the body are composed of from 17 to 19 different amino acids. These amino acids may be compared to an alphabet. If we have an incomplete alphabet, there will be

certain words which cannot be formed because certain letters are lacking. Now the different amino acids which compose the body tissue must be furnished in the protein foods. Certain protein foods, such as milk, cheese, meat, and eggs, contain all the amino acids which are needed for the construction of body tissue and are called complete proteins. Gelatine lacks some of the amino acids which are necessary for life and growth and is called an incomplete protein. Certain other foods, such as cereals, beans, peas, and peanuts, contain some of the essential amino acids in limited amounts and are called partially complete proteins. Therefore, the proteins from plant sources should not be used to the exclusion of animal protein because they do not contain the amino acids in the right proportions for growth. Animal proteins may be used much more economically if supplemented with proteins from plant sources. It is recommended that growing children have two-thirds of their protein from animal sources. Adults may have a smaller proportion of animal protein than children.

It is generally conceded that it is desirable to have some surplus of protein over the minimum amount to which the body could accustom itself. However, a great excess is to be avoided, because the body cannot store the excess not needed by the tissues and the elimination of the surplus nitrogen throws extra work on the kidneys. One-half of the protein may be used as nitrogen, and the other half follows the same courses as carbohydrates and fats, and supplies energy in a very expensive form.

Meat holds a prominent place in the diet because of its agreeable flavor, its protein of excellent quality, its iron and its extractives which stimulate the flow of digestive fluids. Meats contain certain substances called purin bases, which yield uric acid in the blood. When an acid condition exists in the blood, uric acid is rendered insoluble and is retained in the body instead of being eliminated through the kidneys. A neutral or alkaline urine increases the solubility of uric acid so that it may be eliminated as a waste product. Meat does not contain a sufficient quantity of the base-forming elements to neutralize the acids which it forms. It, therefore, needs to be supplemented by foods which are rich in the base-forming elements. In the intestines, meat protein is particularly subject to intestinal putrefaction, and this condition may interfere with the absorption of the iron it contains. Intestinal putrefaction may be overcome by the use of buttermilk, fruits, vegetables and cereals. The too liberal use of

meat in the diet of adults is objectionable, because it is likely not to be adequately supplemented with milk, fruits, and vegetables. One should bear in mind that some protein is derived from bread and cereals and very small amounts from fruit and green vegetables. The amount of meat given to children should be controlled, because there is danger that they will not eat the desirable foods of milder flavor when they can get meats with their higher flavor.

The choice of fat and the amount of fat required is determined by the kind of work done, although fat is necessary to protect body protein, to store energy, and to lubricate. In the dietary, fat adds to the palatability of such foods as vegetables, bread and cereals. Little children and persons of sedentary habits with short intervals between meals cannot digest fat as readily as the farmer working six hours between meals and in the open air. The digestibility of different fats varies very much with different individuals and it is too great a burden to impose upon the digestive tract of a young child to feed him pastry, fried foods and salads. Older persons would do well to omit largely the use of these first two groups of foods from their dietary. Cream, butter, bacon, and olive oil are usually the most easily digested fats. The energy value among fats varies very much less than the price. (See Tables 2, 4, and 11.) While oleomargine or butter substitutes are as good a source of energy as butter, their general use is not recommended when butter is available and can be afforded. Butter should be used for growing children because of the fat-soluble vitamins.

By carefully rendering and blending different fats for cooking great economy in the use of fats may be practised in the home.

