

**GOOD**

**NUTRITION  
IS A  
TREASURE**

TEXAS A&M UNIVERSITY

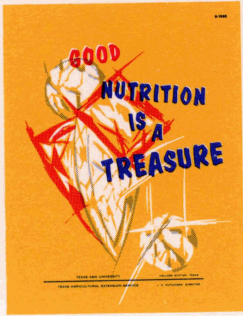
COLLEGE STATION, TEXAS

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TEXAS AGRICULTURAL EXTENSION SERVICE

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## Contents

- Good nutrition does not just happen. It is achieved by gaining accurate information and applying it intelligently to food selection, meal planning and consumption.*
- Good nutrition, directly or indirectly, contributes to a good start in life; strong, vigorous bodies; good teeth; skin, hair and eyesight; correct weight for height; lengthening of the prime of life; alertness, energy and enthusiasm and national strength. National strength is dependent upon a well-fed nation. The nutritional status of all age groups has improved since the end of World War II. However, the nation's health and fitness is good, but not as good as it might be. Many of our youth do not rate A-plus in health.*
- With a bountiful and safe food supply, it is possible for most segments of the population to be well fed. Are you well fed? Is your family well fed? It's up to you.*
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## Acknowledgments

*Appreciation is expressed to the following persons who reviewed the manuscript for this publication and made helpful suggestions: Alice Stubbs, acting head, Home Economics Research; Raymond Reiser, professor, Department of Biochemistry and Nutrition; Sydney O. Brown, professor of physiology, Department of Biology, Texas A&M University; and to S. J. Ritchey, formerly assistant professor, Home Economics Research, Texas A&M University.*



# GOOD NUTRITION IS A TREASURE

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**F**OOD IS YOUR MOST URGENT DAILY NEED—the single, most important influence on your health. You began life as a single cell, too small to be seen without a microscope. Now you represent a complex, controlled organization of billions upon billions of cells. The materials accomplishing this truly wonderful change came from food.

Food affects your rate of growth, your size, vigor, appearance and age—not in years, but measured as to physical condition. Indirectly, food affects your attitudes, ability for achievement and happiness. Food can help you face daily problems with strength and confidence. A food deficit may make you irritable, weak and readily subject to disease. You can add years to your life and life to your years by applying a knowledge of nutrition to food selection and use. Each body process depends on the food you eat, but food must be digested before it can be used.

## Digestion

If you were to take a 30-foot trip through the human body, you would follow along the alimentary canal, the tube through which food travels during its systematic breakdown, preparing it for use in body tissues. The digestive system is an arrangement of organs working in close harmony. Its chief parts are the mouth, salivary glands, esophagus, stomach, small intestine, large intestine, liver and pancreas. The digestive system is like an assembly line in reverse, starting with complex substances such as carbohydrates, proteins and fats and breaking them down into simple ones.

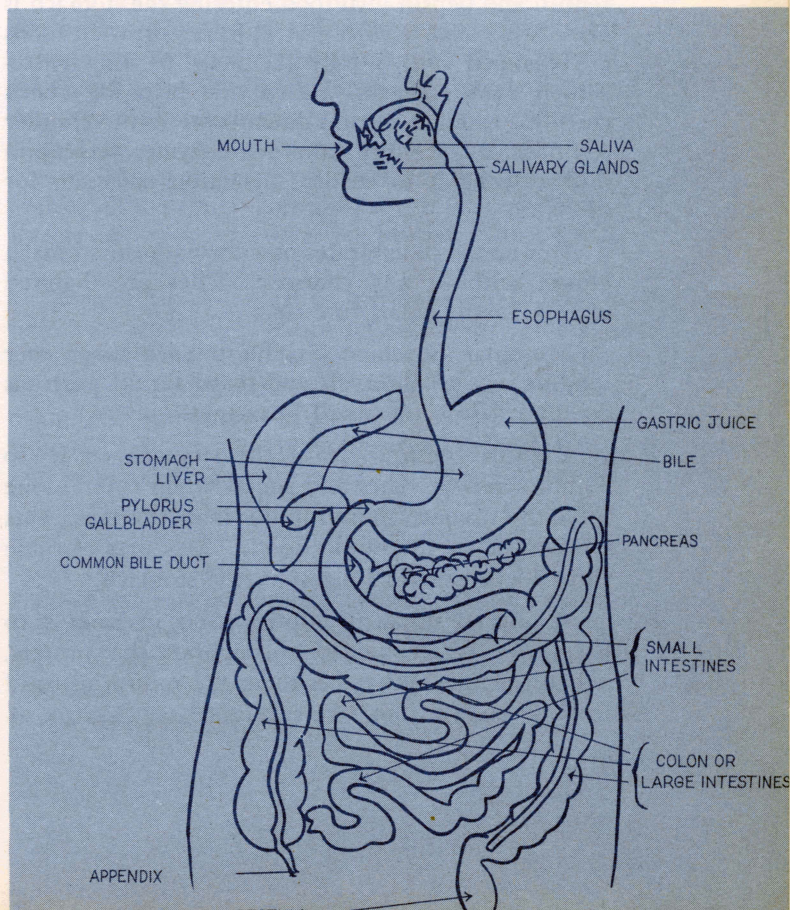
Body tissues cannot utilize food in the form it is eaten because it is insoluble, it cannot enter cells and is too complex chemically for tissue use.

Physical and chemical changes of food occur in the digestive system.

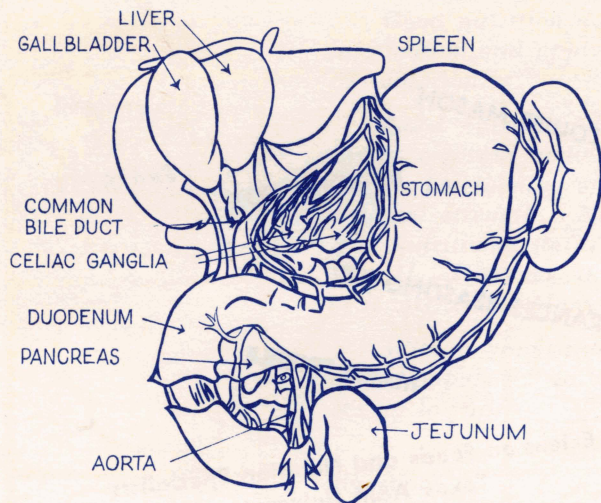
### Mouth

Digestion begins in the mouth, where food is broken into small pieces by chewing and mixing with saliva, a mechanical process. Saliva contains an enzyme that acts upon cooked starches, such as bread and potato, hastening their change from starches to sugars, a chemical process.

### Digestive Organs and Juices







#### Innervation of Stomach and Duodenum

As food is swallowed, it passes down the esophagus and enters the stomach.

#### Stomach

The shape and position of the stomach varies among individuals. Normally an adult's stomach holds from 3 to 5 pints.

Digestive or gastric juice in the stomach comes from millions of glands lining the stomach wall. The most important function of gastric juice is partial digestion of proteins. This juice contains three important substances—hydrochloric acid, rennin and pepsin. All food entering the stomach is mixed thoroughly with gastric juice. Protein foods are changed into a jelly-like mass by the hydrochloric acid. Pepsin, an enzyme bringing about chemical reaction, breaks down protein into simpler compounds. Rennin, another enzyme, acts upon milk causing it to curdle, an action necessary for digestion.

Fats and carbohydrates pass through the stomach almost without any changes. They are digested mainly in the small intestine.

Muscular movements in the stomach sweep over food at regular intervals and drive liquid portions downward into the small intestines.

Liquids begin to leave the stomach in 15 to 30 minutes. Starches and sugars when eaten alone leave the stomach more rapidly than proteins. Fats remain longer than other foods. Mixtures of these three foods remain longest in the stomach.

A normal stomach empties itself in from 4 to 6 hours. Water, added throughout the process, aids digestion. What began in the mouth as solid food becomes a soup-like substance.

#### Small Intestine

Final digestion of protein, carbohydrate, starch and sugar, and fat is completed in the small intestine, a tube with two muscle layers, one having length-wise fibers and the other circular fibers. Small intestine length varies among individuals, but averages about 20 feet in adults.

The liver, pancreas and gall bladder also aid digestion. The gall bladder receives bile, manufactured by the liver, and stores it until needed in the small intestine. As food enters the small intestine, liver bile and juice from the pancreas pour in through the bile ducts. Bile salts help break down fats into microscopic droplets. The enzyme in pancreatic and intestinal juices changes fats, now in an emulsified state, into fatty acids and glycerol which are ready for absorption into the blood stream.

As partially digested starches enter the small intestine, the pancreas furnishes enzymes responsible for changing starches into their simplest form, glucose, which is now ready for absorption.

The small intestine contributes intestinal juice, containing an enzyme that acts upon certain sugars, breaking them down into glucose, fructose and galactose. In these simple forms, they, too, are ready for absorption.

Proteins, entering the small intestine, have been digested partially in the stomach. The pancreas furnishes enzymes which complete protein breakdown. What once were meat, eggs and milk now are broken down to their simplest forms, amino acids and peptides, and are ready for absorption.

