

## CHAPTER FOUR

# *Generalizations and Facts*

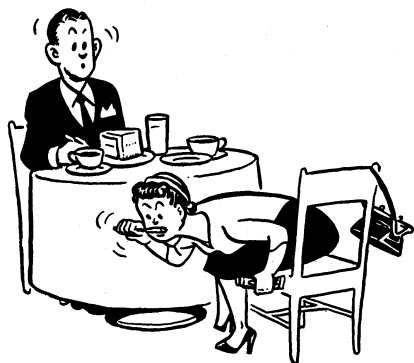
In this chapter, information considered important in practical nutrition education is presented under 18 major headings which may be described as generalizations. The statements from 1 through 4 relate to the ways in which nutrition may affect the individual and society; 5 through 15 present measures necessary to insure good nutrition; 16 through 18 tell how one may check his own nutrition. The subheadings as indicated by letters expand the main generalizations, and the statements of the next order are related facts.

The statements are not to be memorized by students, but to be used by the educator as a basis for learning experiences (see Chapter 5). They are planned to lead the student to an understanding of sound nutrition, to awaken him to the significance of nutrition as a force in his life, and to provide a base on which his knowledge can grow. Many statements are abstract and may be applied in a wide variety of situations. The effectiveness of their application challenges the ingenuity of the educator whether he is a teacher, a public health worker, or a columnist.

1. **Nutrition can affect how you look by its influence on the different parts of your body and the characteristics which relate to your personal appearance.**
  - A. Good nutrition plays an important part in producing an attractive skin.

- 1) The skin of a well-nourished person is usually smooth, slightly moist, and tinged with pink; that of a poorly nourished person is likely to be dull and lifeless.
  - 2) Inadequate amounts of vitamin A in the diet for long periods of time result in dry, scaly skin which is more susceptible to infection than normal skin.
  - 3) Too little of certain members of the vitamin B complex in the food supply may result in scaly, greasy, or crusty skin around the corners of the mouth and in the folds of the nose.
  - 4) When food has contained too little protein, minerals, and vitamins, the red blood cells do not have a normal amount of their red coloring matter, and the skin of the individual may be pale in color.
  - 5) For some people common foods, such as milk, eggs, strawberries, or wheat bread, may cause a skin rash known as allergy, and it becomes necessary to eliminate the offending foods or to become desensitized to them.
  - 6) Although the acne of adolescence may be unrelated to nutrition, a good all-around diet, together with cleanliness, may help to combat it.
- B. The teeth are complex parts of the body, subject to nutritional influences beginning at the time of their formation and continuing through the period of maturity.
- 1) An important measure in controlling tooth decay is to provide the building materials — protein, calcium, phosphorus, and vitamins A, C, and D — from the prenatal period until the last permanent teeth are fully developed.
  - 2) Whatever the cause of poor nutrition — whether poor diet, infection, or disease — nutritional deficiency during the formation of the teeth results in their imperfect development and predisposes them to decay.
  - 3) If nutritional deficiency is present when the permanent teeth are being formed, the permanent teeth often suffer injury more than do the temporary ones.
  - 4) There are some unknown factors which sometimes prevent sound formation of teeth even when all known tooth-building materials are present in the food supply and the teeth are kept clean by brushing and by rinsing the mouth.
  - 5) For reasons not understood, some nationalities as well as some families have developed either marked susceptibility or marked resistance to tooth decay.

- 6) A good diet from one generation to the next offers the hope that the people of the United States may eventually increase their resistance to tooth decay.
  - 7) One may be born with a tendency toward poor teeth but this tendency can be checked by good nutrition or further aggravated by poor nutrition.
  - 8) High carbohydrate foods which tend to stick to the teeth, as hard caramel candy, are likely to produce tooth decay in people who are susceptible to dental caries.
  - 9) One to 1.5 parts per million of fluorides in drinking water, when used by children whose teeth are in the formative stage, apparently help to protect the teeth against dental caries.
  - 10) A little more than 1.5 parts per million of fluorides in drinking water, when used by children whose teeth are in a formative stage, may produce defects in the enamel known as mottled enamel.
  - 11) Fractures in tooth enamel which may occur when one bites hard objects, or when one injures a tooth in a fall or blow, produce places where food particles and bacteria may lodge and start decay.
  - 12) Since acids formed by bacterial action on sweets lodged around the teeth may start decay by dissolving the calcium, it is well to cleanse the teeth thoroughly soon after eating foods of this type.
  - 13) Current experimental work suggests that acid fruit juices may have a greater erosive effect on tooth enamel than the same acid fruits eaten whole.
  - 14) Keeping the teeth clean is essential, but it will not replace the need for good food in the protection of the teeth from decay.
- C. The muscles, nerves, and mucous membranes of the eyes, and also the processes by which images are received, are sensitive to the nutrition of the individual.



It is well to cleanse the teeth thoroughly soon after eating . . .

The hair may become dull, dry, and difficult to manage.



- 1) Usually the eyes of the well-nourished, healthy person, with good habits of living, are bright and clear.
- 2) After very long and severe shortages of vitamin A, the covering of the eyeball and the mucous membrane around the eye may become dry and hard, and sometimes even blindness may result.
- 3) The ability to see in a dim light or to adapt quickly to marked change in the brightness of light depends in part on a good supply of vitamin A.
- 4) Itching, burning, and a grating sensation of the eyes when exposed to fairly bright light may be caused by too little riboflavin in the diet.
- 5) If there is severe lack of riboflavin, the blood vessels of the covering of the eyeball become enlarged or may burst, and the eye may be clouded by thickened tissue or be bloodshot.
- 6) Because of the sensitivity of the eye to general body conditions, poor nutrition may affect adversely the efficiency of this organ; in fact, the eye is often a sensitive indicator of the general state of nutrition.

D. Hair and nails are body tissues which reflect the state of nutrition.

- 1) When the food supply of protein, minerals, and vitamins is adequate, hair tends to be soft and lustrous.
- 2) When the food supply of protein, minerals, and vitamins is poor, the hair may become dull, dry, and harsh, and difficult to manage.
- 3) The universal relationship of excellent nutrition and care of animals to the fine quality of their coats leaves little doubt of the benefits which people may derive for their hair.
- 4) Though animal experiments have shown apparent relationships between dietary deficiency of specific nutrients and loss of hair and even loss of color in the fur,

there is no convincing evidence to support claims of such relationships for human beings.

- 5) Good protein food, reinforced with minerals and vitamins efficiently used by the body, helps to form firm, well-shaped fingernails which can be groomed to attractiveness.
- E. Body size is a result of many factors such as diet, secretions of glands, inheritance, disease, and exercise.
- 1) The relationship of nutrition to body size is shown by the fact that increase in body weight in proportion to height is probably the best over-all index of nutrition during growth, since body weight represents the composite of all parts of the body — bones, organs, blood, muscles, and other tissues.
  - 2) Boys and girls need to understand that the growth spurts during adolescence (about 10 to 12 years for girls and about 12 to 14 years for boys) are natural and should be supported by a well-balanced, adequate diet.
  - 3) If the food intake exceeds the amount of food used by the body for exercise, maintenance, and growth there will be storage of the surplus and gain in body weight, due to the accumulation of body fat; conversely, if the food intake is less than the body needs there will be loss of weight.
  - 4) Surplus food fat, protein, and carbohydrate are transformed into body fat, which is then deposited about the organs, between the muscles, or in a layer of fatty tissue under the skin.
  - 5) Fat deposits serve as a reserve supply of body fuel to be drawn upon in case of temporary shortage of, or increased need for, fuel.
  - 6) Fat deposits serve to support and protect the organs and to prevent loss of heat from the body surface.
  - 7) Fat deposits under the skin help to soften the angles produced by the bones, and in proper amounts contribute to the attractiveness of the person.
  - 8) The human body adjusts itself to an inadequate amount of food by a decrease in body weight and perhaps in activity and, ultimately, by changes in the chemical processes of the cells.
  - 9) Children who are considerably below the average weight for their height and age may tire more easily and have less endurance than others, although these conditions

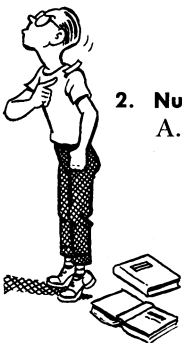
are sometimes masked by drives which lead to excessive activity.