TABLE 1.—*Foods rich in protein*

	Measure of 100 Calorie portion	Grams of protein in 100 Cal. portion	Calories per lb.	Grams of protein in one lb.
Beef, dried	2 ounces	16.7	817	136.0
Beef, fresh, lean	2¼ ounces	13.6	709	96.6
Cheese, cottage	⅓ cup	19.0	498	94.8
Halibut steak	3½ oz.	15.1	457	69.4
Codfish, salt	4.4 oz.	23.8	361	86.1
Egg white	7 whites	24.1	231	55.8

TABLE 2.—*Foods rich in fats*

	Measure of 100 Calorie portion	Calories per lb.
Lard	1 Tablespoon	4,082
Olive oil or Cottonseed oil	1 Tablespoon	4,082
Salt pork	1 Tablespoon	3,555
Butter	1 Tablespoon	3,488
Beef suet	1½ Tablespoons	3,425
Oleomargine	1 Tablespoon	3,410
English walnuts	9 medium-sized meats	3,199
Cream, thick	2 Tablespoons	1,727
Cream, thin	¼ cup	900

TABLE 3.—*Foods rich in carbohydrates*

	Measure of 100 Cal. portion, uncooked	Calories per lb.
Sugar	2 tablespoons	1,814
Cornstarch	4 tablespoons	1,632
Tapioca	2 tablespoons	1,608
Rice	¾ cup steamed	1,591
Dates	3 to 4 unstoned	1,575
Honey	1 tablespoon	1,480
Molasses	1½ tablespoon	1,301
Bananas	1 large	447
Potatoes, white	1 medium	378

TABLE 4.—*Foods rich in proteins and fats*

	Measure of 100 Cal. Portion	Grams of Protein in 100 Cal. portion	Calories per lb.	Grams of protein per lb.
Almonds	12 to 15 nuts	3.2	2936	95.2
Peanut butter	1½ tablespoons	4.8	2741	132.9
Peanuts	20 to 24 single	4.7	2487	117.0
Cheese American	1½ inch cube	6.5	1994	130.6
Egg yolk	2 yolks	4.3	1643	71.2
Ham, smoked	1 ounce	3.9	1621	64.4
Eggs, whole	1⅓ eggs	9.0	672	60.8
Milk, whole	⅝ cup	4.7	314	14.9

TABLE 5.—*Foods rich in protein and carborydrates*

	Measure of 100 Calorie portion	Grams of Protein in 100 Calorie portion	Calories per lb.	Grams of protein per lb.
Oatmeal	¾ cup cooked	4.2	1803	75.5
Shredded wheat	1 biscuit	3.5	1657	54.9
Cream of wheat	¾ cup cooked	3.0	1641	49.9
Macaroni	1 cup cooked	3.7	1624	60.8
Peas, dried	⅛ cup	6.9	1612	111.6
Beans, navy	⅛ cup	6.5	1564	102.0
Bread	2 slices	3.6	1174	42.2

TABLE 6.—*Foods rich in cellulose and water*

	Measure of 100 Calories of edible portion	Calories per lb.
Apples	1 large, 5.6 ounces	285
Oranges	1 large, 6.8 ounces	233
Cabbage	5 cups shredded, 11.2 oz.	143
Watermelon	11.7 oz.	137
Spinach	2¼ cups cooked, 14.76 oz. fresh	108
Tomatoes	1¾ cups, canned	103
Lettuce	2 heads, 18.5 oz.	87
Celery	20 stalks, 19 oz.	84
Asparagus	2½ cups canned, 19.5 oz.	82

TABLE 7.—*Iron content of foods* *

	Measure of 100 Calorie portion	Grams of iron in 100 Calorie portion
Spinach	2¼ cups cooked	.0151
Oysters	¾ cup	.0089
Lettuce	2 heads, 18.5 oz.	.0078
Beans, string	2¼ cups	.0027
Egg yolk	2 yolks	.0023
Beef, lean	2½ oz., uncooked	.0021
Strawberries	1⅓ cups	.0021
Beans, navy	⅛ cup, uncooked	.0020
Potatoes	1 medium	.0016
Raisins	¼ cup	.0014
Oatmeal	¾ cup cooked	.0010
Prunes	4 to 5 prunes	.0010
Graham bread	2 slices	.0010
Oranges	1 large	.0004
Milk	⅝ cup	.0004
White bread	2 slices	.0004

* The requirement for iron is .015 grams per person per day.