These mechanical and chemical actions on food also release associated vitamins and minerals so they can be absorbed and used by the body.

For example, when you drink whole milk, digestion involves the routes of fat, protein and carbohydrates. These processes also prepare the calcium, phosphorus, riboflavin and vitamin A in milk for body use.

#### Large Intestine

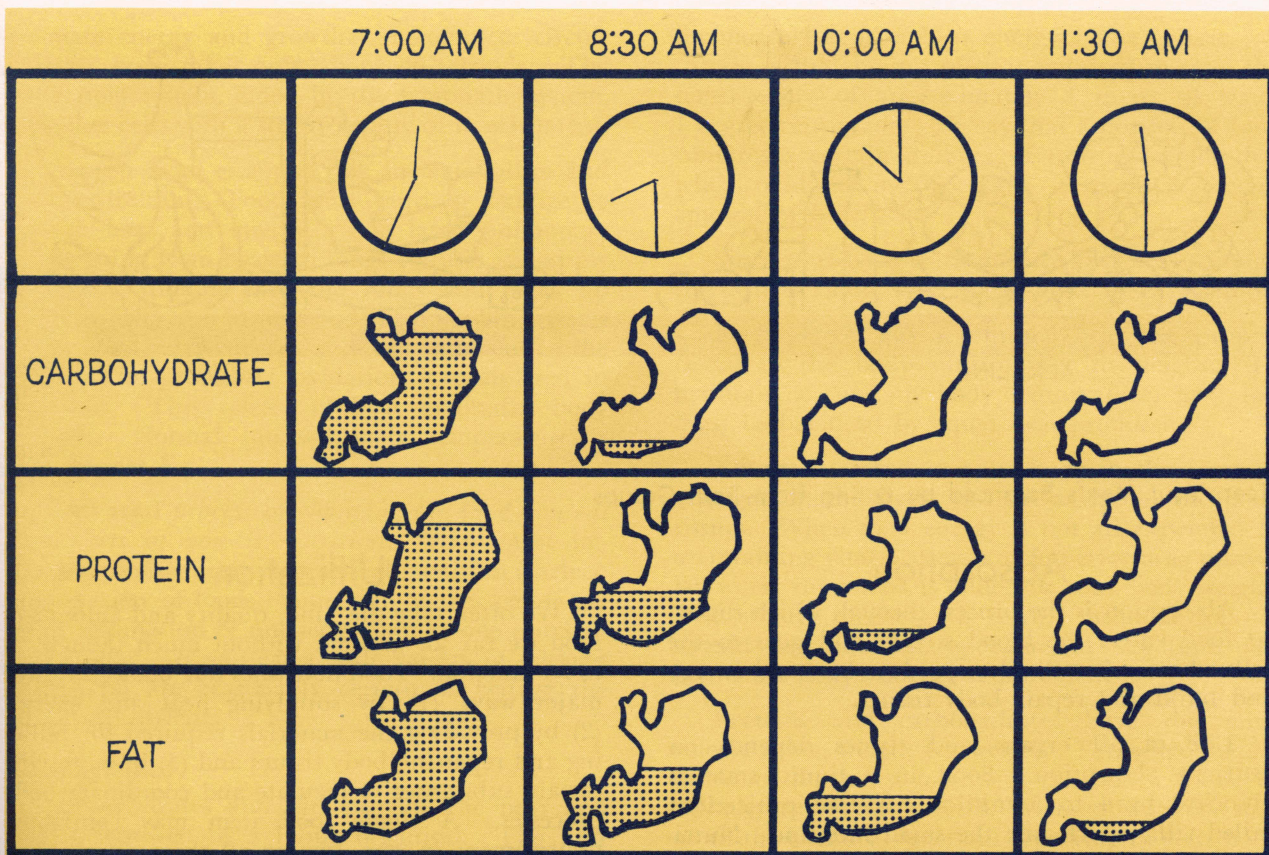
Many tough fibers found in plant foods are not digested and, therefore, cannot be absorbed. They pass along with other bits of undigested products from the small intestine into the large intestine or colon. This undigested mass adds bulk and helps rid the body of solid waste materials. In the colon, most of the water diffuses into the blood. Finally, the mass of indigestible material is eliminated from the body through the anus.

#### Conditions Influencing Digestion

Several conditions influence the gastric digestion of food. Among the most important are:

*Emotional influences.* The zest with which food is consumed largely influences gland activity;





Length of Time Food Stays in Stomach

thus, the mental and physical condition of the individual plays a large part. Prolonged periods of emotional tension cause gastric juice secretion to increase and may result in stomach ulcers.

*Preparation of food.* Properly prepared food is easiest to digest.

*Physical state of food.* For example, fresh bread and hot biscuits are not digested as readily as older bread.

*Presence of fat.* Fat slows down gastric digestion, because it lessens the amount of gastric juice secreted. The fat around fried foods keeps enzymes from readily attacking the food.

*Foods too hot, cold, coarse or spicy.* These conditions also may slow digestion.

*Regular eating times.* Follow a regular schedule for rising, retiring, working, relaxing and eating. The various body parts become conditioned to doing certain things at regular intervals.

*Strenuous exercise.* Strenuous exercise immediately after eating a meal delays gastric juice secretion and emptying of the stomach. A hot bath causes similar effects.

*Certain foods.* Some foods with too much acid cause the stomach to sour. The burning sensation in the stomach and esophagus, which are near the

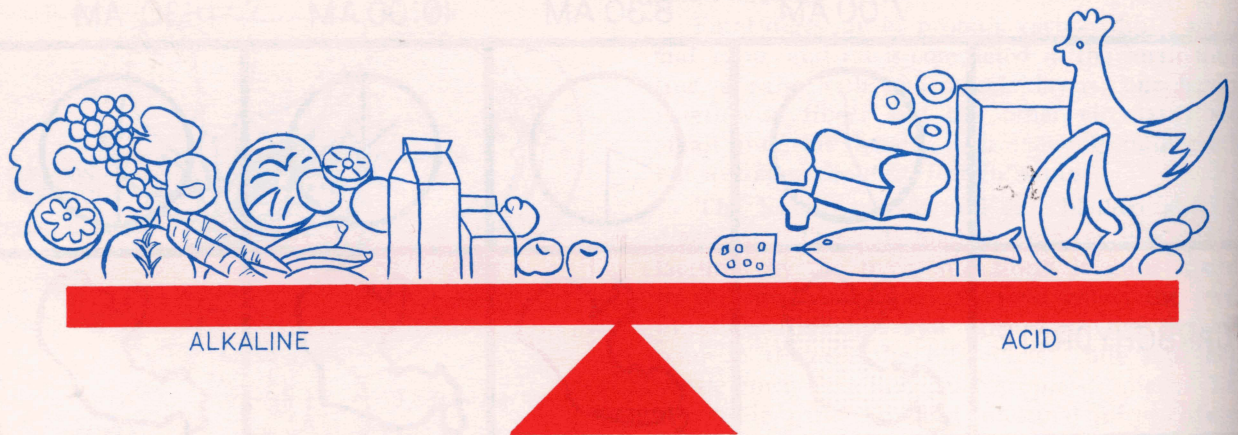
heart, may make it seem as if this organ is affected; hence, the term "heart burn."

*Too much acid in the stomach.* Acidosis results when the proportions of fat, carbohydrate and protein are so unbalanced as to upset their normal relationship. The body may be flooded with organic acids arising from the incomplete oxidation of fat. However, this is rare in normal individuals. Meats, fish, eggs, grain products and fruits such as cranberries, prunes and plums are acid forming. Excess acid slows the digestive process. Most fruits and vegetables are alkaline.

Formation of excessive gas may cause severe pain and produce pressure on the heart, giving a suffocating sensation. This feeling may result from eating food containing a large amount of air or other gas, or it may be caused by gastric juice or bacteria and yeast acting on some food substance and generating gas. In many instances gas, resulting from bacterial action on food materials that were not absorbed, forms in the intestines.

If troubled with gas, avoid foods such as raw vegetables, except tender lettuce, certain coarse-fibered or gas-forming cooked vegetables, such as corn, cabbage, brussel sprouts, turnips and parsnips; raw fruits with skins and seeds; sweet potatoes, dry beans and peas.





Keep Your Meals Balanced by Eating from Both Groups

### Absorption

Absorption is the process through which digested food enters the blood stream and goes to the cells where it is utilized to produce heat and energy and build and repair body tissues.

Life of all organs and tissues depends on nutrient absorption. Food in a liquid state is absorbed by 4 to 5 million hair-like projections called villi, which line the small intestine. Nutrients pass through the villi into capillaries, lacteals and blood vessels. The artery in each villi transports nutrients, except fat, to the portal vein and from there to the liver. The liver is the storehouse for proteins, carbohydrates, vitamin A, iron, copper and other nutrients with the exception of calcium and vitamin C. Vitamin C is not stored in the body. Sugar is stored in the liver as glycogen. Calcium is stored in the body's bone structure. From this storehouse of nutrients, the blood stream picks up needed materials and carries them to the tissues.