- 10) That characteristics of body build are inherited is evident in the similarity of bone structure that is often seen among members of a family.
  - 11) The fact that family members often have similar eating habits may account for the tendency toward fatness or thinness sometimes observed in families.
  - 12) Rest influences body weight through its effect on conservation of energy.
  - 13) A safe program for reduction of relatively large amounts of body weight requires the supervision of a physician.
  - 14) The goal for which one should strive when reducing body weight is a small, steady loss per week with the maintenance of a good state of mental and physical efficiency throughout the reducing period.
  - 15) Because of readjustments of the body to a reducing diet, weight loss may not be immediately apparent; it is therefore important to allow sufficient time before becoming discouraged with the results of a reducing program.
  - 16) Excess weight is often accompanied by development of heart and circulatory diseases and diabetes in middle age.
  - 17) Because of the great difficulty in reducing and staying reduced, it is wise never to allow the accumulation of excess weight.
  - 18) Emotional disturbances such as sorrow, nervousness, irritability, anxiety, or lack of acceptance socially may increase or decrease the desire for food and thus affect body weight.
- F. Posture is in a large measure dependent on the tone of the muscles and the proper development of the bones, both of which are greatly influenced by nutrition.
- 1) A well-built and substantial framework together with good muscles provide the basis for a well-shaped body and good carriage.
  - 2) When children, including adolescents, receive too small a supply of protein, calcium, phosphorus, and vitamins C and D, there is danger that the growth of bones will be stunted or that the bones will be improperly shaped.
  - 3) Diets poor in calcium, phosphorus, and vitamin D are liable to cause narrow chests, small pelvic bones, knock-knees, and bowlegs.

- 4) Malformed bones resulting from poor food supply during childhood remain malformed throughout life.
  - 5) Malformation of the pelvis in childhood may cause difficult delivery for the mother at the time of childbirth and thus the nutrition of one generation affects the welfare of the next.
  - 6) When clothing, smoke, fog, window glass, or geographic location prevents direct rays of the sun from reaching the skin, vitamin D should be supplied to growing children and pregnant and lactating women through supplements such as cod-liver oil and vitamin D concentrates, or through vitamin D enriched milk. Since vitamin D supplements are very potent, and because excess can be harmful, they should be given in doses exactly as directed.
  - 7) Because protein is used for building bone, blood, and body tissues such as muscles, organs, skin, and hair, the protein needs are highest in periods of rapid growth.
  - 8) If children keep increasing in height when they have poor diets, they are likely to develop poor posture and malformations of the body.
  - 9) With well-formed bones, firm muscles, and normal pads of fat and connective tissue, the organs are held in their proper place and the disfiguring effect on posture of a protruding abdomen is avoided.
- G. Nutrition can help to produce the glow of good health which greatly enhances personal appearance.
- 1) The glow of good health is often more important to the beauty of an individual than the contours of the face or body.
  - 2) An alert, happy expression and relaxed, erect posture contribute to the sparkling good looks of a healthy, well-nourished boy or girl.
  - 3) Poor nutrition makes people look dull, lifeless, and prematurely old.

**2. Nutrition can affect your personality, vigor, and ambition.**

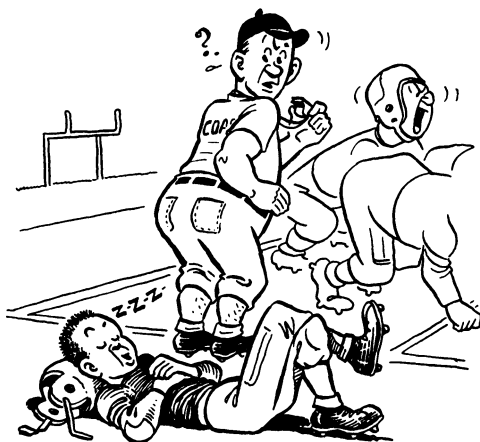
- A. Some personality traits known to be affected by the nutrition of the individual are cheerfulness and cooperativeness, self-confidence and poise, interest in others, and emotional stability.



- 1) Since good nutrition helps the body function properly, it also helps the individual to feel capable of meeting problems, and thus reduces tensions and frustrations.
  - 2) Hungry human beings think of little else than food or subjects closely related to it.
  - 3) People suffering from chronic dietary deficiencies become morose and unhappy and lose their sense of humor.
  - 4) When an individual is extremely hungry, he is likely to be irritable, restless, and lacking in self confidence and judgment; prolonged hunger often makes the individual lose his sense of right and wrong, consideration for others, ability to get along with people, and ambition.
  - 5) Good health helps people to enjoy and take part in activities with their friends; interest in being socially acceptable has been observed to decrease under conditions of poor nutrition.
  - 6) Thiamine has been called the "morale vitamin," because a body deficiency of this vitamin may cause personality characteristics such as fearfulness, apprehension, timidity, depression, irritability, quarrelsomeness, lack of co-operation, and loss of initiative.
  - 7) When families fall into the habit of disorganized meals and carelessness in eating, friction and unhappiness are the usual results; at least one good family meal a day will do much to preserve the unity of the family and promote the personality development of its members.
  - 8) Good nutrition is an important measure in helping to prevent antisocial behavior among teenagers.
  - 9) Lack of food is the basis of much of the unrest in the world today, as it has been throughout the history of mankind.
  - 10) A first step in world peace is the creation of conditions whereby people of the world can be assured of enough of the right kinds of food to eat.
- B. Vim and vigor are an outgrowth of the good health which comes as a result of good nutrition and freedom from disease.
- 1) There is a distinction between the hyperactivity of a nervous individual and the purposeful action of the normal, healthy person.
  - 2) Apathy is a general characteristic of poorly nourished people.
  - 3) There is no reason to believe that any benefits will be derived from excesses of nutrients after the body needs and stores of nutrients have been fully provided.



- 4) Vitamins will not contribute to the vim and vigor of an individual unless all of the other nutrients, such as protein, fat, and minerals, are supplied in adequate amounts.
- 5) Animal studies have indicated that raising the level of nutrition from "fairly good" to "excellent" increases adult vitality, length of life, and vigor of offspring.
- 6) Apparently the achievement and progress of nations which are well fed far exceed that of the poorly fed peoples of the world.



**3. Nutrition can affect how you work by its influence on your physical and mental efficiency.**

- A. Since physical efficiency requires good muscle and nerve co-ordination, it varies with the state of nutrition.
  - 1) Skipping breakfast has been shown to result in a decrease in maximum work rate and maximum work output in the late morning hours.
  - 2) Foods which help to develop sound muscles and steady nerves contribute to ability to develop athletic skills.
  - 3) Boys and girls engaging in strenuous exercise need more of the energy-rich foods such as sugars, fats, cereals, and breads than do less active people of the same age.

- 4) Beverages containing caffeine and alcohol may cover up fatigue and give a temporary feeling of well-being.
- 5) Good nutrition alone will not produce a winning athletic team, but eating good food in the right amount is an important aid to success in athletics.
- 6) Members of a winning team need an adequate diet every day, not on days of the game alone.
- 7) To fulfill its function, a training table encourages its members to maintain weight at the desired level and to eat, every day, the variety of foods which constitute a good diet — meat, milk, eggs, cheese, fruits, vegetables, and enriched or whole-grain cereals and breads.
- 8) With most training-table regimes, one problem is to prevent undesirable weight gain, which normally comes only from eating more food than is being expended to meet energy needs.
- 9) Permission to eat and enjoy foods to which they are accustomed aids in building morale in athletes.
- 10) Participants in some sports may need as much as 100 per cent more food energy than a sedentary person, depending on the sport and the degree of participation.
- 11) By checking weight daily, it is possible to tell if an athlete is getting enough to eat in relation to his energy expenditure.
- 12) The usual requirement of dietary protein for growth suffices for the young athlete since activity does not affect the amount of this substance needed.
- 13) It is not good to eat immediately before strenuous exercise, since it is undesirable to divert the blood supply from the digestive tract, where it is needed to aid in absorption and utilization of food.
- 14) After extreme exercise, athletes need at least an hour of rest and relaxation from tension of the game before eating a meal, in order that the meal may be enjoyed and the food well utilized.
- 15) Moderate use of fluids which are neither excessively hot nor cold is recommended before and after strenuous exercise.
- 16) A substantial meal 4 to 5 hours before a game is desirable so that the food may be digested and absorbed in advance of the vigorous exercise and so that the energy may be available for the game.

- 17) Even after prolonged exercise for as many as 4 to 5 hours, a normal body can usually furnish the required energy from its reserves so that supplements of sugar are not required.

**B. Good nutrition creates conditions favorable to the maximum mental achievement of which the individual is capable.**

- 1) Through good physical growth and development, favorable conditions are created for mental, emotional, and social development of the individual.
- 2) For individuals with poor nutrition, there is reason to believe that the mental alertness and general progress in studies can be improved by better nutrition.
- 3) Prolonged hunger and poor nutrition undermine the interest of the individual in mental pursuits such as reading and writing.
- 4) Forgetfulness and irresponsibility have been observed as characteristics of poorly nourished people.
- 5) Although no relationship of nutrition to intellectual capacity has been established, deterioration of the mind and nervous system characterizes many deficiency states.
- 6) There are no specific foods or nutrients which can be depended upon to increase the intellectual capacity.
- 7) Mental work, unless accompanied by considerable body tenseness, does not increase the energy needs of the body.

**4. Nutrition can affect how you grow and develop through its interplay with hereditary influences, environmental conditions, and other factors related to the chemistry of the body.**

**A. Hereditary factors may set a limit, but within that limit nutrition can help the individual to attain his optimum growth and development.**

- 1) Body size and build are influenced by heredity, but inherited tendencies can be upgraded by good nutrition; good nutrition through several generations has been observed to improve the stock.
- 2) Racial and family tendencies in body size may be altered through nutrition; a continued state of poor nutrition is not inherited.
- 3) That characteristics of body build are inherited is evident in the similarity of bone structure that is often seen among members of a family.
- 4) The fact that family members often have similar eating habits may account for the tendency toward fatness or

thinness sometimes observed in several family members.