TABLE 8.— *Phosphorus content of foods* *

	Measure of 100 Calorie portion	Gram of Phosphorus in 100 Calorie portions
Spinach	2¼ cups, cooked	.285
Buttermilk	1⅛ cups	.271
Lettuce	2 large heads	.224
Celery	4 cups, ¼ inch piece	.201
Asparagus	20 stalks	.177
Cheese, cottage	⅓ cup	.175
Beef, lean	2½ oz. uncooked	.147
Beans, navy	⅛ cup, uncooked	.137
Milk	⅝ cup	.134
Beans, string	2¼ cups	.126
Egg yolk	2 egg yolks	.118
Oatmeal	¾ cup, cooked	.099
Graham bread	2 slices	.084
Potatoes	1 medium	.069

* The requirement for phosphorus is 1.32 grams per person, per day.

TABLE 9.— *Calcium content of foods* *

	Measure of 100 Calorie portion	Grams of Calcium in 100 Calorie portion
Celery	4 cups, ¼ in. pieces	.421
Cauliflower	½ medium heads, 11.6 oz.	.403
Spinach	2¼ cups	.281
Milk, whole	⅝ cup	.174
Cabbage	5 cups shredded	.143
Carrots	3 to 4 medium	.124
Strawberries	1⅓ cups	.104
Oranges	1 large	.088
Onions	3 to 4 medium	.069
Beets	2 to 4 medium	.064
Lemon juice	1 cup	.060
Tomatoes	1¾ cups cooked	.050
Beans, navy	⅛ cup uncooked	.047
Eggs	1⅓ eggs	.045
Peas, fresh	1 cup	.026
Bread, whole wheat	2 slices	.020
Prunes	4 to 5	.018
Oatmeal	¾ cup cooked	.017
Potatoes	1 medium	.016
Bread, white	2 slices	.011
Beef, lean	2½ oz. uncooked	.008
Cornmeal	¾ cup cooked	.005

* The requirement for calcium is .67 grams per person per day.

TABLE 10.—*Acid-forming and base-forming foods (Ranked in order of their acid and base-forming properties in 100 Calorie portions of food materials).*

Acid Forming	Base Forming
Oysters	Spinach
Beef juice	Cucumbers
Egg white	Celery
Liver	Lettuce
Halibut steak	Tomatoes
Eggs	Carrots
Egg yolk	Beets
Lean beef	Cabbage
Salmon	Cauliflower
Chicken	Orange juice
Pork chops	Pineapple, fresh
Oatmeal	Peaches, fresh
Whole wheat bread	Beans, fresh
White bread	Lemon juice
Rice	Watermelon
Corn meal	Potatoes
Bacon	Raisins
	Apples
	Beans, navy
	Grape juice
	Asparagus
	Milk

TABLE 11.—*Foods rich in vitamins*

A.	B.	C.
Codliver oil	Yeast	Oranges
Butter	Beans	Lemon juice
Cream	Cabbage	Tomatoes
Egg Yolks	Tomatoes	Lettuce
Eggs	Spinach	Cabbage, raw
Milk, whole	Cauliflower	Pineapple, fresh
Spinach	Celery	Pineapple, raw
Cabbage	Lettuce	Spinach
Cheese	Onions	Potatoes, raw
Dandelion greens	Parsnips	Grapefruit
Kidney	Peas	Onions, raw
Liver	Potatoes	Peas, fresh
Lettuce	Rutabagas	Apples, raw
Sweet potatoes	Grapefruit	Carrots, raw
Yellow squash	Oranges	Peaches, fresh
Tomatoes	Oatmeal	Raspberries, fresh
	Nuts	
	Liver	