The body handles fat differently. Fatty acids and glycerol are absorbed by the villi into the lacteals. These go directly into the lymphatic system, bypass the liver and enter the thoracic duct at the left subclavian in the neck. From here they flow slowly into the blood stream for nourishing tissues.

Food materials which are converted into sugar combine with phosphorus to release energy for muscular contraction, glandular secretion, intestinal absorption, nerve conduction and other body processes and activities.

Nature is frugal and doesn't want to waste anything. Fat is stored as padding around vital organs, a layer under the skin and various other places in the body.

### Utilization

We often take the kind, quality and amount of food we eat for granted without much thought as to its function. Food nourishes our bodies in three major ways (1) by supplying heat and energy, (2) by providing the materials required for building and repairing body tissues and (3) by supplying certain substances to regulate and coordinate body processes. A single food item may contribute nourishment in one, two or all three ways. Too little or too much of essential nutrients injures the body; thus a well-built and well-functioning body is possible only if the diet supplies every nutrient the body needs.

Food affects your rate of growth, size, vigor, appearance and age as measured by physical condition—not by years. Indirectly, food affects attitudes, ability for achievement and happiness, and the strength and confidence with which you face daily problems. A food deficit may make you irritable, weak and readily subject to disease.

All cells must have food every day. Materials in all body tissues, skin, muscles, hair, teeth, nerves and bones are derived from food.

Although you retain your body composition, size and shape, recent research has shown that 98 percent of the body's chemical units today will be replaced by others within a year.

### Nutrients, Oxygen and Water

The circulatory system, consisting of the heart, arteries, veins and capillaries, provides transportation of food, oxygen and various secretions to the tissues and returns waste products to the places of elimination.

Blood travels from the liver to the heart and to all parts of the body, distributing its supply of



ultimate energy and growth. A complete circuit in your body takes only about 40 seconds. The circulatory system, aided by the lymphatic system, furnishes cells with a steady supply of nourishment.

Oxygen is an essential link in metabolism and food utilization. Food must burn or oxidize to furnish heat and energy. The large pulmonary artery going from heart to lungs releases its supply of carbon dioxide into the lungs and picks up oxygen. The iron in your body hemoglobin attracts oxygen and carries it into the heart and out to the body. The process of oxidation is completed in the cells. This release of heat maintains body warmth. Normal internal body temperature is 98.6 degrees F.

*This vital process of changing the food you eat into parts of you is nutrition.* Your most important consideration in practical nutrition is selecting a variety of foods. Your body makes better use of a combination of nutrients than of one nutrient eaten alone. If you eat a wide variety of selected foods, you are reasonably certain of getting the essential nutrients.

### Carbohydrates

Carbohydrates and fats provide the heat and energy required by a living organism. The unit

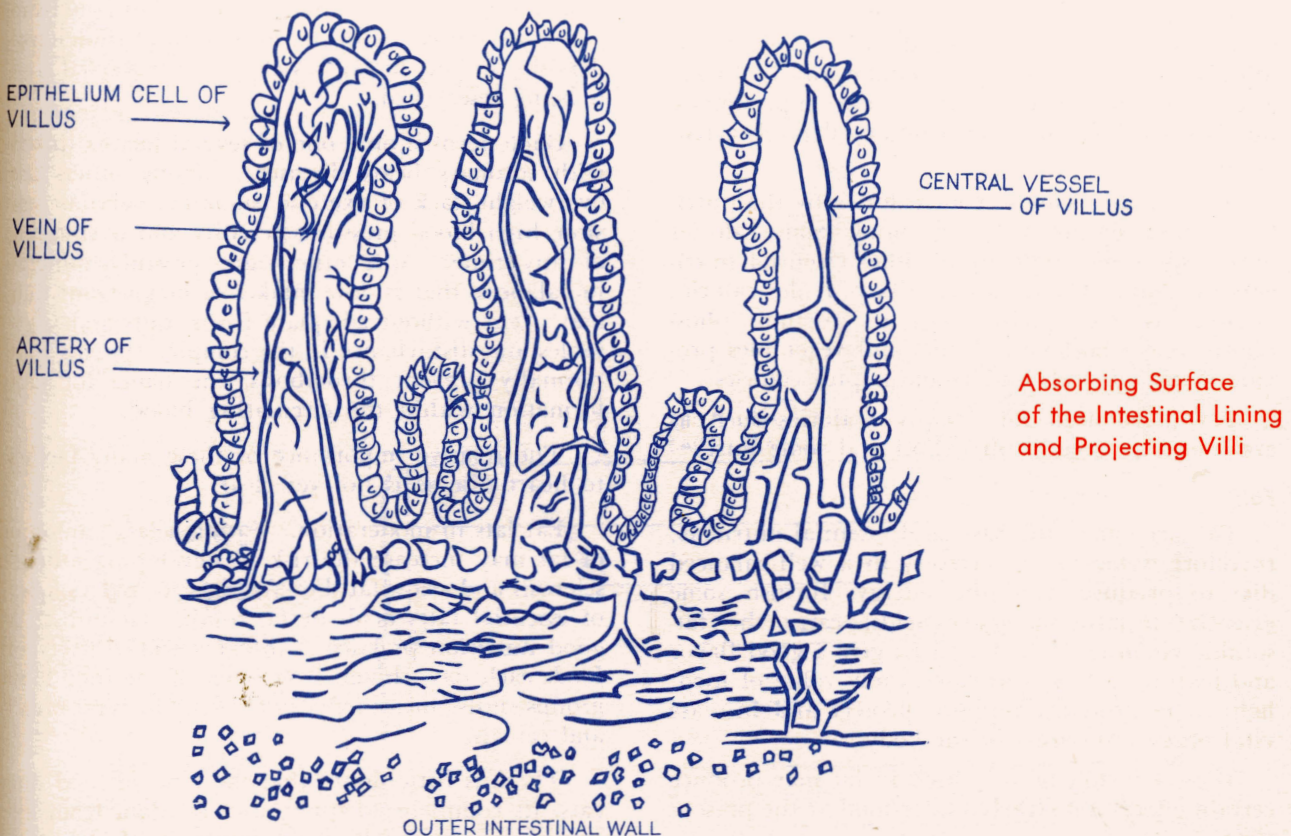
for measurement of heat energy is the calorie. A calorie is the amount of heat required to raise the temperature of approximately 1 quart of water 1 degree centigrade. To say that a portion of food contains a certain number of calories means that when oxidized in the body, it yields a certain amount of heat.

Since your body continuously loses heat through the skin, periodic refueling is done by eating food.

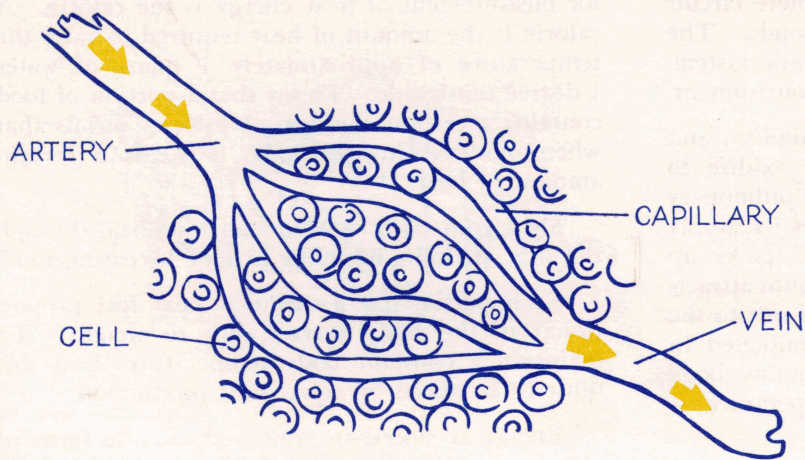
Each person has a minimal heat loss proportional to the body surface, not to weight. To maintain a constant body temperature, heat loss must be balanced by equal heat production.

Energy is stored in your body in the form of glycogen in the liver, and fat as fat in the body tissues. When food energy is not all expended in maintaining vital processes or in performing muscular work, the excess is added to your body weight. This storage of energy is readily available for use should the diet's energy value, at any time, fall below the body's energy requirements.

Proteins and carbohydrates have the same caloric value, weight for weight. Fat, when metabolized in the body, has twice the caloric value of carbohydrates and proteins. Metabolism is the sum of all the chemical reactions occurring in your body







The cells receive nutrients and oxygen from the blood as it moves through the tiny capillaries. The blood receives waste and carbon dioxide from the cells.

and is expressed in terms of heat given out by the body in a given time.

Basal metabolism is the amount of energy required to maintain body involuntary activity while lying awake, completely relaxed, 12 or more hours after eating. The basal metabolism of the average man is about 1,650 calories in 24 hours; the average woman 1,350 calories. It usually is expressed as calories per square unit of body surface per hour. Above these base needs, our bodies require additional energy according to our activities.

We can get a general idea of the number of calories we use by taking our desirable weight and multiplying this by 18 for a woman and by 21 for a man. The answer will be the approximate number of calories used daily by a moderately active adult.