- 5) One may be born with a tendency toward poor teeth, but it can be checked by good nutrition or further aggravated by poor nutrition.

B. Environmental factors exert a strong influence on health, but nutrition can help in the adjustment to many of the strains exerted by environment.



**Nutrition can affect how you grow.**

- 1) An extremely cold environment or insufficient protection from cold increases the body's need for fuel and food energy.
- 2) The layer of fat deposited under the skin, which helps to protect the body against heat loss when exposed to severe cold, reflects the adequacy of the caloric intake.
- 3) Under usual conditions of clothing and temperature, heat produced by chemical changes in the food eaten is sufficient to maintain normal body temperature.
- 4) Inadequate housing or insufficient clothing in severe weather or climates may increase the need for energy to maintain body temperature, and extra food will have to be used for this purpose.

- 5) Underweight children and semi-starved and thin old people, who do not have a good layer of fat under the skin, may have difficulty in maintaining body temperature and may need additional amounts of food to keep warm; if it is not provided, body tissue will be burned for this purpose.
- 6) Cold is an environmental factor which further aggravates the effects of poor nutrition in thin and ill-clothed people, especially children.
- 7) An extremely warm environment is likely to decrease the body's need for food energy because of possibly depressed body processes and lessened physical activity.
- 8) Good nutrition may help to fortify workers in industry against such hazards as exposure to moderate amounts of lead, TNT, and other chemicals.
- 9) Individuals who work at night or are deprived of exposure to sunshine may need to take a supplement containing vitamin D or to use vitamin D enriched milk.
- 10) When soil and water are known to be deficient in certain minerals, the ill effects may be offset by an automatic source of the substance, as iodides in salt.

**5. Good nutrition requires that the nutrients, or chemical substances, needed by the body for its functions be provided in ample amounts.**

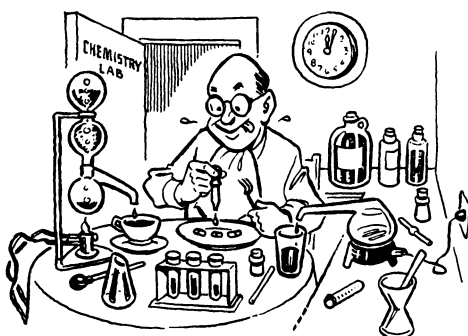
- A. The nutrient needs of individuals vary with age, sex, activity, climate, and state of nutrition, and are subject to individual differences due to hereditary and acquired conditions.
  - 1) The present knowledge concerning the amounts of various nutrients which should be allowed for the maintenance of good nutrition in healthy persons in the United States has been summarized in the Recommended Dietary Allowances of the National Research Council;<sup>1</sup> these figures include margins of safety and are selected to cover the expected individual variations (failure of an individual to attain them does not necessarily mean that he is poorly nourished).
  - 2) During the growth period the need for nutrients, such as calcium and protein, is high because the proportion of these nutrients in the body increases during that time.
  - 3) In a specific age group growing boys usually need more

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<sup>1</sup>National Research Council, *Recommended Dietary Allowances*, Publ. 302, Washington, D. C., 1953.

food than growing girls due to their greater activity, muscle mass, and usually larger size.

- 4) If a child is not fully developed or physically fit because of a long period of faulty eating, a liberal amount of nutrients will be necessary over a long period of time to bring the body to good condition.
- 5) The nutritional requirements during pregnancy and lactation are generally high and are most likely to be met if good food habits have been established in the teen ages or in the period before pregnancy.
- 6) The body need of some nutrients is greater for children than for adults, hence children cannot meet their needs simply by eating a fraction of the diets of adults.
- 7) A well-planned family meal may be adjusted to meet the varying needs of the different family members.



... the nutrients must be provided in ample amounts.

- 8) Meals which contain liberal amounts of protein-rich foods and vitamin-rich fruits and vegetables can be adjusted to meet the needs of each family member by varying the amounts of dairy products, other vegetables and fruits, cereals, fats, and sweet foods.
- B. Energy from food is used to do muscular work, to produce body heat, to support growth of the body, to maintain the functions of the vital organs.
- 1) Calories represent the energy available in food and the energy needs of the body, hence they are a useful guide

- in determining the amount of food needed by the individual.
- 2) Physical activity is the outstanding factor causing variability in calorie needs of people of similar size.
  - 3) A small increase in daily caloric intake may be allowed for people living where the average external temperature is below 50°F. (10°C.), and a small decrease where the average external temperature is above this amount.
  - 4) In order to keep from gaining weight during middle age, a small reduction in the daily caloric intake should be made for every decade beyond age 25 unless the exercise of the individual has increased.
  - 5) Weight and weight change indicate the adjustment of the calorie intake to the individual's needs.
  - 6) Food energy value depends on carbohydrate, fat, and protein content of the diet since these constituents release energy as they are broken down in the body cells.
  - 7) Sugars and starches are about the same after they are digested because digestive juices break the links between the units which make up sugar and starch as eaten.
  - 8) Since fats provide about twice as many calories as the same weight of carbohydrates or proteins, the calorie value of foods increases as the amount of fat in the foods increases.
  - 9) The calorie value of foods becomes less as the water and fiber content increase.
  - 10) With low calorie diets as those of small children, sick people, or people who are reducing, care must be taken that all foods are highly nutritious, so that enough of the essential nutrients will be supplied.
- C. Protein contains nitrogen in the form of amino acids which are used in the growth, functions, and maintenance of the body.
- 1) The total protein need of normal adults is influenced primarily by body size, not by activity.
  - 2) Because protein is used for building tissues such as muscle and bone, and for formation of the constituents of blood, the protein needs are highest in periods of rapid growth.
  - 3) Per pound of body weight, growing children and adolescents need from two to three times as much protein as do normal adults.

- 4) During pregnancy and lactation, women need about 40 per cent more protein than at other times.
  - 5) Because there is limited provision for storage of protein in the human body a liberal amount of this substance must be eaten daily.
  - 6) If people eat no protein, the tissues will slowly waste away even though plenty of carbohydrate and fat are available for fuel.
  - 7) In many parts of the world children are suffering from diets in which the protein content is low and primarily of vegetable origin.
  - 8) When the amount of protein in the diet is adequate, if approximately one-half comes from animal foods such as milk, cheese, meat, and eggs, all the amino acids needed for promoting growth are provided.
  - 9) Liberal amounts of protein in the diet are needed to aid in recovery from wounds, burns, and wasting illnesses.
- D. Many mineral substances are present in the body and serve important purposes; these minerals include compounds of calcium, phosphorus, chlorine, sulfur, sodium, potassium, magnesium, iron, copper, iodine, fluorine, manganese, zinc, and cobalt.
- 1) These substances cooperate with protein and the vitamins in such important body functions as building bone and teeth, producing the red blood cells for carrying oxygen to the tissues, and making secretions of the glands which control many body activities.
  - 2) When children and adolescents receive too small a supply of calcium and phosphorus, together with shortages in proteins and vitamins, especially C and D, there is danger that the growth of bones will be stunted or that the bones will be improperly shaped.
  - 3) According to present standards, calcium is one of the substances most frequently lacking in the diets of the people in the United States.
  - 4) If growing children and young people are to utilize calcium effectively, it is important that they receive vitamin D in amounts up to 400 International Units per day plus a liberal supply of phosphorus.
  - 5) The amount of calcium needed by the body varies with individuals, depending upon the supply which the body has previously received, upon individual differences in utilization, and upon other constituents of the diet.

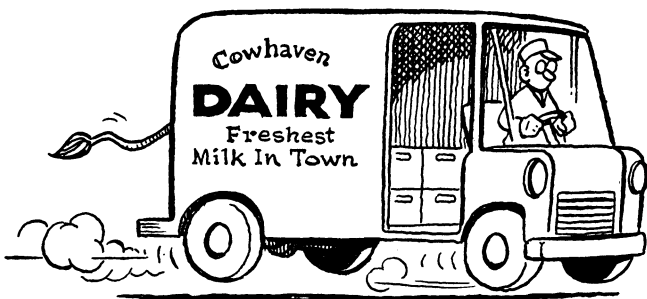


- 6) A child whose diet has been poor in calcium for a long time needs more calcium, and substances related to its use in the body, than a child whose diet has been adequate in calcium.
  - 7) Hemoglobin, the iron-containing coloring material in red blood cells, has the ability to carry oxygen from the air to the body tissues where it helps in utilizing food nutrients to furnish heat and energy.
  - 8) The iron requirement is higher for rapidly growing boys and girls than for adults because red blood cells are required for the increasing volume of blood that is being manufactured during growth.
  - 9) Because the normal life of red blood cells is about 100 days, numerous substances including protein, iron, copper, and the vitamins of the B complex are needed continually to rebuild them.
  - 10) A remarkable example of the body's ability to conserve its resources is that a portion of the iron resulting from the normal destruction of red blood cells is stored in the liver and used over again in the manufacture of new red blood cells.
  - 11) When there are short-time dietary deficiencies of iron, the body needs will be met so far as possible by supplies which are stored in the liver, spleen, and bone marrow.
  - 12) Anemia may be caused by poor diet, by frequent donations of blood, by profuse menstrual losses, by loss of blood through injury and illness, or by excessive destruction of red blood cells as from infection.
  - 13) Adolescent girls frequently have diets with too little iron.
  - 14) The thyroid gland attempts to adjust to an insufficient supply of iodides by increasing in size; this condition results in one of various kinds of goiter, namely, simple goiter.
  - 15) Adolescent girls and pregnant women are more subject to simple goiter than are other people.
  - 16) Extensive evidence indicates that during tooth development a controlled intake of fluorides, such as is provided by drinking water containing about 1 part per million, results in substantial protection against dental caries.
- E. Vitamins are chemical substances, distinct from the main components of food (fat, protein, and carbohydrate), but necessary for the life processes.