A FOOD PLAN

The menu itself means suitable combinations and variety day in and day out. It is well to check over from time to time the amounts and the costs, and to investigatae carefully to see that the dietary is adequate in all respects. The housewife should endeavor to use the foods of the season to the best advantage and see that a one-sided diet is avoided. A simple meal of well-prepared wholesome foods attractively served is preferable to an elaborate meal composed of foods which do not meet the needs of the body. For example, for the average family of six with four children under ten (aged one, three, six, and nine), some of the important points to consider are:

Milk for all — 3 cups to 1 quart for each child and a pint for each adult, if possible
Orange juice for the one year old
At least one kind of fruit for the others in the family
Cooked cereal for all the family, preferably of whole grain type
A mild green vegetable for the two younger children
At least one vegetable besides potatoes for the other members of the family
Eggs for at least the three younger children
Meat or some other protein-rich food for the others
Such staples as bread, butter and potatoes

TYPES OF MEAL PLANS

Breakfast Plans

Very light	Light	Medium	Heavy
Fruit	Fruit	Fruit	Fruit
Breadstuffs as toasts, rolls, or muffins	Cereal	Cereal	Cereal
Beverage	Breadstuff	Eggs or meat	Eggs or meat
	Breadstuff	Breadstuff	One other hot dish
	Beverage	Beverage	Breadstuff
			Beverage

Dinner Plan

Meat or other protein dish
Starchy dish, as potatoes, rice, macaroni, or corn
One other hot vegetable dish or vegetable salad or both
Bread and butter
Beverage
Dessert

Supper or Luncheon Plan

One hearty dish (see below)
Vegetable or salad, if desired
Bread and butter
Beverage
Dessert

Suitable hearty dishes for supper or luncheon are cream soups, chowders, creamed dishes, macaroni or rice and cheese, mush and milk, milk toast, cottage cheese, eggs, meat and vegetable stews, hash, meat pies, corn pudding or a hearty salad. Satisfactory desserts are cookies or plain cake with cooked or fresh fruit, or a cold pudding.

SUGGESTIVE MENU FOR FAMILY OF SIX

Food	Measure	Calories
Breakfast		
Milk for baby	1 cup	170
Milk for 3 yr. old	1 cup	170
Orange juice for baby	2 tablespoons	22
Orange juice for 3 yr. old	3 tablespoons	33
Oranges for four	4 small or 2 large	200
Oatmeal for five	3 cups	400
Toast for six	12 slices	600
Butter	5 tablespoons	500
Eggs for four	4	300
Milk for cereal and coffee	2 cups	340
Milk for older children	1½ cups	255
Sugar for coffee and cereal	4 tablespoons	200
Coffee for adults		

Lunch (10 A. M.)

Oatmeal jelly for baby	2 tablespoon	16
Milk for baby	1 cup	170
Stale bread for 3 yr. old	1 slice	50
Milk for 3 yr. old	1 cup	170

Dinner for Four

Swiss steak for four		
Round steak	1½ lbs.	1300
Flour	2 tablespoons	50
Lard	2 tablespoons	200
Creamed asparagus	1½ lbs.	150
Asparagus		
Flour	2 tablespoons	50
Butter	1½ tablespoons	150
Milk	1 cup	170
Lettuce	¾ lb.	50
Potatoes in half-shell	5 medium	500
Potatoes		
Milk	⅓ cup	57
Butter	1 tablespoon	100
Whole Wheat bread	8 slices	400
Butter	4 tablespoons	400
Milk for two older children	1½ cups	255
Canned peaches	1 pint	400
Cookies, plain	4	400

Dinner for younger Children (2 P. M.)

For Baby

Milk	1 cup	170
Baked Potato	½	50
Asparagus	1 tablespoon	5
Butter	½ teaspoon	17
Egg yolk	½	25

For three-year-old

Milk	¾ cup	127
Egg	1 whole	75
Bread, stale	1 slice	50
Butter	1 teaspoon	33
Asparagus	¼ cup	20
Baked potato	½ medium	50
Peaches canned	2 halves	100

Supper for Younger Children (5:30 P. M.)