The advice, "choose your calories by the nutritional company they keep," is sound. Some calories have respectable company of other essential nutrients in foods. For instance, milk provides calories as well as good-quality protein, calcium, phosphorus and riboflavin. Fruits and vegetables provide many minerals and vitamins plus calories.

Few have need for "empty" calories such as are found in sweets, soft drinks and some fats.

### Fats

Fats are one of the basic and essential nutrients; therefore, some fat is necessary in a well-balanced diet to produce heat and energy; furnish some essential unsaturated fatty acids; carry the fat-soluble vitamins A, D, E and K; give a good flavor and texture to food; provide satiety value of food; help spare proteins; support, protect and insulate vital organs and areas of the body.

Diets very low or very high in fat may produce certain effects not clearly understood at the present time.

Some are alarmed at the increase of fats in the American diet, because it may be related to a rise in heart and artery diseases. This is a natural association, because in the condition called atherosclerosis, arteries develop fatty deposits containing large amounts of cholesterol and other fatty materials. When these deposits occur in the small artery called the coronary, which supplies blood to the heart, blood clots form there causing heart attacks.

The relationship of saturated fats, usually from animal sources, versus unsaturated fats, usually from vegetable sources, with the formation of cholesterol deposits in the blood vessels is controversial and is being researched.

Cholesterol is only one of several factors linked with coronary heart diseases. Among others are overweight, lack of exercise, smoking, nervous tension, high blood pressure, heredity and over-eating at any time. Still others are possibly mineral imbalances, that is, low intakes of magnesium that may occur without adequate fruits, nuts and vegetables and disturbance in the complex systems that normally prevent thrombosis, the name for clot formation within the circulating blood.

The relative importance of these many factors to heart disease is not yet clear.

Eat fats in moderation. Eating a large amount of fat may increase the risk of developing atherosclerosis and a low-fat diet may lead to a deficiency of essential fatty acids or fat soluble vitamins. A good nutrition practice is to eat a wide variety of foods each day, chosen from each of the four food groups—milk; meat; fruit and vegetables; and bread and cereals.

There is little doubt that the kind of food one eats, its complete adequacy and freedom from excessive saturated fats, is an important factor con-



tributing to the health of all artery wall cells and to the health of heart muscles.

### Protein

The word protein comes from a Greek word meaning "first." Proteins are a vital part of every cell and are necessary for building and repairing body tissues. Average cell life is only 10 to 20 days; thus, everyone should eat some protein foods daily.

Proteins are a complex group of food elements and differ slightly, depending on source. Each is composed of single materials called amino acids, 22 of which make up the amino acid alphabet. Proteins must be broken down into amino acids by digestion before they can be absorbed and used. Eighteen amino acids commonly occur in our food supply, some more common than others. Your body can manufacture many from materials supplied by the protein, but there are eight essential amino acids that the body cannot make from any materials. Food must supply them completely formed and ready for use. Other amino acids are essential to life and health, but if food does not provide any or enough of them, your body can make them from raw materials supplied by food. Therefore, they are called nonessential amino acids, since it is not necessary for food to furnish them ready-made.

Proteins may be classified according to source, such as animal or plant. Foods of high-protein

value contain all essential amino acids and largely originate from meats, fish, eggs and milk. Plant proteins are poor in protein quality because they lack one or more essential acids or do not contain adequate amounts of certain amino acids. They may be combined with animal protein to provide adequate amounts of the amino acids.

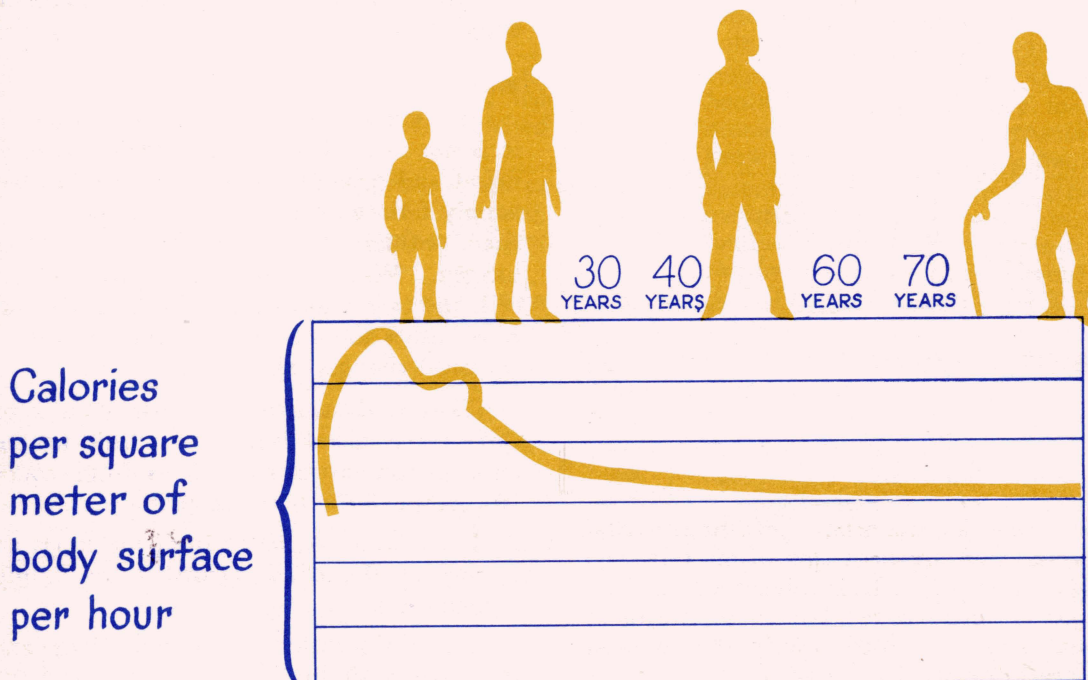
Separate amino acids are absorbed into the blood stream and carried to tissues. Each tissue chooses the needed amount and rejects others.

Excess food protein cannot be stored in your body as such. The carbon, hydrogen and oxygen parts of protein can be stored as glycogen in the liver and used to produce heat and energy. Nitrogenous materials are found only in proteins. If not used, they are excreted by the kidneys.

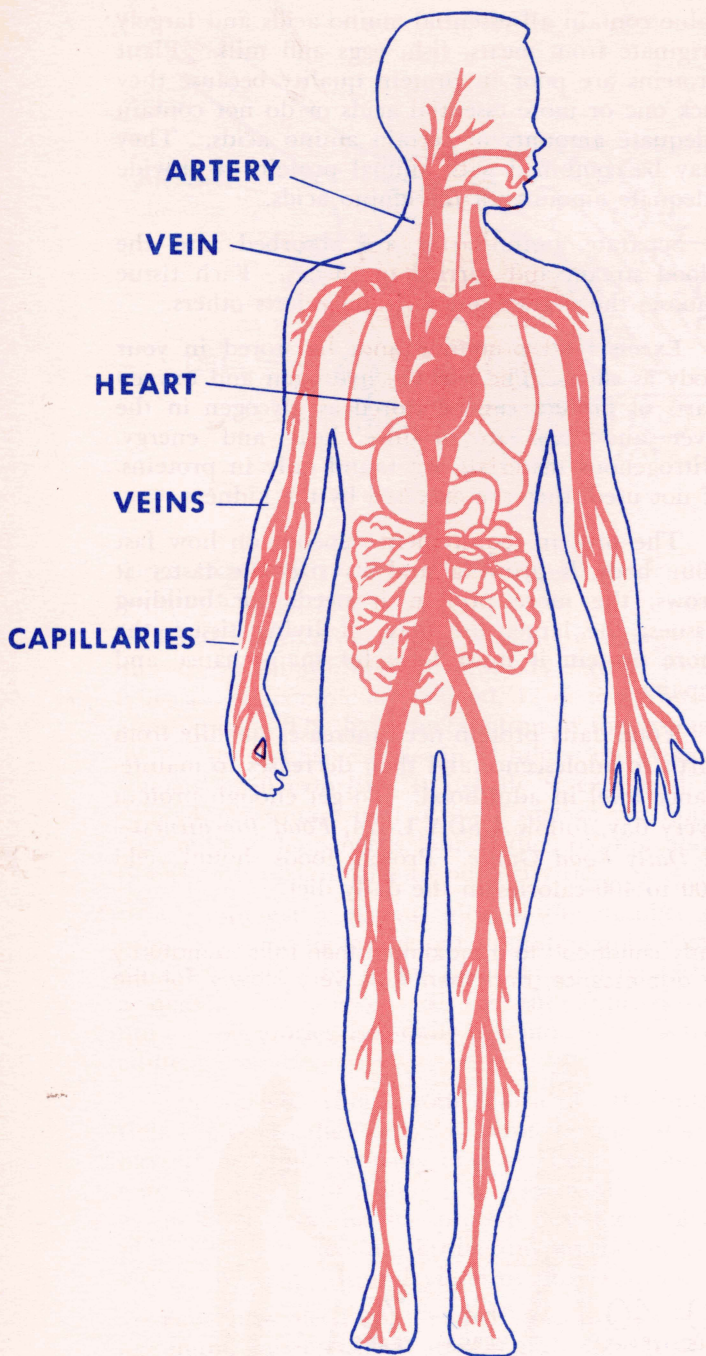
The protein requirement depends on how fast your body is growing and its size—the faster it grows, the more protein it needs for building tissues; the larger the mass of living tissue, the more protein it must have for maintenance and repair.