- 1) Vitamins aid the body in making use of its building and maintenance materials, hence serious deficiency will result in widespread disorders.
- 2) Vitamins are concerned in the chemical processes involved in growth and thus are needed in liberal amounts by children and by women during reproduction.
- 3) The need for some vitamins varies with body size, food energy value of the diet, and state of nutrition of the individual.
- 4) With the proper selection of natural foods it is unnecessary for the normal healthy adult to take vitamin pills.
- 5) There is no evidence that amounts of vitamins beyond the maximum needed for the body functions and stores will result in added vigor and health.
- 6) Although some vitamins may be stored, many cannot and therefore should be supplied in the diet every day.
- 7) Since vitamins are present in foods in very small amounts, they may be lost in processing and preparing for eating unless correct methods are used.
- 8) Many vitamins dissolve in water and can be destroyed when exposed to light and oxygen, or when heated, especially in the presence of an alkali such as baking soda; these facts should be considered in order to conserve vitamins during food preparation.

**6. Good nutrition is attained by selecting foods which provide the nutrients in amounts needed by the body.**

- A. Food is one of the most important factors influencing health and well-being of the individual; it is a factor which the individual can control during most of his life.
- 1) The nutritional state of the individual depends largely on the selection of food and the ability of the body to utilize the nutrients contained in the food eaten.
  - 2) Education and training in the wise selection of food for health are important, since human beings are not known to have inherent impulses or drives to select the food they need.
  - 3) When people refuse to eat many foods, or for some reason cannot have a variety of foods, they are likely to fail to obtain some of the needed nutrients.
  - 4) There are many combinations of foods or patterns of eating by which people may obtain a good diet.
  - 5) A good type of diet for healthy people in the United



- States consists of meat, milk and other dairy products, fish, poultry, eggs, green and yellow vegetables, citrus fruits or other vitamin C-rich fruits and vegetables, whole-grain or enriched cereals and breads, and enough fats, sweets, and other fruits and vegetables to meet, but not exceed, the energy needs of the body.
- 6) There is much evidence that the people of the United States could improve their diets considerably if they increased their use of milk, green, leafy, and yellow vegetables, and vitamin C-rich foods such as citrus fruits, melons, tomatoes, and cabbage.
  - 7) Eating foods that one likes and enjoys increases one's feeling of well-being.
  - 8) People do not like to have food restrictions placed on them unless they know the reason and accept it.
- B. Milk and some products derived from it provide the main source of calcium in the diets of the people of this country, and in addition are an excellent source of protein and riboflavin.
- 1) The diets of children and growing youth, which include one quart or more of milk a day, are likely to be adequate in calcium, protein, and riboflavin.
  - 2) One quart of vitamin D milk usually contains the Recommended Dietary Allowance<sup>2</sup> of vitamin D for children of all ages and for pregnant and lactating women.

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<sup>2</sup> *Ibid.*

- 3) Two to three dips, or about one and one-half cups, of ice cream provide as much calcium as one cup of whole milk.
- 4) A scant one-fourth cup of nonfat dry milk solids is equivalent to one cup of skim milk.
- 5) One cup of fresh, whole milk is approximately equivalent in nutrients to one-half cup of undiluted evaporated milk or a one-inch cube of cheddar cheese.
- 6) Milk is valuable whether used in a beverage or in prepared foods such as creamed or scalloped vegetables and cream soups.
- 7) Such desserts as ice cream, custard, bread pudding, cornstarch pudding, and custard, pumpkin, and cream pie contribute one-third to one-half cup of milk per serving to the diet, while cake and cookies contribute little or none.
- 8) Unless a conscious effort is made to use foods which have been prepared with liberal amounts of milk, it is difficult to obtain the recommended amount without using some milk as a beverage.
- 9) When skim milk is substituted for whole milk in order to reduce the calorie intake, it should be liberally supplemented with foods of high vitamin A value, as green and yellow vegetables, eggs, and liver.
- 10) Because of this high nutritive value of milk, it is one of the most important foods to include in a reducing diet or most other diets in which the total intake of food is small.
- 11) Like any other food, milk is not fattening unless taken in excess of the energy needs.
- 12) For habitual use, plain pasteurized milk is preferable to flavored milk.

C. Whole-grain or enriched breads and cereals are carbohydrate-rich foods which are at the same time economical sources of food energy, protein, iron, and vitamins of the B complex — riboflavin, niacin, and thiamine.

- 1) Cereal foods afford one of the cheapest sources of food energy.
- 2) Cereals and breads can usually be eaten in large amounts without digestive difficulty.
- 3) Because amino acids are unequally distributed among cereal foods, it is desirable to use a variety of cereals

along with some foods from animal sources, as meat, milk, and eggs.

- ④) When a single cereal food comprises the bulk of the diet, as it does with some nationalities and some economic groups, the nutritive value of the cereal largely determines the adequacy of the diet.
- 5) Dietary deficiency diseases, as beriberi and pellagra, are most prevalent where people are dependent on a single highly refined cereal.
- 6) Diets which contain large amounts of cereal foods are liable to be inadequate unless they are supplemented with foods rich in calcium, vitamin A, and vitamin C, and with some foods containing animal protein.
- 7) The nutritive value of a cereal food depends largely on the extent to which it has been milled, subjected to high temperatures, and enriched.

D. Meat, poultry, fish, eggs, and legumes are excellent sources of protein, iron, niacin, riboflavin, and thiamine.

- 1) One to three servings of foods of this group are usually found in the adequate diet.
- 2) For most adults, a daily diet which includes one pint of milk, one serving of meat, and one egg or a serving of legumes is likely to ensure an adequate supply of protein.
- 3) When it is necessary to make a substitution for meat as a source of protein, various combinations of milk, cheese, eggs, dried beans and peas, and peanuts may be used.
- 4) Although meats differ somewhat in their nutritive value, beef, pork, lamb, poultry, and fish are generally interchangeable in the diet.
- 5) Although the best proportion is not known, it seems desirable for some of the protein in one's diet to come from animal sources.
- 6) Edible organ meats such as heart, kidney, and liver are valued for their protein, mineral, and vitamin contribution to the diet.
- 7) When eggs are not desired in the daily food plan, a combination of milk, legumes, and green and yellow vegetables may be substituted.
- 8) The shape and color of the egg shell do not indicate the quality, grade, or nutritive value of the egg.

E. Vegetables and fruits add variety and nutritive value to the diet.

- 1) A good diet usually contains three to five servings of fruits and vegetables daily.
- 2) The yellow vegetables and fruits usually contain an abundance of certain yellow pigments, called carotenoids, which are partly converted into vitamin A in the human body; there are other yellow pigments which do not give rise to vitamin A, and a few yellow foods, as oranges and rutabagas, are not exceptional sources of this vitamin.
- 3) In some foods, as the green leafy vegetables, tomatoes, and prunes, other pigments conceal the yellow pigment, and these foods are valued as a potential source of vitamin A; green leafy vegetables are therefore classed with the yellow in daily food guides.
- 4) Citrus fruits, raw green vegetables, melons, tomatoes, and cabbage are good sources of vitamin C.
- 5) The importance of citrus and tomato juices as dietary sources of vitamin C has led the Council of Food and Nutrition to develop the following minimal criteria for the vitamin C content per 100 ml. (approx. one-half cup) of these foods: orange juice, 40 mg. for single-strength juice at the time of packing; grapefruit juice, 30 mg.; orange-grapefruit juice blend, 35 mg.; tomato juice, 17.5 mg.<sup>3</sup>
- 6) When potatoes are used frequently, they supply a substantial amount of vitamin C, though the amount actually obtained will vary with the method of preparation.
- 7) Other vegetables and fruits are needed to supplement the calories, minerals, and vitamins furnished by green and yellow vegetables, the vitamin C-rich fruits, and potatoes.
- 8) All fruits and vegetables except legumes furnish negligible amounts of protein; most are also poor in calcium.