For Baby

Milk	1 cup	170
Oatmeal jelly	2 tablespoons	16
Stale bread	½ slice	50

For three-year-old

Milk	1 cup	170
Rice	½ cup steamed	67
Toast	1 slice	50
Butter	1 teaspoon	33
Soft custard	⅓ cup	100

Supper for Four

Rice with cheese and tomatoes		
Rice	1 cup	696
Cheese	½ cup grated	200
Tomato	2 cups	114
Flour	4 tablespoons	100
Butter	2 tablespoons	200
Graham bread	8 slices	400
Butter	4 tablespoons	400
Milk for children	1½ cups	255
Custard	3 cups	510
Milk	3 cups	225
Eggs	6 tablespoons	300
Sugar		
	Total for one day	12,996
	Requirement	12,000

This day's dietary has been carefully estimated to give the children their required quart of milk apiece, the remainder being used freely in cooking. If it were necessary to economize on milk, skim milk might be used in cooking and in part for the older children. The difference between whole milk and skim milk is in the lack of butterfat and vitamin A in the latter. Further economy may be effected by the use of butter substitutes in cooking if necessary but this will lower the vitamin A content of the dietary.

The following menus have been planned with reference to foods available on Nebraska farms.

SUMMER MENUS

Breakfast	Dinner	Supper
Stewed rhubarb Pettijohns and cream Poached egg on toast Coffee	Canned roast beef and gravy Boiled potatoes Creamed asparagus Radishes Bread and butter Dried apricot whip	Baked hash Wilted lettuce Graham bread and butter Canned cherries Cookies
Cream of wheat with fresh strawberries Bacon Graham muffins Jelly Cocoa	Meat loaf Escalloped potatoes Buttered beet greens Bread and butter Fresh cherry cobbler	Potato croquettes Cottage cheese Graham bread and butter Green onions Strawberries and cream
Baked apples and oatmeal with cream Egg omelet Toast Jam Coffee	Sauté Catfish Creamed new potatoes and peas Cucumber and lettuce salad Bread and butter Apple tapioca	Macaroni and cheese Tomato salad Bread and butter Fresh peaches and cream Sponge cake

WINTER MENUS

Breakfast	Dinner	Supper
Prunes Cracked wheat Bacon and eggs Muffins Coffee	Roast pork Sweet potatoes Cabbage and beet salad Whole wheat bread and butter Apple snow	Cream of tomato soup Crackers and butter Canned raspberries Sugar cookies
Oranges Bacon Corn bread and syrup Cocoa	Meat and vegetable stew Bread and butter Lemon pudding	Escalloped corn Stewed tomatoes Bread and butter Apple sauce
Cracked wheat with dates Scrambled eggs Toast Coffee	Pot roast of beef Browned potatoes Gravy Creamed string beans Celery Bread and butter Chocolate pudding	Rice and vegetable soup with meat stock Bread and butter Canned plums Gingerbread

SOME LESS EXPENSIVE FOODS

Cornmeal
Cottonseed or corn oil
Hominy or samp
Oat-meal
Molasses
Oleomargarine
Rice, broken or brown
Suet
Pearl tapioca
Macaroni
Spaghetti
Peas, dried
Beans, navy
Cottage cheese
Whole grain flour and cereals
Home-grown vegetables and fruits
Skim milk
Home-canned vegetables and fruits

PROTEIN RECIPES OF MODERATE COST

Meat stews
Meat loaves
Meat croquettes
Meat souffles
Creamed left over meats
Baked hash
Baked pork and beans
Bean soups
Corn chowder
Macaroni and cheese
Spanish rice
Fish chowder
Codfish balls
Cheese souffle
Egg dishes (except in winter)
Cream of vegetable soups