Total daily protein need increases steadily from birth to adolescence and then decreases to maintenance level in adulthood. To get enough protein every day, follow USDA L-424, *Food for Fitness—A Daily Food Guide*. Protein foods should yield 300 to 400 calories in the daily diet.

Basal metabolism, per unit surface area, rises during early childhood to a maximum then falls to maturity with a brief spurt as the sex hormones become active in adolescence, and then falls very slowly for the remaining life span.







## Circulatory System

### Minerals

Minerals play an important part in the vital body processes and are necessary in all cells and body fluids. They differ from other food stuffs in that they are not metabolized, but are a constituent of the food eaten, are used briefly and in most instances are discarded by the body.

Minerals needed in considerable amounts are calcium, phosphorus, iron, sodium, chlorine and magnesium.

Other minerals are found in the body in small amounts, hence they often are called *trace minerals*. Many of them may have undiscovered functions, or they may be present only because they happen to be in some foods.

Fluorine, a trace element, has proven beneficial in preventing some tooth decay when placed in the public water supply in small quantities.

### Vitamins

Vitamins in food are "helpers" in nutrition. They help your body make better use of other food nutrients, but cannot take the place of food. They are essential for many chemical reactions necessary for maintenance of life. Vitamins must be furnished ready-made in food, since the body is unable to make them from simpler materials. Niacin, derived from tryptophan, one of the essential amino acids, is the one exception to this rule.

Total vitamin amount necessary daily is so small it would fit easily in a teaspoon. When vitamins were first discovered about 50 years ago, they were given alphabetical names. Vitamins are now named for their chemical structure, such as riboflavin, thiamine and ascorbic acid.

People who eat a well-balanced diet each day usually do not need vitamin pills or supplements. In some cases, vitamin supplements are necessary for infants, people with prolonged illness and older persons who may have to eat a limited diet. Always seek the advice of your doctor before taking vitamin supplements.

### Water

Water is vitally important in nutrition, although it is not a nutrient. Measured by urgency of demand and promptness of disaster following water supply failure, it is of greater importance to life than ordinary foodstuffs and is second only to oxygen. Water transports nutritive elements to cells and carries away waste products of metabolism. It furnishes the medium in which all intracellular chemical changes take place.

The fluid structure of your body consists of three parts: blood, intracellular fluid and the interstitial, between organs of body fluid, constituting 70 percent of the body weight.

Evaporation of water from the lungs and skin is one of the chief factors in regulating body temperature.

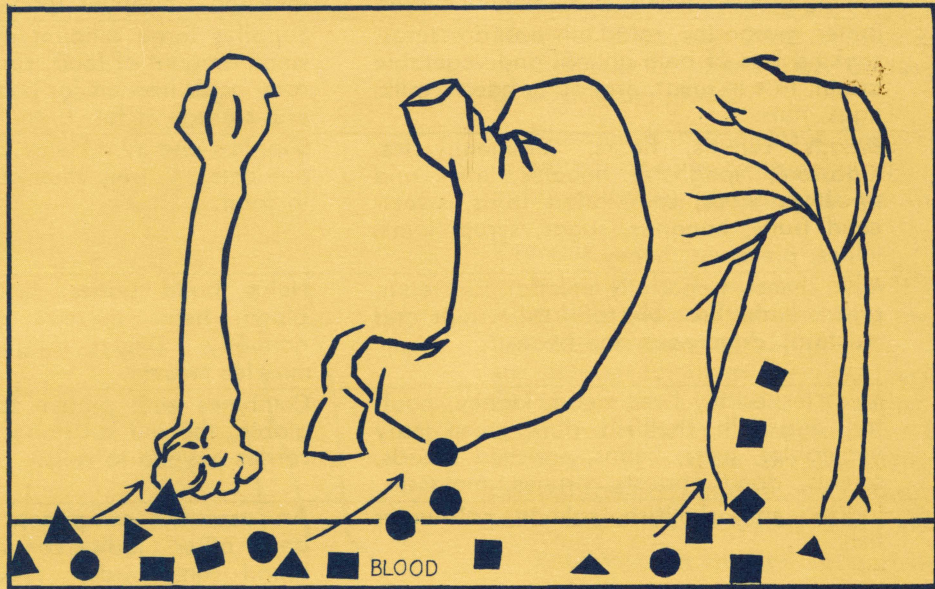
Water absorption occurs in the large and small intestines with little or none absorbed from the



## KEY NUTRIENTS — WHERE THEY COME FROM — WHAT THEY DO

Nutrient	Source	Its Function
Proteins	Animal proteins: meat, fish, poultry, eggs, milk, cheese. Vegetable proteins: peas, beans, bread, cereals, nuts, peanut butter.	Builds and repairs all body tissues. Helps build blood and form antibodies to fight infection. Supplies food energy.
Fats	Butter, margarine, salad oils and dressings, cooking fats of both animal and vegetable origin, fats in meat, especially bacon, milk, eggs, nuts.	Supplies large amount of energy in a small amount of food, supplies essential fatty acids needed for body's proper use and storage of fat.
Carbohydrates, starches and sugars	Breads, cereals, flours, cornmeal, rice, macaroni, spaghetti, noodles, Irish and sweet potatoes, corn, dried fruits, sweetened fruits, bananas, sugar, syrup, jams, jellies, preserves, honey.	Supplies energy. Helps body use other nutrients. Carries other nutrients present in food.
Calcium	Milk, cheese, (especially cheddar) ice cream, greens (kale, broccoli, collards, turnips and mustard), dried peas and beans.	Helps build bones, teeth; helps clot blood; helps muscles contract, relax normally. Delays fatigue; helps tired muscles recover.
Iron	Meat (especially liver, heart, kidney, poultry), egg yolk, shellfish, dark green leafy vegetables, peas, beans, enriched breads, cereals, dried apricots, prunes, molasses.	Combines with protein to make hemoglobin, the red substance in blood that carries oxygen to cells.
Iodine	Iodized salt, shellfish, salmon, salt-water fish.	An essential component of thyroxine and other iodine-containing thyroid gland compounds. Prevents endemic goiter.
Phosphorus	Liver, meat, fish, milk, cheese, ice cream, eggs, beans, whole grain cereals.	Essential for proper development of bones and teeth. Helps regulate muscular and nerve action.
Vitamin A (Carotene)	Dark green, leafy vegetables; deep yellow vegetables as carrots, pumpkin, sweet potatoes, winter squash, cushaw; yellow fruits as peaches, apricots, cantaloupe, fish liver oils, butter, margarine, egg yolks.	For growth, normal vision, protection against night blindness. Helps keep skin and mucous membrane linings healthy and resistant to infection.
Thiamine (Vitamin B <sub>1</sub> )	Meat (especially pork, liver, heart, kidney, poultry), eggs, milk, dried peas and beans, nuts, whole grain or enriched breads and cereals.	Promotes growth; aids in changing starches, sugars to body energy; aids digestive processes; maintains appetite; helps keep nervous system healthy.
Riboflavin (Vitamin B <sub>2</sub> )	Milk, cheese, ice cream, meat (especially liver and poultry) and eggs, fish, dark-green leafy vegetables, enriched bread and cereals.	Helps cells use oxygen, necessary for health of eyes; necessary for growth; promotes normal nerve structure; helps keep skin, tongue and lips healthy.
Niacin	Meat, liver, poultry, fish, dried peas and beans, nuts (especially peanuts), whole grain or enriched cereals and bread.	Essential for: growth, carbohydrate metabolism, health of skin, mouth, tongue; functioning of stomach and intestines; functioning of nervous system.
Pyridoxine (Vitamin B <sub>6</sub> )	Meats (especially liver), whole grain cereals, dried peas and beans, milk, peanuts.	Works with enzymes to aid the body in using food, as in the conversion of amino acid tryptophan to vitamin niacin.
Folic Acid (Vitamin B <sub>12</sub> )	Milk, deep sea fish, oysters, clams, lean meat, liver, kidney—animal protein foods.	Helps prevent certain forms of anemia, necessary for formation of blood cells.
Ascorbic Acid (Vitamin C)	All citrus fruits and juices, strawberries, cantaloupe, tomatoes, green and red peppers, raw cabbage, broccoli, kale and turnip greens, mustard greens, collards, Irish and sweet potatoes, spinach.	Helps make cementing substances that holds body cells together, makes walls of blood vessels strong, helps resist infection and helps healing, necessary for healthy gums and body tissues.
Vitamin D	Fish oils, egg yolk, irradiated milk, yeast, salmon, sardines, margarine, eggs, sunshine and ultra violet irradiation.	Helps the body absorb calcium; helps build strong bones and teeth; necessary for calcium and phosphorus utilization.
Vitamin K	Liver, tomatoes, soybean oil, green, leafy vegetables, fruits.	Helps prevent hemorrhagic diseases in new-born babies. Necessary for clotting.