F. Fat foods may be eaten as needed to complete the requirement for food energy, to provide specific nutrients, and to make one feel satisfied by the food eaten.

- 1) The fats found in milk and egg yolk are finely divided and easily digested.

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<sup>3</sup> Importance of Vitamin C in the Diet: Food Standards. Report of the Council on Foods and Nutrition. *Jour. Amer. Med. Assn.*, 160:1470 (Apr. 28, 1956).

- 2) Liquid fats and those which melt at body temperature are somewhat more readily and completely digested than solid fats.
  - 3) Vitamin A, which is carried by fats in butter, cream, and egg yolks, and in very small amounts in meat fats, is lacking in unfortified, refined fats of vegetable origin.
  - 4) When oleomargarine is fortified with vitamin A, its vitamin A value is equal to the average concentration in butter.
  - 5) In a low-cost diet, when the expenditure for table fat is disproportionately high, the nutritive value of the diet suffers.
  - 6) Fish-liver oils or concentrates of vitamin D are given to children to supply vitamin D, since foods in their natural state contain it in negligible amounts.
  - 7) Fish-liver oils contain vitamin A and iodine, in addition to vitamin D, whereas many other vitamin-D preparations contain vitamin D only.
  - 8) Two or more tablespoons of butter or fortified margarine in the daily diet are a good source of food energy and of vitamin A.
  - 9) Although a certain amount of fat in the diet is desirable, the people of this country seem to be using a somewhat larger amount than is beneficial for their health.
  - 10) High fat diets are usually high in calories, and the continued use of such diets leads to obesity and possibly to diseases of the heart and blood vessels.
  - 11) As a safeguard to their later health, children should form the habit of eating very little rich sauces, gravy, salad dressing, and rich desserts.
  - 12) Fat foods are as completely and easily digested as are carbohydrate and protein-rich foods.
  - 13) Because fat foods are somewhat more slowly digested than others, they provide a "staying" quality to the diet.
- G. Sweets provide a concentrated source of food energy and are useful in adding needed calories to diets containing enough of the nutrients, in making other foods palatable, and in adding interest and satisfaction to meals.
- 1) Sucrose, or common table sugar, contributes only calories to the diet and when taken between meals in the form of candy or concentrated sweets, may diminish the appetite for the following meal, and when taken in

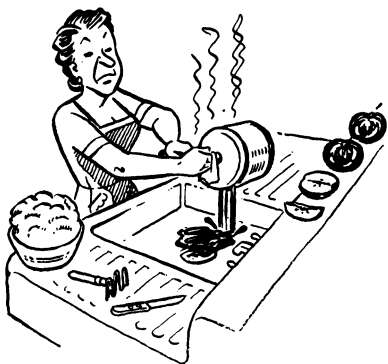
large amounts, may cause irritation in the digestive tract.

- 2) Candy and soft drinks furnish calories to the body, while milk, fruit, and fruit juices furnish calories plus nutrients needed for many body processes.
- 3) Very active adolescent boys and girls may need the extra calories furnished by desserts such as pudding, cake, and pie.
- 4) For children who have an abnormal craving of sweets, special effort should be made to see that they have liberal amounts of milk, meat, fruits, and vegetables.
- 5) With the correction of faulty diets, by increased use of milk, meat, fruits, and vegetables as needed, children have been observed to lose their abnormal craving of sweets.
- 6) Good dental hygiene is especially important for children after eating concentrated or sticky sweet foods, since acid substances formed by bacteria on the food residues adhering to the teeth may cause decay.
- 7) Because sugar can be quickly digested and absorbed, its food energy is quickly released to the body, but foods containing protein and fat provide food energy over a longer span of time.

H. Some substances when eaten or ingested create nutritional problems and difficulties.

- 1) Alcoholic beverages yield calories but few nutrients to the body, and if taken in large amounts may increase the needs for several nutrients; for a combination of reasons people addicted to alcohol are often poorly nourished.
- 2) Mineral oil dissolves the carotene of green and yellow vegetables and fruits, and if used along with these foods may interfere with the absorption of this substance and reduce its value as a source of vitamin A to the body.
- 3) Some foods, as spinach, contain oxalic acid which interferes with the use of calcium by the body; these foods, however, often contain several nutrients in large amounts and so should not be excluded from the diet.
- 4) Since raw egg white contains a substance which interferes with the use of one of the B vitamins by the body, it is best not to use raw egg white too frequently.





Nutrients such as vitamin C are easily lost or destroyed.

**7. Good nutrition is promoted by handling and using foods so that they will furnish their maximum of the nutrients.**

A. Nutrients such as vitamin C, which are soluble in water and changed by exposure to air, are easily lost or destroyed in food preparation.

- 1) The liquid in which vegetables are cooked contains valuable minerals and vitamins, and, if not served with the foods, may be used in soups, sauces, and gravies.
- 2) Fruits and vegetables, such as apples and potatoes, lose much of their vitamin C content when sieved or mashed, as contact with the oxygen of the air decreases their vitamin C content.
- 3) Appearance, quality, and nutritive value of vegetables and fruits are conserved by quick cooking in small quantities of water.
- 4) If fruits and vegetables are kept at room temperature after slicing or chopping, they may rapidly lose vitamins through exposure to oxygen in air and to light.
- 5) Keeping vegetables hot after they are cooked or reheating cooked vegetables causes loss of some color, flavor, and vitamins.

B. In cooking foods, the addition of an alkali, such as baking soda, increases the losses of some of the vitamins, especially vitamin C and thiamine.

- 1) Addition of soda may preserve color of green vegetables but may cause some loss of vitamin C, thiamine, and, to a lesser degree, riboflavin.
- 2) Small excesses of baking soda in quick breads, as biscuits and cornbread, may abolish the benefits of enrichment; specifically, when  $\frac{1}{2}$  teaspoon soda was increased to  $\frac{9}{10}$  teaspoon in a cornbread recipe requiring  $1\frac{1}{2}$  cups sour

milk, about  $\frac{1}{2}$  of the thiamine was lost in the final product.<sup>4</sup>

C. Exposure of foods to light has a harmful effect on some nutrients.

- 1) Riboflavin, which is liberally supplied by milk, is destroyed when milk is exposed to direct sunlight.
- 2) Storage in a dark place or opaque containers helps to retain the nutritive value of foods.

D. Since people eat foods that taste good to them, it is important that foods be prepared so as to be palatable.

- 1) When meat is cooked at a low, or moderately low, temperature there is less loss of the juices.
- 2) The cooking methods of meat will vary with the kind of meat; dry heat may be used for tender cuts, as steaks or roasts, and moist heat for the less tender cuts.
- 3) Tough cuts of meat can be tenderized by long cooking with moist heat at, or just below, boiling temperature; this produces chemical changes in the connective tissue.
- 4) When cheese is cooked at high temperature, it becomes tough and stringy; when heated gently, it softens to a creamy consistency and retains its original flavor.
- 5) Eggs will be most tender if cooked at relatively low temperatures; sizzling hot fat and boiling water will not result in well-cooked eggs.
- 6) Overheating fat in frying causes it to decompose and produce irritating substances.
- 7) Although the general rule for cooking vegetables is to cook in a covered pan, in the smallest amount of water possible, and for the shortest time possible, there are exceptions; green vegetables will become dull and brown if cooked in a covered pan, and most strongly-flavored vegetables, except cabbage, will be less palatable if not cooked in a fair amount of water.

E. Foods must be made safe for human consumption even though the nutritive value may be slightly impaired.

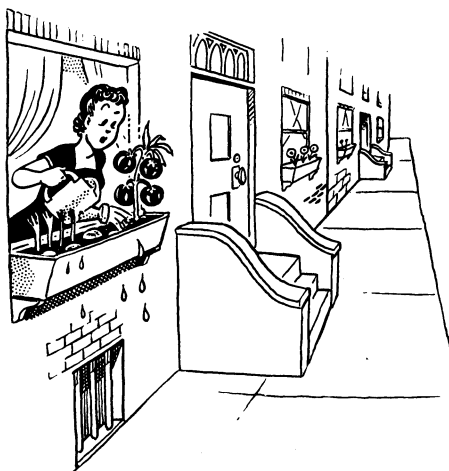
- 1) Pasteurization makes fresh milk safe for human consumption but does not improve its nutritive value or remove the necessity for sanitary practices in later handling.
- 2) Milk sold from an open can or container can seldom be considered safe and therefore cannot be considered economical at any price.

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<sup>4</sup> *Better Corn Meal and Grits*, Texas Agr. Exp. Sta., Tex. Agr. Ext. Serv., College Station, Texas, Misc. Publ. 127, May, 1955.