EXPENSIVE FOODS IN PROPORTION TO FOOD VALUE

Gelatine salads and desserts
Chicken
Beef with great waste
Oysters
Meat soups
Squab
Cakes
Candies
Olive oil
Maple sugar
Maraschino cherries
Imported cheese
Mushrooms
Pimentoes
Sweetbreads
Lobster
Veal
Lamb
Commercially canned fruits and vegetables
Out-of-season fruits and vegetables
Commercial relishes
Foods in fancy containers
Ready to eat breakfast cereals
Commercial jams and jellies

SUMMARY

1. In a well-planned dietary the following factors should be considered:
   a. Sufficient food to meet the energy needs of the body furnished by good proportions of carbohydrates, fats, and proteins
   b. Protein suitable as to kind and amount for building and repair of body tissues
   c. Ash constituents for building and regulating processes with special attention given to calcium, phosphorus, and iron
   d. Vitamins, or growth-promoting substances
   e. Water
   f. Cellulose or bulk
   g. Masticating substance for the welfare of the teeth and gums
   h. Digestibility
   i. Palatability
2. Meals should be at regular intervals, particularly for children.
3. Teach children to like and respect all wholesome, natural food. Most food prejudices are formed while very young and can be over-

come. The example of the older members of the family is an important influence in developing good food habits with younger children.

4. Keep children kind toward milk. Three cups to one quart, of milk for each child is the safest rule to follow in order to provide sufficient calcium and phosphorus for bone growth. This milk need not all be used as a beverage, but may be used in part in cream soups, white sauce for vegetables, escalloped dishes, custards, junkets, milk sherbets, cereals cooked in milk, corn starch and tapioca desserts, etc.

5. Insist upon breakfast being eaten. Breakfast is stimulating to the digestive tract and avoids overeating later. Constipation is prevented by taking (at regular intervals) food that is of sufficient bulk and sufficiently stimulating in its effect.

6. Foods which stimulate the appetite should be eaten early in the meal, such as fresh fruits at breakfast, and meat soups or meats at dinner.

7. Sweet foods dull the appetite and should come at the end of the meal. Give candy to children only after meals and as a part of the regular meal. Do not permit ice cream cones, cookies, etc., between meals.

8. Aim to dilute concentrated foods,— butter with bread, pork with apple sauce or gooseberries, cheese with crackers, rice, or macaroni, etc. Study happy combinations of flavors and colors. Do not, as a rule, repeat the same flavor in the same meal. For example, do not serve tomato soup and stewed tomatoes in the same meal. An exception to the rule of not using the same food more than once in the same meal is in the case of fresh fruits in season, as strawberries, apples, etc.

9. Aim to have variety in the texture of foods served at a meal. For example, a meal consisting of meat loaf, mashed potatoes, buttered squash, hot biscuits, and cornstarch pudding is monotonous because the foods are all of about the same texture. If creamed beans or a tomato and lettuce salad were substituted for the squash, and a fruit gelatine for the corn starch pudding, the meal would be more appetizing because of the greater variety in the texture of the foods.

10. Select food wisely and preparte simply; cook well and serve attractively. Make sure there is no waste in preparation, in serving, and in use of left-overs.

11. Serve left-overs as attractively as possible, and keep them over a day when advisable.

12. "Catsups, pickles, and highly spiced or very sweet foods of all sorts are irritating to the delicate walls of the digestive tract and should be used sparingly by the robust, never by invalids, children, or any persons with delicate digestion."— Rose.

13. As a rule, digestion is better when there is at least one hot dish at a meal. On the other hand, a meal consisting entirely of hot foods is less interesting than when one or more dishes are cold.

14. Adapt menus to the season. Use foods in season.

15. It is good economy to store one's own supply of fruits and vegetables by canning, drying, and storing. This practice is most efficient when a budget is used. Such a measure makes for economy, convenience, and better health of the family.

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