Flowing blood makes all nutrients available to all body organs. From the blood, each organ, like a customer in a cafeteria, takes the particular substances it needs.

stomach. Water leaves the body through the kidneys, lungs, skin and bowels. The proper daily fluid intake for a healthy man varies from 1 to 3 quarts or 4 to 12 cups as beverages or liquid food.

## Food for Special Family Members

### One to Five-Year-Old Needs

The amount and preparation of food needed from each of the four basic groups may differ from that served to older family members. The amount of food a child wants depends on his body's needs, activity and attitude toward food. Allow each child to develop in his own way.

An average food serving varies with age and appetite. About 2 level tablespoons of vegetables is a normal serving for a 2-year-old and 3 tablespoons for a 3-year-old. Wait for him to ask for more. Older children may eat almost a half cup of vegetables. Proper food in the correct amount builds strong bodies and infection resistance.

Learn the kinds and amounts of food your child needs. Young children require the same basic foods as older family members. You do not have to provide a special diet.

Try to understand your child's viewpoint about food. Most foods, as well as the eating process, are new experiences for 1 and 2-year-olds. Most children are cautious, curious and rebellious at times. They want to touch food with their fingers. Teach children early that eating is a pleasant, happy experience.

Set a good eating example. One of the best ways to encourage good eating habits is practicing them yourself and encouraging other family members to do the same. If family members appear to enjoy a variety of nourishing foods, chances are the young child will, too.

Key foods for children include:

*Milk and other dairy products.* Milk is important, but should not be "pushed" so that the child rebels or fills up and has no capacity for other necessary foods. Three to 4 cups of milk daily are recommended for children up to 2 years of age. They can receive part of this from cheddar or cottage cheese, ice cream or cooked foods. Milk may be used in cooking cereals, soups, custards and puddings.

*Meat, poultry, fish and eggs.* This is an important food group to growing boys and girls. Servings for young children can be small, but when



the child becomes 5 years old, the amount served may be almost as large as that for an adult.

Beef, pork, lamb, fish and poultry are needed at all ages. Liver once a week is excellent for children. Gradually introduce solid foods so that by the end of the first year, your child will be eating many regular family foods.

Keep seasonings mild, and serve meat ground or cut in bite-size pieces so the child can feed himself.

Serve eggs about four times a week.

*Fruits and vegetables.* Serve fresh and dried fruits; raw and cooked vegetables. Fruit and vegetable juices are good for between-meal snacks.

One to 4-year-olds usually prefer bland vegetables and delicate fruits. As children grow older they accept stronger flavored vegetables and tart fruits.

*Bread and cereals.* A serving of cooked or prepared cereal is recommended daily for the child under 2 years of age. Count foods such as grits, rice, macaroni or spaghetti as cereals, not as vegetables.

### PROGRESS WITH FOOD PROBLEMS AND FOOD HABITS

The problem	As your child sees it	As you see it	What to do about it
Introducing new foods	Here's something new. He's curious but probably distrustful of the unknown.	You want your child to learn as early as possible to eat and enjoy a variety of foods.	Introduce only one new food at a time. Offer a small amount at first, at the beginning of the meal. When appropriate, mix with milk or cereal or another food the child likes. Allow time for the child to look at and examine the food. Don't try to introduce a new food when a child doesn't feel well or is cross and irritable. If the food is turned down, don't make a fuss. Offer it again in a few days.
Food dislikes	He asserts his independence by rejecting something which does not appeal. Or he may not like the taste.	You want your child to overcome the dislike.	Refrain from making an issue of the situation, since it likely would make the child more determined. Try combining the food with other favorites. Offer small servings. Prepare in different ways. A fruit or vegetable might be served raw. Milk might be used in other dishes. Set a good example. Children, as well as adults, are entitled to a few dislikes.
Refusal to eat	He may be asserting his independence or he may not feel like eating. He may lack appetite for some reason.	You feel your child needs the food and must in some way be made to eat.	If this happens only occasionally and the child appears to feel all right, remove the food and let him wait until the next meal. No bribes or punishment. A skipped meal will not harm a healthy child. If the child is ill, consult your doctor. Few well children starve themselves unless food becomes a weapon against parents.
Dawdling or playing	He may not be hungry or he may want to attract attention.	You probably become irritable and feel that you must "take over" and make him hurry and eat.	Allow a reasonable length of time. Offer help if it is needed. Explain to the child that you will remove the food when he is finished. Refrain from making a "scene." This may be what the child is looking forward to. Once the food is removed, serve no more until the next meal.
Food jags	A food or combination appeals and he wants it often.	You feel that it isn't good for the child to eat the same thing.	A child, like adults, may show brief preference for a certain food or food combination. Humor him for a few days. Usually, the "jag" won't last long, unless an issue is made of it.



*Other foods.* Fats and sweets help foods taste good as well as satisfy the appetite.

Children need some fat for good health. Butter or margarine makes bread and cooked vegetables taste better.

Most children develop a liking for candy, cake, soft drinks and other sweets without encouragement. Except on rare occasions, sweets should be offered to young children at the end of a meal. Studies show that sweets between meals dull the child's appetite. These foods damage teeth when small amounts are left in the mouth. Encourage children to brush their teeth after each meal and after eating sweets. If brushing is not possible, rinse the mouth with water.

Do not offer sweets as a bribe for eating needed foods.

#### **Food for Expectant Mothers**

Proper eating habits during pregnancy help the expectant mother produce a strong, healthy baby. Applied knowledge of food and nutrition during prenatal periods produce infants with maximum development capacity. Proper nutrition of the infant, therefore, is based on an adequate diet for the mother, not only during pregnancy, but also during her late childhood and adolescence.

The mother's nutrition is an important factor in medical problems arising during pregnancy and requires careful medical supervision. Mothers with poor eating habits and malnourished bodies are likely to have toxemias, especially if young and expecting their first child. Some essential nutrients are not stored in significant amounts in the body; therefore, the mother and her unborn baby must obtain them from the mother's diet. A young woman who has not completed her growth and development and whose body is not nourished adequately may be unable to develop a nutritionally sound baby without medical supervision throughout pregnancy. An older woman may have depleted her supply of food nutrients. A woman whose dietary pattern has been poor will deplete her supply of nutrients with each pregnancy and nursing period.

USDA L-424, *Food for Fitness—A Daily Food Guide*, is basic in determining nutritional needs; however, some adjustments are necessary since certain nutrients play an important role in the diet of an expectant mother.

Protein is necessary for growth and repair of body tissues. Add an additional serving of protein rich foods to the daily diet to care for this increased need.

Vitamin C is vital in metabolism, growth and tissue repair. It has high priority in the daily food intake. Include two servings of food rich in vitamin C.

Three or more cups of milk, or the equivalent in calcium-rich foods such as cheese, provide a safeguard for the bones and teeth of the expectant mother.

A variety of other foods selected in proper amounts from the four basic food groups satisfies the appetite, meets general nutritional needs and prevents abnormal cravings for certain foods. Daily caloric intake may be increased 200 calories in second and third trimester of pregnancy.

#### **Food for Nursing Mothers**

The adequacy of the mother's diet determines her ability to produce breast milk of quantity and concentration required to meet the infant's nutritional needs. During lactation, the body's daily requirements of several food substances increases, based on varying conditions of activity, environment and the state of nutrition previously maintained.

Daily caloric intake may be increased by 1,000 calories. Number of servings of protein foods and citrus foods may be increased to three servings each. The amount of milk may be increased to 4 or more cups. Other foods, chosen from the four basic groups and eaten in the recommended amounts, will complete the day's nutritional needs.

An increased fluid intake also is recommended.

#### **Food for the Senior Citizen**

Nutrients for the senior citizen are the same as those supplied at any age. Various minerals and vitamins, proteins of good quality and sufficient calories are required to maintain ideal weight and energy for normal activities. These are supplied by the same foods that gave satisfaction and good health in earlier years. Specially prepared foods and food supplements seldom are needed by the average older person.

The decreasing energy requirement of the older person calls for fewer high calorie foods. Smaller or less frequent servings of pastries and other rich desserts and fewer fried foods usually result in a sufficient decrease in calories without marked reduction in the protein, mineral and vitamin content.