- 3) After frozen foods are defrosted, they require the same precautions in handling as do fresh foods.
  - 4) Frozen prepared foods, as creamed chicken, are not sterilized in processing, and hence should not be thawed and allowed to stand but should be cooked from the frozen state.
  - 5) Mixtures containing milk and eggs are an excellent medium for growth of bacteria and therefore should be cooked immediately or refrigerated.
  - 6) Because of the danger of ingesting trichinae, small organisms which are sometimes imbedded in the muscle fibers of pork, it is necessary to cook this meat thoroughly, although some of the thiamine may be destroyed.
  - 7) The acidity of foods helps to protect against losses of vitamin C in commercial canning; canned citrus juice and tomatoes remain an excellent source of vitamin C.
- F. Since the nutrients in foods are not usually distributed equally in all parts of the food, discarding portions of food may reduce its nutritive value.
- 1) Large amounts of the minerals and vitamins in vegetables often lie directly under the skin, so that vegetables cooked in the skin usually retain more food value than those cooked by other methods.
  - 2) Through refining grain, the nutritive value of flour and meal becomes impoverished.
  - 3) By discarding the outer green leaves of a head of lettuce, this food loses much of its value as a source of vitamin A and iron.
  - 4) Since the juice of acid fruits may be less nutritious and desirable as a food than the whole fruit, it is probably unwise to replace whole fruit entirely by juices.
  - 5) Fat from meat which is left as plate waste reduces the calorie value of meat.
  - 6) Amino acids and fat may be lost if drippings from meat are discarded.
- 8. Good nutrition may be furthered by low income families through wise and economical food budgeting and buying.**
- A. Enough money from the family budget should be allotted to food to ensure an adequate supply of the nutrients needed by all of the family members.
- 1) A good plan for budgeting the money to be spent for food will vary with the circumstances of the family, but care should be taken to allow enough money for milk and the vitamin-rich fruits and vegetables.

- 2) Poor nutrition is likely to become prevalent in periods of rising food costs unless people see the wisdom of allocating money for food even at the sacrifice of some immediate comforts which may reflect the family's standards of living to the public.
- 3) Through home food production food costs may be substantially reduced.
- 4) Education makes it possible for many people with low incomes to have diets adequate for good nutrition.



**Home food production!**

**B.** Wise, economical food buying involves consideration of unit cost, amount of waste, nutrients supplied by the food, and time, energy, and further expense in preparing the food to serve.

- 1) Protein foods are usually expensive; after the need for them is supplied, economy may be gained by using carbohydrate and fat foods to meet the energy needs.
- 2) If a cut of meat contains much bone, connective tissue, or gristle, it may be expensive even though the price per pound is low.
- 3) Fruits with thick skins or bruised spots, and vegetables with a large proportion of coarse outer leaves or shriveled skins may not be economical purchases because so much of them cannot be used for food.
- 4) A careful study of the unit cost of fresh, dried, canned, and frozen fruits and vegetables may be necessary to

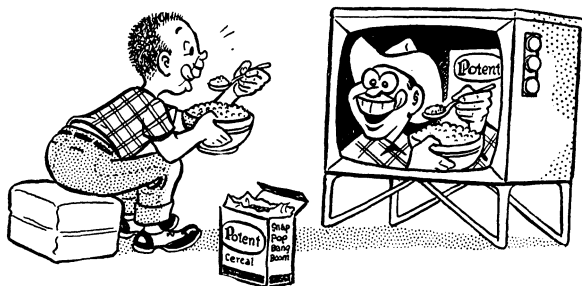
determine the most economical form in which to purchase the food.

- 5) Milk is an economical source of a number of nutrients; cream is expensive to buy in relation to the nutrients it furnishes.
- 6) Substitution of dried or evaporated milk for fresh milk is often economical, and is highly desirable if the sanitation of fresh milk is not safeguarded.
- 7) Good, low-cost diets may be obtained through the liberal use of cereal foods and legumes, supplemented with inexpensive forms of milk and cheap vitamin-rich vegetables such as cabbage, tomatoes, and carrots.

**9. Good nutrition demands that one be able to discriminate between fact and fallacy in the vast amount of advertising and popular beliefs about the use of foods.**

A. Sound information about the nutritive value of foods and the nutritional needs of the body provides the best basis for making intelligent choices of foods in spite of the mass of information and misinformation confronting the consumer.

- 1) There is no reason to believe that any combination of sanitary foods is harmful or poisonous, or that certain foods when used together have some unusual reaction on the body.
- 2) Foods lose their identity in the digestive tract and, although they provide many nutrients needed by any part of the body, they do not serve a special purpose, as for example, fish serving as a brain food.
- 3) Excesses of vitamins above those needed for the use and stores of the body will not be likely to yield special benefits in the form of extra energy, vim, or vigor.
- 4) Vitamin pills will be beneficial only to the person who



has a real deficiency, and most pills contain a number of vitamins which the person does not need in amounts greater than he receives in his usual diet.

- 5) Special diets, advertised to meet specific conditions, very often are seriously deficient in some of the nutrients and would be harmful if used over a period of time.
- 6) Claims regarding great nutritional benefits derived from using special types of cooking equipment are often misleading; furthermore, claims regarding "disastrous toxic effects" are unfounded.
- 7) Acid fruits and vegetables do not produce an acid condition of the body.
- 8) There are no foods or diets that can produce any spectacular benefits for arthritis, rheumatism, or cancer.
- 9) Money spent for "health foods" and "health aids" will usually be better spent for nutritious foods which contribute toward a good diet.
- 10) Although the individual should always be receptive to ideas regarding the use of food, food fads and sensational claims should be viewed critically.

**10. Good nutrition is promoted by maintaining the body in a condition favorable for utilizing the nutrients.**

A. Since infection may increase the need for certain nutrients, it may be a factor in bringing about a state of poor nutrition on an apparently good diet.

- 1) Well-nourished children are less likely than poorly nourished children to contract most infections.
- 2) Growth of children whose diets apparently have been good may be retarded by infection.
- 3) Nutritional deficiency, whether caused by poor diet, infection, or disease during the formation of the teeth, may result in their improper development and predispose them to decay.
- 4) Nutrient needs may be increased by illness at the same time that food intake and use are decreased.
- 5) Protein-rich foods furnish materials from which the body can build substances in the blood which help to guard against infection by disease organisms.
- 6) Large amounts of protein in the diet aid recovery from wounds, burns, broken bones, and wasting illnesses.

B. Emotional stability and relaxation aid in maintaining good nutrition.



Emotional disturbances often decrease the desire for food.

- 1) Emotional disturbances such as worry, sorrow, anger, and anxiety, often increase or decrease the desire for food and thus affect body weight and health.
  - 2) People sometimes try to compensate for lack of social acceptance by overeating and consequently they become overweight.
  - 3) Hyperactivity associated with nervous tension often results in chronic underweight.
  - 4) Adequate rest helps maintain body weight through its effect on conservation of energy.
  - 5) At least an hour of rest and relaxation is needed after extreme exercise and tension before a meal is eaten.
- C. The nutritional requirements of the undernourished person may be greater than those of a normal person of the same size.
- 1) A continued state of malnutrition reduces the ability of the body to utilize nutrients.
  - 2) The muscles of the digestive tract and the functioning of the digestive organs are impaired by poor nutrition.
  - 3) In certain kinds of nutritional deficiencies the appetite is markedly decreased.
- 11. Good nutrition is promoted by wise distribution of foods among meals and snacks.**
- A. The organization of the food of the day into meals and snacks is one of the most important steps in attaining good nutrition.
- 1) Although it has not been definitely proved, regularity in eating is probably an asset to the body's ability to use food.
  - 2) Breakfasts containing generous amounts of protein of good quality are more likely than others to maintain a feeling of satiety, alertness, and well-being throughout the morning and perhaps even into the afternoon.
  - 3) Skipping breakfast has been shown to result in a de-

crease in maximum work rate and in maximum work output in the late morning hours.

- 4) In an experiment with young women who had one pint of milk daily, protein utilization was improved when one cup of the milk was included in the breakfast meal.
  - 5) When these young women had no milk or other animal protein in a low-calorie noon meal, protein utilization was poor although they had one cup of milk at breakfast and one cup in the evening meal.
  - 6) A substantial proportion of some nutrients (especially protein furnished by animal foods) distributed through the meals of the day may be important to the efficient utilization of the nutrients.
  - 7) If one meal is missed during the day, careful planning will be required to furnish the nutrients needed by the body in the other two meals.
  - 8) Excessive hunger, brought about by missing meals, may lead to discomfort and indigestion because of overloading the stomach when meals are eaten.
  - 9) If enough time is allowed for meals, they are more likely to be enjoyed and less likely to be reduced in amount or missed altogether.
  - 10) Informality and freedom from physical discomfort or embarrassment increase the young person's pleasure from mealtime.
  - 11) If foods are prepared so that they can be carried to the living room, the porch, or the yard for occasional meals, they are often more enthusiastically accepted than when always served in the same room.
  - 12) If the necessary ingredients are available and the preparation of food is simple, children and young people often enjoy getting meals for themselves and their friends.
  - 13) Food which is well prepared and attractively served is likely to be consumed and enjoyed.
  - 14) Serving food to people is an expression of hospitality, friendliness, and good will toward them.
  - 15) Eating together informally can help to develop friendship.
- B. Snacks comprise an appreciable portion of the day's food for many people, and should be highly nutritious.
- 1) If snacks provide nutrients not liberally supplied in the three meals of the day, they can help in maintaining health.





