Food Needs for Health

Mary A. Dolve

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Growing Healthy Americans

A physically efficient adult is the product of a well-developed child and youth.

Well-developed children are products of balanced diet, regular meals, sleep and rest, exercise and play, fresh air, sunshine, and corrections of physical defects. All of these factors are within the control of the average parents.

Second in importance as causes for rejection for military service during the World War were joint abnormalities, skeletal defects, and bad teeth. “These facts mean only one thing, that these boys did not develop in childhood as they should have done. In a very large number of cases, if we knew the facts, we could trace their inferior condition back to dirty milk, feeding food unfit for infants, overfeeding or feeding on modified milks which were modified by ignorant persons and unfit for infants food.”

The surest and quickest way of losing that school-girl complexion and to bring on early signs of age such as wrinkles, crows' feet, and lusterless hair, is to follow an incomplete diet.

Knowing these facts, the good homemaker will study foods and the nutrition of her family at least to the same degree that the successful livestock grower studies feeds and feeding of livestock.
Food Needs For Health

MARY A. DOLVE
Extension Specialist in Foods and Nutrition

Physical Fitness

Observe the individuals about you. You will notice that physically the best differs from the ordinary and that they vary in degree of fitness from the physically perfect individual (in minority) to the person decidedly handicapped by physical defects.

Parents should know the main characteristics of a well developed child and the factors influencing good development. A physically efficient adult is the product of a well developed child and youth.

Similar facts having a bearing on agricultural problems have been recognized. There was little progress in the improvement of the quality in livestock and corn until those interested had in mind an ideal to work toward and studied to become acquainted with all factors that had a bearing on the results they were working for. The corn grower knows that the best differs from the ordinary and that there are varying degrees of quality from a perfect ear to the nubbin. (See page 8.) He has a mental picture of the ear of corn he wants to produce; the right size for the variety he is raising; straight rows of deep set kernels, well filled out at both the tip and butt; heavy, dry and of good color. He knows that in order to raise good corn he must, first, give the seed proper care and that, secondly, the soil in which he plants the seed must contain the right kind of plant food in sufficient quantity.

The same facts hold true in raising physically efficient individuals. (See page 9.) Parents should have in mind the essential points of physical fitness which they want the members of the family to have and then give at least as thorough and extensive study to all factors within their control which influence and determine the development of the family as the corn grower does to the raising of corn.

Well developed children are products of balanced diet, regular meals, sleep and rest, exercise and play, fresh air, sunshine and corrections of physical defects. All of these factors are within the control of the average parents.

Nutrition

Like the corn plant an individual must be given the right environment from the start and all through the growing period. If the right soil (child’s environment and food) could be provided, all the weeds eliminated (irregularity, bad habits, poor example, etc.) the child would grow and develop as nature intended that he should. This would also eliminate the “don’ts” in the household. A balanced diet is just as important to the
Characteristics of a Well-Nourished Child

The well nourished child or the child that is growing into the physically efficient adult has the following characteristics:

1. Alert expression.
2. Clear skin.
3. Bright eyes.
4. Strong teeth.
5. Pink mucous lining of mouth.
6. Unobstructed breathing.
7. Even shoulders.
8. Flat shoulder blades.
10. Straight back.
11. Firm muscles.
12. Flat abdomen.
13. Straight legs.
15. Strong arches.
16. Posture — generally good with head erect, chest up, abdomen not protruding beyond the chest, and step elastic.
17. Disposition — usually happy, good natured, full of life and activity.
18. Sleep is sound.
19. Digestion good; bowels regular.

He is what nature intended him to be above all else — a happy, healthy young animal.

Physical development of the child as available plant food is to the best development of the corn.

Lusk, an eminent authority says, “Nutrition may be defined as the sum of the processes concerned with growth, maintenance, and repair of the living body as a whole or of its constituent parts.”