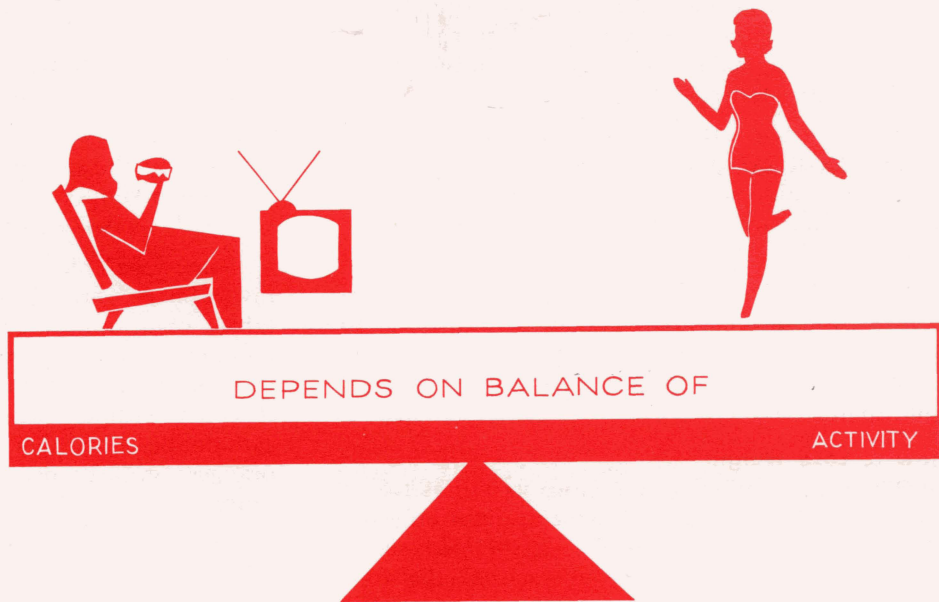
A decrease in fat is desirable, because it decreases caloric intake. Also, the amount of fat digesting enzymes decreases gradually in the digestive tract so the aging body cannot handle fat as well.

Need for protein and milk does not decrease with advancing age.

Minerals and vitamins suffer most from changes many older people make in their food habits. The need for these nutrients remains as high as in earlier years.



Which  
You  
Are ...



Smaller meals with light between-meal snacks result in better digestion and a greater sense of well being.

When teeth are faulty, food sometimes is chewed poorly. This gives the stomach more work, and discomfort may follow. Thus, a person may fall back on a diet so limited it results in malnutrition. Change the preparation, not the food. Cube, chop or grind difficult-to-chew foods. A few suggestions follow:

1. Eat three meals daily at regular hours. Sometimes milk or fruit or a cup of soup between meals may be desirable.
2. Begin the day with a nourishing breakfast.
3. Serve at least one hot dish at every meal.
4. Serve milk, vegetables, fruits and meats first. If there is appetite and need for additional food, add bread, sweets and fats.
5. If the appetite is small, make the food especially tempting.
6. Fried foods digest slowly and seldom should be served.
7. Tea and coffee are mild stimulants. Taken in moderation, they often are valuable.

## You and Your Weight

Your weight is determined by the ratio of energy expended to caloric intake. Overweight occurs when daily expenditure is less than total daily calories consumed.

How serious is overweight? This depends on the individual situation, but studies show that it is definitely a health hazard. Overweight people are poor surgical risks, have less resistance to disease

and are more likely to have diabetes, high blood pressure, heart and blood vessel diseases, strokes and arthritis. Five pounds of extra fat calls for three additional miles of blood vessels. This puts more stress on the heart and circulatory system. Death rates are higher for overweight people than for people of normal weight.

Overweight is a social handicap at any age, and often it affects morale and self-confidence.

Normal weight promises greater comfort, better health, longer life and more attractive appearance.

You may be overweight for any of the following reasons:

*Over eating.* Generally overweight is simply the result of eating more food than the body needs.

*Insufficient exercise.* Normal weight is maintained when caloric intake and energy output are balanced. Their current way of life limits exercise to a minimum for many people.

To lose a pound of fat, 3,500 calories must be used by the body or eliminated from the diet. The loss of a pound a week can be accomplished by cutting out 500 calories a day.

*Heredity.* Heredity often is given as an excuse for overweight. You acquire eating habits from family eating patterns, thus overweight often runs in families; however, research is indicating that heredity may also be a factor in overweight. Weight can be controlled by limiting caloric intake and with adequate physical activity.

*Lack of knowledge.* A knowledge of the caloric and nutritive values of food makes it possible to choose lower calorie foods which provide essential nutrients.



*Habit.* Eating habits formed early in life determine your eating pattern. It is necessary to form new eating habits to lose weight and maintain weight at the desired level.

*Social eating.* It is the custom in our society to offer food and drink for hospitality. In accepting it, we add more calories to our daily food intake. This accounts for a gain in weight, provided our daily food intake is adequate to meet our body needs.

*Frustration and boredom.* Many people try to relieve their frustration and boredom by eating often during the day or eating more food at meal time than necessary.

### How to Lose Weight

The one accepted way to lose weight is to eat less food. Plan reduced food consumption carefully. Follow the *Food for Fitness—A Daily Food Guide* and choose foods from each of the four groups daily. Reduce the total food intake, but do not cut out any food except rich desserts, cakes, cookies, candy, soft drinks and nuts.

Eat three regular meals each day. Count snacks as a part of the total caloric intake.

### Safe Reducing Diet

A general plan for a safe reducing diet provides about 1,400 calories a day.

#### BREAKFAST

- 1/2 medium grapefruit or 1/2 cup orange juice
- 2 eggs, cooked as you like them
- 1 slice toast or bread
- 1/2 tablespoon butter or margarine
- 3/4 cup milk

#### MID-MORNING SNACK

- Tea or coffee without cream or sugar

#### LUNCH OR SUPPER

- 1/4 pound meat, preferably broiled
- 2/3 cup vegetable or
- 1 cup vegetable salad with lemon juice
- Tea or coffee without sugar and cream

#### MID-AFTERNOON SNACK

- 3/4 cup milk

#### DINNER

- 1/4 pound meat, preferably broiled
- 2/3 cup vegetable with 1/2 tablespoon butter or margarine
- 1/2 cup fruit, unsweetened or in light syrup
- Tea or coffee without sugar and cream

#### BEDTIME SNACK

- 3/4 cup milk

—Weight Reduction Research Project—Michigan State University, Margaret Ohlson

### Choice of Foods

Choice of foods in this plan makes a difference in total number of calories provided daily. Select low-calorie foods in each of the four food groups.

*Meat group.* Lean meat contains less calories than meat with fat. Choose lean meats or trim fat from fatty meats. Broil or roast meat. Rich gravies do not fit into a reducing diet.

*Fruit and vegetable group.* There is a wide variance in the caloric content of vegetables. Prepare them simply; do not add calories by serving with rich sauces.

Some vegetables fairly low in calories are: beets, raw cabbage, carrots, cauliflower, celery, leafy vegetables, okra, onions, green peppers, radishes, tomatoes and turnips. There is also a variance in caloric content of fruits. Some fruits fairly low in calories if eaten without sugar are berries of all kinds, cantaloupe, honeydew melon, cherries, grapefruit, oranges, grapes, peaches, pears, pineapple and plums.

*Milk group.* Drink skim milk or buttermilk. These contain about half the calories of whole milk. Drink coffee without cream. Cottage cheese is filling and adds taste and appeal to salads and main dishes. Other kinds of cheese have a high caloric content, so omit them in a reducing diet.

*Bread and cereals.* You may want to substitute cereal products as rice, macaroni and spaghetti for bread once in awhile. Do not eat them in addition to bread.

### Preparation of Foods

The method of preparing and seasoning food is as important as choice of food. A low-calorie food can become high-calorie by frying or adding rich sauces, gravies, nuts, margarine or butter and sugar.

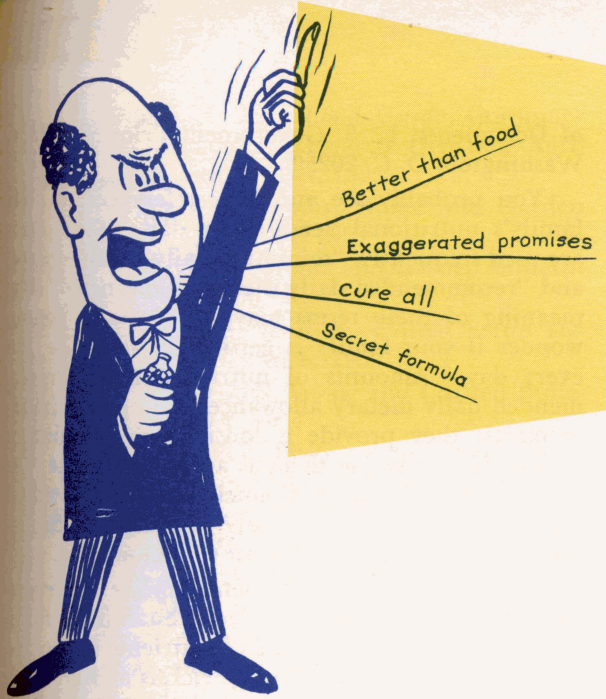
Steam or boil vegetables, broil or roast meats and eat fresh fruits without additional sugar. Reduce fat used in seasonings.

### How to Maintain Normal Weight

Your problem, if you are overweight, is not so much how to lose weight as how to maintain normal weight, once you have lost the excess pounds. Weight loss will be permanent only if new eating habits are formed by substituting one habit for another. For example, if you have the habit of eating something sweet for a snack in the afternoon, try eating vegetable sticks such as carrots and celery. If you have been eating a doughnut at coffee break, substitute one or two plain crackers.