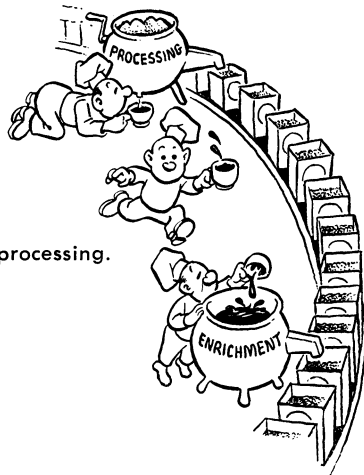
- 2) Snacks tend to be rich in carbohydrate and poor in most nutrients, hence they add little but calories to the diet.
- 3) If fruit and fruit juices, raw vegetable strips, simple sandwiches, and milk are available at regular snack hours, children may be less tempted to eat rich foods that may spoil their appetite for the next meal.
- 4) Well-chosen snacks not only give a sense of well-being but they supplement the day's meals so that total food intake fully meets the individual's requirements.
- 5) Suitable mid-morning and mid-afternoon snacks have been observed to increase the efficiency of many industrial workers.
- 6) Eating sweet foods will increase the blood-sugar level and may produce body conditions which diminish the desire to eat.

**12. Good nutrition is promoted by supplementing foods as needed.**

- A. Under normal conditions individuals may obtain the needed nutrients, except vitamin D, through natural foods.
  - 1) Vitamin and mineral supplements should be taken under the supervision of a physician.
  - 2) Fish-liver oils or concentrates of vitamin D should be given to children and others known to need this substance since foods in their natural state do not contain vitamin D except in very limited amounts.
  - 3) When clothing, smoke, fog, window glass, or geographic location prevent direct rays of the sun from reaching the skin, vitamin D needs to be supplied to growing children and pregnant and lactating women through supplements like cod-liver oil and vitamin D concentrates, or through vitamin D milk.

- 4) Natural foods undoubtedly have some important, as yet unknown, factors which vitamin preparations may not contain unless they are concentrates of some naturally occurring substances such as liver, yeast, and cod-liver oil.
- 5) If large amounts of certain minerals or vitamins are taken, they may increase the need for others and so create deficiencies where none existed in the beginning.
- 6) Some vitamin preparations taken in excess of the prescribed dosage may be toxic to the body, and may result in danger to the health.
- 7) If milk cannot be taken, calcium compounds are usually prescribed by a physician as a supplement to the food intake.
- 8) If one has been ill or undernourished, vitamin preparations may be needed for a time to furnish the amounts required to hasten recovery.
- 9) When nonfat dry milk solids are added to ice creams, breads, cakes, and cookies, the calcium, protein, and vitamin content of these products is increased.
- 10) If the number of red blood cells is not normal, or if the red coloring matter of the blood is low, iron may be given in an easily utilized form, but must be accompanied by protein and vitamins which are as important as iron in blood building.

B. Enrichment and fortification of some foods are good measures when foods have been impoverished in processing and when diets of people are known to be generally lacking in the substances added.



Restoring nutrients lost in processing.

- 1) Enriched flour is white flour to which three B vitamins — thiamine, riboflavin, and niacin — and iron have been added in amounts approximately equal to those lost in milling.
- 2) Enriched flours, bread, and cereals improve diets without changing food habits since almost everyone eats these foods in some form every day.
- 3) Enriched bread is white bread, which contains specified amounts of iron, and the B vitamins — thiamine, riboflavin, and niacin.
- 4) Enriched flour and bread are especially effective in improving diets of low-income families, since these families usually eat large quantities of such foods.
- 5) One quart of vitamin D milk usually contains the Recommended Allowance of vitamin D for children of all ages and for pregnant and lactating women.
- 6) If iodized salt is used on the table and in food preparation, it will supply the body with enough iodine to prevent simple goiter.
- 7) When oleomargarine is fortified with vitamin A, its vitamin A value is equal to the average concentration in butter.
- 8) Approved enrichment is limited mainly to the restoration of nutrients lost in processing or to the addition of nutrients known to be lacking in the diets of the people of the United States.
- 9) Since citrus fruit juices and tomato juice are important sources of vitamin C, standards have been set for the vitamin C content of these juices; these standards are to be attained by care in selecting and processing the food used rather than by adding synthetic ascorbic acid.

**13. Nutrition plays a special role in the prevention and treatment of some physiological conditions which are very prevalent.**

A. Weight control may be achieved through proper adjustment of food intake to the body needs.

- 1) For good nutrition, reducing diets should include adequate amounts of meats, eggs, vegetables, fresh fruits, and skim or whole milk, but should limit fats, sugars, and breads and cereals.
- 2) To avoid feeling hungry when reducing one should eat liberal amounts of meat, eggs, and milk, and small amounts of fat foods.
- 3) If reducing diets do not furnish protein, minerals, and

Underweight people may need more than three meals per day.



vitamins needed for growth or maintenance, the body may be permanently damaged.

- 4) If the caloric level of a reducing diet is not sufficiently high, body tissue other than fat will be destroyed, and dietary protein will be used for calories and not for body tissue.
- 5) Meals recommended for people who need to gain weight include liberal use of fats, whole-grain or enriched cereals, sugars, meats, eggs, cheese and whole milk, and plenty of fruits and vegetables.
- 6) In order to obtain the amount of food needed to gain in weight, it may be necessary for underweight people to eat more than three meals per day and to take much rest.

B. Good intestinal hygiene depends on the maintenance of good muscle tone, a favorable type of bacteria in the intestinal tract (intestinal flora), regular time for elimination, and perhaps ability to relax from mental and emotional strain.

- 1) A generally good diet, with regular meals, contributes to the conditions which promote good elimination.
- 2) It is important to include fruits and vegetables in the daily diet not only because of their minerals and vitamins but also because of the roughage which helps in moving the intestinal contents along the digestive tract.
- 3) Although it is important that waste materials be regularly removed, the body is protected against toxic products formed by bacterial action on these residues, and

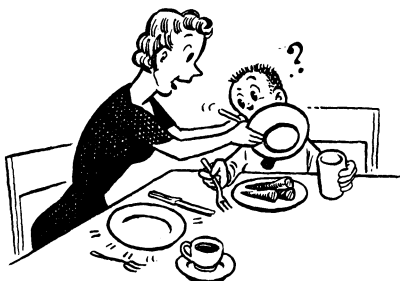
over-anxiety about elimination serves only to aggravate the situation.

- C. Although the exact relationship of nutrition to dental caries is not known, good nutrition may help to prevent dental caries, to check progressive decay, and to increase the resistance to dental decay in the next generation (see 1B).
- D. Liberal amounts of protein, iron, and the B vitamins help to maintain the hemoglobin and red blood cells of the blood at a high level, and thus to prevent anemia; it is especially important that adolescent girls take dietary precautions to prevent anemia (see 5C and D).
- E. The severe lack of certain nutrients, usually accompanied by other stresses and strains, will result in dietary deficiency diseases which, though rare in this country, are prevalent throughout the world; some of these conditions with the nutrient involved are: *scurvy*, vitamin C; *beriberi*, thiamine; *pellagra*, niacin; *xerophthalmia*, vitamin A; *endemic goiter*, iodine; *kwashiorkor*, the nutritional disorder affecting many children in the world today, animal protein.

**14. Good nutrition is promoted by establishing good food habits and good attitudes toward food.**

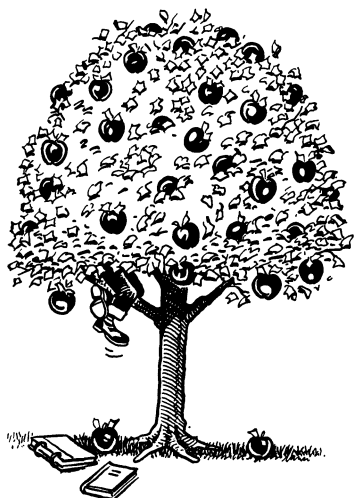
- A. Good food habits require that individuals be able to change the kinds and amounts of food they eat as they change in age, physiological state, and social or economic level.
  - 1) As individuals grow older and become more sedentary, they must curtail their calorie intake if they are to avoid overweight and its accompanying ills.
  - 2) If appetite and hunger have become geared to large amounts of food during periods of considerable activity, eating must be controlled when activity has been reduced.
  - 3) With increased incomes and access to good food, a person must be able to control his use of rich foods and social eating and drinking.
  - 4) When people have learned to like a variety of foods, they can more easily adjust their diet to meet changing conditions.
  - 5) Some knowledge of the nutritive value of foods is important in making dietary adjustments for changing conditions of life.
- B. The development of food habits is the result of many influences.
  - 1) When parents have some knowledge of nutrition and of the psychology of feeding children, they may do much to help their children form good food habits.