Dr. Roberts of Chicago University enlarges upon this definition by saying, “In this broad sense, nutrition includes all the processes through which food goes to be utilized by the body, whether built into the body structure or used as a source of energy for its activities. Good nutrition then, implies first of all, an abundant food supply containing every material needed by each individual part of the body. It means, in addition, that every step in the chain of processes fitting that food for the body’s use is running smoothly. The teeth are in good condition and are doing their work of grinding the food; the saliva is normal and in the process of mastication is mixed with the food; the stomach and intestines are sound, all their juices and enzymes are present, and digestion and absorption are carried on easily and completely. The heart, also, is normal and is able to pump the blood containing the digested food and oxygen to all parts of
Characteristics of a Mal-Nourished Child

The malnourished child or the child growing into the adult varying in degrees of physical fitness, lacks several or all of the characteristics of the normal child, depending on the degree of mal-nutrition, and he has some or all of the following characteristics:

1. Apt to lack alertness and vigor.
2. May have delicate, waxlike, pale, sallow, muddy, or earthy and loose skin.
3. Dull eyes.
4. Irregular, decayed teeth.
5. May have obstructed breathing.
6. Usually rounded shoulders, sometimes protruding to produce wings.
7. Flat and narrow chest.
8. May have curved or rounding back.
9. May have flabby flesh and undeveloped muscles (usually thin, though may be fat and flabby).
10. May have protruding abdomen.
11. May have knocked knees or bow legs.
12. Enlarged joints.
13. May have pronated or flat arches.
15. Disposition—may be irritable, fidgety, nervous, restless and difficult to manage.
17. Bowels irregular; constipated; tongue coated.

The problem we are especially concerned with here is to find out how to provide the members of the family with a diet that will make for one hundred percent physical efficiency both as children and as adults. This means that the individual must have from infancy a balanced diet for growth and for resistance to disease. Such a diet contains all elements found in the body and other food factors having to do with body processes including growth.

Balanced Diet

Every homemaker knows what happens to a cake if all ingredients called for in the foundation recipe are not added. Any one of these ingre-
dients left out altogether or in part will make the cake less attractive in appearance or taste or possibly both. This is because making a cake is a chemical process and the chemical changes take place partly because of the proportions or amounts of the various ingredients.

The processes going on in our bodies are largely chemical changes. The body is at its best when the materials (foods) provided for growth, repair, energy, and regulating factors come up to certain specifications as to amount and kinds. When the food intake is according to these specifications the diet is balanced. For a balanced diet the essential food principals, in adequate quantities, are proteins, minerals, vitamins, carbohydrates (starches and sugar) fats, roughage and water. These are found in varying proportions in the different foods.

The Three Food Needs

**Growth and Repair**

Building foods are those which build new tissues in the growing child and which keep the body in repair.

**Living Tissues of the Body.**— Protein is the basis for every living cell and is needed in larger quantities than other building materials. It is generally distributed through all foods but some proteins are more adequate than others. Those capable of maintaining and promoting growth are called complete proteins. Caesin of milk is such a protein. Experiments have been performed on rats that show the effect of complete and incomplete proteins. Because some proteins are better than others for tissue building it cannot be said just how much protein is necessary in the daily diet. But it is known that the average daily amount should be from three to three and one-half ounces.

Nutrition experts are agreed that one can secure enough proteins by eating every day from one to two eggs, one quart of milk, a liberal serving of meat, fish or fowl, plus the proteins in the other foods one would naturally eat, such as bread, potatoes, etc.

The protein in milk is especially efficient and if milk is generously used along with some other protein foods such as eggs, meat, fish and legumes, the protein need will be taken care of.

**Bones and Teeth.**— One of the chief concerns of the livestock grower is to provide a feed that will give good bone growth or develop a good frame work for later development. Calcium, or lime, and phosphorous are the principal constituents needed for bone growth. Phosphorous is needed to give rigidity and strength to the bones. Vitamin D is necessary in order that calcium and phosphorous be properly utilized for bone and teeth development.

Calcium is the most important of the minerals which are necessary for good health. Most foods contain too little calcium for body needs. The two best foods for calcium are milk and leafy vegetables. The child's need for calcium is probably twice that of the adult's because so much is deposited in the growing bones. (See page 14, Vitamin D.)

That a good many fall short in child feeding is shown by the altogether too prevalent cases of mild rickets, a disease due to faulty bone growth. About 90 percent of city and country people have one or more unfilled cavities in their teeth. Joint abnormalities, skeletal defects and bad teeth
together were second in importance as causes for rejection of men for military service during the World War. Dr. E. V. McCollum says, "These facts mean only one thing, namely, that these boys did not develop in childhood as they should have done. In a very large number of cases, if we knew the facts, we could trace their inferior condition back to dirty milk, feeding food unfit for infants, overfeeding or feeding on modified milks which were modified by ignorant persons and were unfit infants' food."

We do not need to go any further than the club health clinic at the South Dakota State Fair for facts which show that a similar condition exists among South Dakota boys and girls. The 300 in attendance is the cream of the club membership as far as achievement goes. If there is a high correlation between physical efficiency and mental efficiency these boys and girls should at least represent the average physically.

The facts brought out in the clinic report of 1926 are indications of some faulty nutrition. All the health clinic reports tell the same story.

There were 306 examined, 167 boys and 139 girls. Of these 27.6% boys and 30.2% girls were underweight, more than 7% boys and 3.5% girls, more than 20% overweight.

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
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<tbody>
<tr>
<td>Chest abnormal shape</td>
<td>10.2%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Knock knee</td>
<td>2.4%</td>
<td>15.1%</td>
</tr>
<tr>
<td>Bow legs</td>
<td>6.6%</td>
<td>10.8%</td>
</tr>
<tr>
<td>Incorrect posture</td>
<td>20.5%</td>
<td>30.2%</td>
</tr>
<tr>
<td>Teeth irregular</td>
<td>22.8%</td>
<td>26.8%</td>
</tr>
<tr>
<td>Teeth notched and rigid</td>
<td>10.8%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Decayed teeth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>14.4%</td>
<td>15.1%</td>
</tr>
<tr>
<td>2</td>
<td>15.6%</td>
<td>15.8%</td>
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<tr>
<td>3</td>
<td>29.4%</td>
<td>18.7%</td>
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<tr>
<td>4</td>
<td>.6%</td>
<td>3.5%</td>
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<tr>
<td>5</td>
<td>.7%</td>
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</table>

<table>
<thead>
<tr>
<th>Missing permanent teeth</th>
<th>Boys</th>
<th>Girls</th>
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<tbody>
<tr>
<td></td>
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<td></td>
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<tr>
<td>1</td>
<td>10.8%</td>
<td>14.4%</td>
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<td>3.6%</td>
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The best differs from the ordinary and there are varying degrees of quality from a perfect ear to the nubbin.
Physically the best differs from the ordinary and they vary in degree of fitness from the physically perfect individual (in minority) to the person decidedly handicapped by physical defects.
Other nutrition factors besides food contribute to poor infant develop­ment which often leaves its mark on the adult. Some of them are: depriving children of sunshine by keeping them in the house too much; keeping them excited by too much entertainment and thus preventing enough rest; propping them up when too little; dressing them too warmly; and preventing them from crawling and exercising as much as they should.

Blood.— Iron is another important building food. It forms the most important part of the blood. It gives the blood its red color and enables it to carry oxygen from the lungs to all parts of the body so the food can be utilized for its various purposes. Iron is so important that the new born infant is supplied with enough to tide him over his first few months of life. After that mothers are responsible for seeing that his daily food contains the amount of iron needed. An iron-rich diet from before birth and all through life is essential as the condition of the blood is an important factor in general nutrition. The condition known as anemia is a low iron content of the blood. Iron from food, rather than medicine, is considered most effective in treating anemia as well as in preventing it.

Other Minerals.— Other minerals are needed to build body tissues besides calcium, phosphorous and iron, but they are needed in smaller amounts and occur in sufficient quantities in foods supplying calcium, iron and phosphorous that the homemaker need not pay special attention to them in her meal planning except under certain conditions.

Foods Especially Rich in Building Material.— Following is a list of foods especially rich in the body building materials that should be included regularly in the dietary in order to insure an adequate amount. This is not a complete list but a few of the outstanding foods rich in:

<table>
<thead>
<tr>
<th>Calcium</th>
<th>Phosphorous</th>
<th>Iron</th>
<th>Complete protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>Milk</td>
<td>Liver</td>
<td>Milk</td>
</tr>
<tr>
<td>Leafy vegetables</td>
<td>Meat</td>
<td>Leafy vegetables</td>
<td>Cheese</td>
</tr>
<tr>
<td>Whole cereals</td>
<td>Egg yolk</td>
<td>Whole cereals</td>
<td>Lean meat</td>
</tr>
<tr>
<td>Fruits</td>
<td>Egg yolk</td>
<td>Whole cereals</td>
<td>Dark fruits</td>
</tr>
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</table>

Heat and Energy

The food eaten is the source of body heat and energy expended in work, play and body process. Carbohydrate foods (sugars and starches) and fats are the best fuel foods. The body can use protein for fuel but it is poor economy to supply more protein than is needed for building purposes because in the first place the protein foods are more expensive and, secondly, the digestive process of the protein is more complicated, as is also the elimination of waste products, than of the other foods. An undue amount of protein matter in the digestive tract makes a favorable condition for putrefaction to take place.