- 2) The example set by parents and teachers is a powerful force in forming good food habits.
- 3) The school lunch is one of the best means of showing children the essentials of a good meal.
- 4) Food habits often reflect the family's customs, nationality, and religious background.
- 5) Modern advertising influences the food habits of people directly through information about the product and indirectly through associations built up around it.
- 6) Food habits of people are sometimes revolutionized through new products on the market.
- 7) Social customs of groups to which one belongs are powerful factors in determining food habits.



The example set by parents . . .

- C. The development of good attitudes toward food is basic to the development of good food habits.
  - 1) If people can be made to realize the relationship of nutrition to the values they hold high, they will be interested in developing good food habits.
  - 2) The primary purpose of eating is to provide for the body needs.
  - 3) Although meals should be pleasant and eating enjoyable, pleasure should never become the primary purpose of eating.
- D. Continuously good food habits are conducive to the best state of nutrition.
  - 1) The past state of nutrition is an important factor in determining how the present diet is used by the body.
  - 2) If a child is not fully developed or physically fit because of a long period of faulty eating, a liberal amount of nutrients will be necessary over a long period of time to rebuild a good body condition.



... assuming responsibility for one's own nutrition!

- 3) The amount of calcium needed by the body varies with individuals, depending upon the supply which the body has previously received, upon individual differences in utilization, and upon other constituents in the diet.
- 4) A child who has had a diet poor in calcium for a long time needs more calcium and substances related to its use by the body than a child whose diet has been adequate in calcium.
- 5) If one meal is missed during the day, careful planning will be required to furnish the nutrients needed by the body in the other two meals.
- 6) The best way to ensure good nutrition during pregnancy and lactation, when the needs are extremely high, is to establish good food habits in childhood and to follow them consistently through the teen ages.

**\*15. Good nutrition is promoted by assuming responsibility for one's own nutrition.**

A. Many of the factors which influence nutrition are under the direct control of the individual.

- 1) From the variety of foods available the individual has the power to choose or reject, and thus to determine the nutritive value of his diet.
- 2) Regular hours for eating meals, plenty of outdoor exercise, freedom from hurry and worry, and a nutritious diet help to maintain a good appetite and improve a poor one.
- 3) People may help to avoid colds by having a consistently good diet and by observing good practices of sanitation, hygiene, and rest.

- 4) By choosing snacks which provide the nutrients not liberally supplied by the meals of the day, many people can improve their nutrition.
- 5) Eating a wholesome nutritious breakfast helps boys and girls to avoid feeling nervous, tired, and irritable before noon.
- 6) In the case of 12- to 14-year-old boys, the omission of breakfast has been found to exert a detrimental effect on their attitudes and scholastic attainments.
- 7) Adequate rest helps maintain body weight by conserving energy.
- 8) If one meal is missed during the day, careful planning will be required to furnish the nutrients needed by the body in the other two meals.
- 9) Skipping breakfast has been shown to decrease maximum work rate and maximum work output in the late morning hours.
- 10) By taking enough exercise, the danger of excessive intake of calories will be reduced.

B. For some factors which influence nutrition, the responsibility of the individual must be exercised through participation in community, state, and national affairs.

- 1) A sanitary food supply requires proper legislation and public opinion.
- 2) Sound decisions about fluoridation of a city water supply are likely to result from informed public opinion.
- 3) The enforced enrichment of processed foods, when in the interest of public health, requires action at the state and national level.
- 4) Maintaining a sound economy with a high rate of employment and reasonable prices on basic food commodities is important to good nutrition.
- 5) Conditions which facilitate distribution from point of production to point of need are essential for good nutrition.

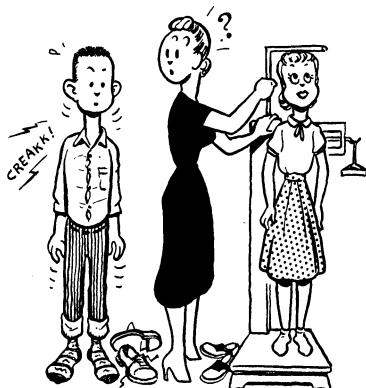
**16. A continuous check of nutritional state may be made by keeping a record of body measurements, notably height and weight.**

A. Height-weight-age tables are helpful in evaluating the growth of children, but comparisons should also be made of the child's present state with his past over a period of time.

- 1) Ideal reference tables are based on measurements of children known to be in good nutritional state and to represent the population under study in environment and nationality background.

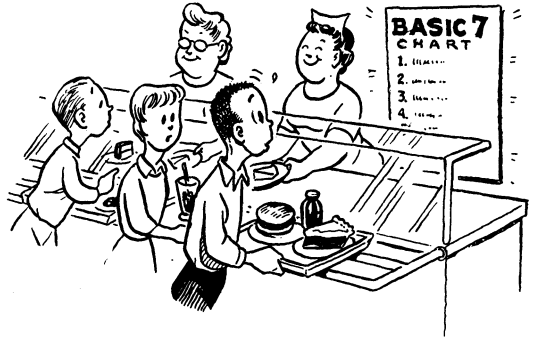


- 2) Children who deviate markedly from standards of body size may nevertheless be healthy if they are growing and have the other characteristics of good health.
- 3) Children who are considerably below the average weight for their height and age may tire more easily and have less endurance than others, although these conditions may be hidden by drives which lead the child to excessive activity.
- 4) One of the easily detectable signs of undernutrition is the failure of children to make expected weight gains; this can be observed by periodic, perhaps monthly or triennial, measurements of height and weight.
- 5) Growth is manifested in increase in chemical content of the tissues as well as body size, hence, body measurements are not the only means of assessing nutrition.
- 6) During the adolescent period normal boys and girls of the same age may differ by four or five years in their physical development.
- 7) Girls begin the adolescent spurt in growth about 2 years earlier than boys, but the growth spurt of boys, when it comes, is greater than that of girls.
- 8) Rapid growth in weight during adolescence begins in girls at approximately 10 to 12 years, and in boys at approximately 12 to 14 years; this rapid growth usually is greatest in the year before the establishment of the sexual function.
- 9) Increases in rate of weight gain of adolescent girls should not be ignored; they may be temporary, and may not indicate need for drastic reducing measures.



Periodic measurements of height and weight.

Continuous check of the diet . . .



B. Height-weight tables are useful guides for adults in maintaining proper weight.

- 1) The significance of deviations from standards should be interpreted in the light of the health and the body build of the individual.
- 2) Generally, deviations from standards of plus or minus 10 per cent suggest the need of nutritional readjustment.

C. In order to compare body measurements taken at different times, the procedures used should always be the same.

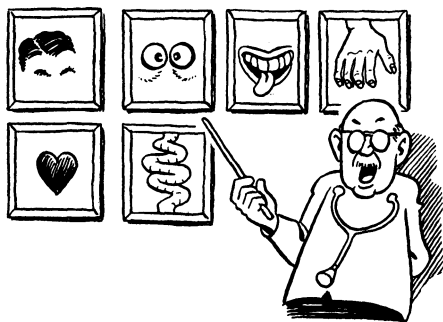
- 1) Heavy clothing and shoes should be removed before weighing.
- 2) Comparisons of weights are best if they have been taken at the same time each day.
- 3) Accurate measurement of height requires that the subject assume a standard posture and that the reading be made with the eye on the level of the figure indicated by use of a right angle marker placed on subject's head.

**17. Since inadequacy of the diet is one of the first steps toward poor nutrition, a continuous check of the diet is an important measure in the maintenance of good nutrition.**

A. If the amounts of food eaten during the day are known, the nutrient intake may be computed from tables of food composition.

- 1) These figures may be compared with standards to determine the relative adequacy of the diet.
- 2) Because of variations in foods and differences in needs of people, the evaluation may be somewhat inaccurate as applied to a single individual.
- 3) When records are kept over a period of time or for large numbers of people, a fairly accurate assessment of the adequacy of the diets may be made.

- B. When a well-kept record of the day's diet is inspected for the kinds and amounts of foods used, a rough estimate of the adequacy of the diet may be made.
- 1) Some training in recognizing sizes of servings is important to the accuracy of this method.
  - 2) In the use of this method it is important to learn the variety of foods included in the different groups and to know which foods are interchangeable.
  - 3) Various check lists of food plans have been developed for rating diets according to foods used; these are helpful but should be used with caution because there are many ways by which people may obtain good diets, and food plans are not infallible.
- C. Certain blood tests may reveal whether or not the intake of substances, as vitamin C and carotenoids, has been adequate.
- D. When an individual is unduly susceptible to such conditions as infection, fatigue, constipation, depression, and hyperirritability, he should investigate his diet and the habits of living which influence the utilization of food.
- E. The final test of the quality of the diet is in the people themselves, as stated by Leitch, "The diet of the people of most beautiful physique, most abounding energy, and least ill health is, at any given stage in our study of diet, the inspiration of and check on our theories of optimum diet."<sup>5</sup>
18. **Other criteria for judging the nutrition of the individual are based on the study of body composition, functioning of the various parts of the body, and outward clinical manifestations which can be judged by the physician.**



<sup>5</sup> Leitch, I., and Aitken, F. C. Technique and interpretation of dietary surveys. Nutr. Abs. and Revs. 19, No. 3, pp. 507-25, 1950.