The amount of fuel foods used or burned is determined by the demand of the muscles for energy and by the amount needed to keep warm, and not according to the amount eaten. Whatever is eaten in excess of immediate needs is stored for future use, mostly in the form of fat.

A normal body has a moderate store of fat widely distributed over the body, under the skin, around the visceral organs, among the muscle fibers and elsewhere. This serves as an insulator for the body and as a padding protecting the organs and muscles from jars and blows. A storage of fat beyond this amount is abnormal and not to be desired, and can be controlled by diet.
Carbohydrate foods, sugar and starches, are stored as glycogen in the liver and to some extent in the muscles. The glycogen storing capacity of the body is small, and when the capacity has been reached the incoming carbohydrates beyond immediate use will be stored in a more concentrated form, namely fat. Fat that is eaten beyond immediate fuel need is also stored as fat practically unchanged. The body does not have a capacity for storing a large surplus of protein although the well nourished body carries some reserve. Protein has a stimulating effect upon the burning process or combustion and has a tendency to burn itself off if eaten in large quantities. It follows that if a heavy meat diet is used with an abundance of potatoes, bread and sugar, the proteins beyond building needs are used for fuel purposes and the sugars and starches go to form the surplus weight which so often is acquired after the middle thirties. If the simple rules in regard to meal planning suggested on page thirteen were followed this would not occur.

It is only within recent years that sugar has been manufactured on a large scale. It does not contribute anything to tissue building in the true sense. Its only value is as a source of body fuel and as such is good if used intelligently. It is a habit-forming food and tends to crowd out of the diet more wholesome foods. This is the main objection to candies, sweet cakes, etc., especially for children and explains why they should be eaten only at the end of the meal. In the United States we are consuming about one-fourth pound of sugar per person a day, one of the reasons, possibly, why there is so much poor nutrition.

Regulating Processes and Growth

Regulating foods are those which maintain the body as a good working machine. These are the foods that contain vitamins, minerals and laxative materials. This food group is the most often neglected. The home-maker should take special care to include one or more regulating foods in every meal.

For the next few days keep track of the foods you eat and also of those about you. Perhaps you will find that the diet of some consists largely of bread, meat, potatoes, gravy, and sugar in some form or other. Such a diet lacks several essentials in good feeding. It is lacking in the mineral elements needed for bones and other tissues and processes. It is lacking in laxative material. It is lacking in vitamins, substances of great importance to health, vitality and vigor.

Vitamins.—It is not known what kind of substances vitamins are but it is definitely known that there are five different ones—Vitamins A, B, C, D, and E—and what happens if these substances are not adequately provided. The relative abundance and distribution of these vitamins in the various foodstuffs is also known.

Vitamin A. The best sources of Vitamin A are codliver oil, butter, cream or whole milk, fat of egg yolk, invisible fat of glandular organs such as liver, kidneys, sweet breads, and leafy vegetables. (Generally speaking, the thinner and greener a leaf is the more Vitamin A it contains). No vegetable fat or oil contains any appreciable amounts of Vitamin A.

Vitamin B. This is the most widely distributed of the vitamins and is found in most common foodstuffs, except that it is never found in fats, oils, starch, sugar, syrups made of gluoses and only in inadequate amounts in highly refined flours and polished rice. The amount of
Vitamin B present in foods when served depends on how they have been treated. For example, fine white flour contains only one-tenth of the Vitamin B present in the original grain. Fully one-half of Vitamin B is discarded when vegetables are cooked in water and the juices thrown away.

Vitamin C. It is found only in uncooked foods because it is very easily destroyed by heat in the presence of air. It is therefore necessary in order to maintain optimum health, to eat some fresh fruit or vegetable each day. All growing parts of plants contain some Vitamin C in varying amounts but the citrus fruits head the list of Vitamin C rich food. Raw cabbage, turnips, potatoes, tomatoes and canned tomatoes are valuable sources.

Vitamin D. Vitamin D which has such a remarkable effect on bone growth is found in only small quantities in our foods. Egg yolks, leaves of plants, butter fat contain some. The best source is cod liver oil which is therefore most valuable in preventing rickets and should be given to children to insure enough of this important vitamin. Sunlight in some way acts as a partial substitute for Vitamin D. This is one of the reasons why exposure to sunlight is so necessary in child development.

Vitamin E. Vitamin E is quite commonly distributed in our foods and will be adequately provided in a good all around diet.

Alkaline Foods.—In health the blood is alkaline in reaction. If it becomes even slightly acid, serious trouble results. One of the factors having a bearing on whether the blood is to be acid or alkaline is the food eaten. Foods are listed as alkaline or acid foods. In general, meat, eggs, cereal are acid-forming foods and milk, fruits and vegetables are base-forming. Upon first thought it may be a little hard to understand why sour fruits like the lemon, grapefruit, orange, etc., are classified as alkaline foods. Everyone knows that when something is burned an ash remains; also, that food eaten is digested, absorbed and burned in the body. Some do not know that the same type of ash remains after the various processes through which food goes as though it were burned outside of the body. It is the reaction of the ash that classifies a food as alkaline or acid.

Roughage and Other Laxative Factors.—Constipation is usually the result of faulty nutrition. When the digestive tract decreases its activity there is a tendency to retain putrifying material which sends into the blood stream undesirable products formed by bacterial action on proteins. For good intestinal activity a certain bulk is necessary. Bad breath is very often an indication of an unhygienic condition of the intestines.

When a diet that does not take care of all nutrition needs is used for any length of time the vitality of the tissues is affected. An incomplete
Meal Planning

A simple rule to follow in meal planning, yet one that brings about a good dietary for the family is, first, to provide the following and, second, to round out the meals with whatever else one wishes.

- A quart of milk for each child and at least a pint for each adult a day.
- Some leafy vegetables should be eaten daily.
- Two servings of vegetables besides potatoes every day.
- Two servings of fruit a day.
- Some raw fruit or vegetable or canned tomato should be eaten every day.
- Some whole cereal each day.
diet is the surest and quickest way of losing "that school girl complexion" and bringing on early signs of age such as wrinkles, crows feet, hair tending to lose luster and fall out, the digestive tract becoming less active, etc. Constipation is often the real cause of that "out of sorts feeling", headache, thickheadedness, sluggishness and lassitude. For most individuals a thorough emptying of the bowels will occur each day, which is essential to optimum health, by regular meals including vegetables, fruits, whole cereals, plenty of water, and regular visits to the toilet.

**Protective Foods.**—Dr. McCollum calls milk and leafy vegetables the "protective foods" because if eaten in sufficient amount they will provide everything which is lacking in the white bread, meat, potato and sugar diet. Leafy vegetables include spinach, lettuce, chard, turnip and beet tops, brussel sprouts and all other leaves used for food. For the best nutrition it is necessary to take each day a moderate amount of some fresh raw plant food such as fresh fruit, raw cabbage, celery, lettuce, tomatoes raw or canned, etc.

**Summary**

Too many people seem dependent on the pastime of eating for their pleasure and satisfaction. How much better it would be to cultivate an appetite that is in accordance with food needs which would result in a more complete satisfaction, a feeling of optimum, well being.

"In the past we have failed to appreciate the seriousness of that condition of malnutrition which falls just short of a deficiency disease" says Dr. McCollum. It is this condition that the thinking housewife is mostly concerned with. She knows that the finest bodies are the products of a well balanced diet, and other nutrition factors such as sunshine, sleep and rest, fresh air, exercise and play, and freedom from preventable disease and defects.

She also realizes that there are fundamental food needs and that she has to acquaint herself with these needs and study the foods available to her family in order that she may put on the table meals that are satisfying not only to the palate and body needs, but also suitable to her income. It is becoming a conceded fact that the homemaker needs to study foods and the nutrition of her family at least to the same degree that the successful livestock grower studies feeds and feeding to make him successful in his undertaking. The four succeeding circulars and demonstrations will deal with the various food groups, their place in the diet and suggestions for their preparation.

**REFERENCES**

*Nutrition Work with Children*—Lydia J. Roberts

*The Foundations of Nutrition*—Mary Swartz Rose, Ph.D.

Other Publications for Homemakers

The following additional extension circulars of especial interest to South Dakota homemakers are available for free distribution:

No.
226, Christmas Gifts
227, The Modern Kitchen—A Step Saver
228, Planning the Living Room
231, New Wall Finishes
234, Clothes for Tots
239, Practical Helps in Dressmaking
250, Winter Vegetables and Cookery
254, First Aid for Home Folks
255, Economy in Clothing Selection
256, Dish Washing
257, Selection of Kitchen Utensils
260, Selection and Care of Clothing
261, New Christmas Gifts
262, Desserts That are Different
267, Care of the Sick
268, New Meat Dishes
269, New Clothes from Old

Any of these publications may be secured free by writing the extension service at State College, Brookings.