Follow your general eating plan of three regular meals, but learn to eat less, one serving of foods instead of repeated servings; reduced amounts of butter or margarine; use lemon juice or vinegar on vegetable salads instead of rich dressings; drink tea and coffee without sugar. Replace a low calorie food for a high calorie in each choice you make





Dr. Quack

#### Food Fads

or choose a very small portion of a high calorie food.

Determination is required to change food habits. By setting goals for ourselves, we can modify our food habits for improved nutrition and for maintenance of desirable weight.

#### Advice for dieters

1. Convince yourself you are going to reduce your weight to desired level.
2. See your doctor before planning to lose 10 pounds or more.
3. Choose foods daily from the four food groups: milk; meat; fruits-vegetables; breads and cereals.
4. Eliminate most fats and sweets.
5. Eat regular meals; nibble on vegetable sticks for in-between-meal snacks.
6. Slice meat thinly—it looks like more on your plate.
7. Eat very slowly.
8. Please yourself by adding a luxury touch to your meals in table setting and in low-calorie food garnishes.
9. Weigh once a week at the same time of day and on the same scales.
10. Reduce slowly, not more than 2 pounds each week.
11. Change your food habits.
12. Avoid crash diets.
13. Exercise moderately. A brisk 1-mile walk each day is helpful and healthy.

More information is available in H&GB No. 74, *Food and Your Weight*. It is available free of

charge from your county home demonstration agent, or it is for sale by Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20250.

## Food Facts Versus Food Fallacies

The American food supply is unsurpassed in volume, variety and nutritional value. Yet food faddism is costing 10 million Americans over 500 million dollars a year and threatening their health by fostering doubt and confusion of approved facts.

Notwithstanding the abundance and quality of the American food supply, a persistent campaign is being waged to undermine public confidence in the nutritional value of staple foods.

L-424, *Food for Fitness—A Daily Food Guide*, explains what to select for an adequate diet from foods found in the nation's market places.

False food ideas are publicized by food faddists and by promoters of vitamin and mineral products. Some of these products are offered as cure-alls for serious diseases.

The dangers from food fads and fallacies are:

- Essential nutrients may be lacking in fad diets. Malnutrition can result.
- Medical attention to a serious ailment often is delayed while a food quack attempts to treat the condition.
- Faddish foods and treatments always are expensive.

Misleading promotion of food supplements commonly is carried on in two different ways:

One method is by so-called "health food lecturers" who claim, directly or by inference, that the products they promote are valuable in preventing or curing disease.

A second method is door-to-door selling.

Both kinds of salesmen use a scare technique in selling their vitamin, mineral and herbal preparations. False ideas about food are their stock and trade. Four of these ideas are used by practically all operators in the field. Each idea contains an element of truth which forms the basis for unwarranted conclusions. They can be debunked easily by making sure certain facts are not overlooked.

The four great myths of nutrition:

- All diseases are due to faulty diets.
- Our basic foods are inferior nutritionally because our soils have become impoverished through long use and because chemical fertilizers have "poisoned" the land.
- Commercial food processing destroys the nutritive value of foods.



● Most Americans suffer from subclinical deficiencies that cause all the vague aches and pains, "that tired feeling," that affects human beings.

These are the foundation for most, if not all, misinformation and quackery perpetrated on the American public in the name of "nutritional science."

Nutrition authorities agree that the best way to buy vitamins and minerals is in foods—vegetables, fruits, meat, milk, eggs, fish, whole grain or enriched bread and cereals.

The public should distrust any suggestion of self-medication with vitamins or minerals to cure diseases of the nerves, bones, blood, liver, kidneys, heart or digestive tract, except in certain cases which only a physician is competent to recognize and treat.

## Applied Human Nutrition Research

Nutrition research is a continuing program in many colleges, universities, medical schools, private industries and in the Agricultural Research Service of the United States Department of Agriculture.

Results of nutrition research are reported in scientific terminology in technical journals. These results often are difficult to interpret by the layman.

The practical application of some comprehensive nutrition research is found in the *Food for Fitness—A Daily Food Guide*. This guide is based on recommendations of the National Research Council, a private non-profit organization of scientists. The Council's suggestions are based on current research in nutrition as to nutritional needs of the population.

The daily amounts of calories, protein, vitamins and minerals are given in terms of grams and milligrams and international units and are considered adequate to maintain good nutrition in healthy persons in the United States. The National Research Council Allowances are not to be used in assessing the adequacy of diets of individuals. The various quantities may be obtained easily from a well-rounded diet if selections, as to kinds and amounts of food, are made from the *Food for Fitness—A Daily Food Guide*.

You need not worry about grams and milligrams of certain nutrients in meals if you base your meal planning on the *Food for Fitness—A Daily Food Guide*. However, if you are interested in figuring individual allowances of your family members, see page 19 for the 1963 Revised National Research Council Allowances. Further information for determining nutrient content of foods is available in USDA H&GB No. 72, *Nutritive Value of Foods*. This is available from your county home demonstration agent or from the Superintendent

of Documents, U. S. Government Printing Office, Washington, D. C. 20250.

You probably see and hear references to your family's nutritional needs every day. Two terms are used frequently, "minimum daily requirements" and "recommended daily dietary allowances." The meaning of these terms may have caused you to wonder if your family is getting an adequate diet every day. Amounts of nutrients in the recommended daily dietary allowances are not minimum amounts; they provide a considerable amount of safety. You may use them as a personal guide, but the National Research Council says an individual will not necessarily be poorly nourished if his intakes are moderately less than the allowances.

Minimum daily requirements, *unlike the recommended daily dietary allowances*, establish a minimum standard, the amount of nutrients needed to prevent diseases such as scurvy, rickets and beriberi. The minimum daily requirements are regulations, set up by the Food and Drug Administration, and are standards for labeling purposes of foods and of other preparations for special dietary uses. They are not intended as a guide for individual eating habits. Percentages of minimum daily adult requirements are often found on packaged cereals.

The word "minimum" has been eliminated from newly proposed regulations because it was misunderstood. Some people mistakenly thought that if a certain amount of a nutrient was good more would be better. Such misunderstanding has encouraged some manufacturers to include needlessly large amounts of vitamins and minerals in food supplements. The Council on Foods and Nutrition of the American Medical Association warned that continued heavy doses of certain vitamins, particularly vitamins A and D, can be harmful.

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#### RECOMMENDED DAILY DIETARY ALLOWANCES<sup>1</sup>, REVISED 1963

Food and Nutrition Board, National Academy of Sciences-National Research Council  
 Designed for the maintenance of good nutrition of practically all healthy persons in the U.S.A.  
 (Allowances are intended for persons normally active in a temperate climate.)

	Age <sup>2</sup> Years	Weight kg. (lbs.)	Height cm. (in.)	Calories	Protein gm.	Calcium gm.	Iron mg.	Vita- min A I.U.	Thia- mine mg.	Ribo- flavin mg.	Equiv. <sup>3</sup> Niacin mg.	Asc. Acid mg.	Vita- min D I.U.
Men	18-35	70 (154)	175 (69)	2900	70	0.8	10	5000	1.2	1.7	19	70	
	35-55	70 (154)	175 (69)	2600	70	0.8	10	5000	1.0	1.6	17	70	
	55-75	70 (154)	175 (69)	2200	70	0.8	10	5000	0.9	1.3	15	70	
Women	18-35	58 (128)	163 (64)	2100	58	0.8	15	5000	0.8	1.3	14	70	
	35-55	58 (128)	163 (64)	1900	58	0.8	15	5000	0.8	1.2	13	70	
	55-75	58 (128)	163 (64)	1600	58	0.8	10	5000	0.8	1.2	13	70	
	Pregnant (2nd and 3rd trimester)			+ 200	+ 20	+0.5	+ 5	+1000	+0.2	+0.3	+ 3	+30	400
	Lactating			+1000	+ 40	+0.5	+ 5	+3000	+0.4	+0.6	+ 7	+30	400
Infants <sup>4</sup>	0-1	8 (18)		kg. × 115	kg. × 2.5	0.7	kg. × 1.0	1500	0.4	0.6	6	30	400
				+ 15	+ 0.5								
Children	1-3	13 (29)	87 (34)	1300	32	0.8	8	2000	0.5	0.8	9	40	400
	3-6	18 (40)	107 (42)	1600	40	0.8	10	2500	0.6	1.0	11	50	400
	6-9	24 (53)	124 (49)	2100	52	0.8	12	3500	0.8	1.3	14	60	400
Boys	9-12	33 (72)	140 (55)	2400	60	1.1	15	4500	1.0	1.4	16	70	400
	12-15	45 (98)	156 (61)	3000	75	1.4	15	5000	1.2	1.8	20	80	400
	15-18	61 (134)	172 (68)	3400	85	1.4	15	5000	1.4	2.0	22	80	400
Girls	9-12	33 (72)	140 (55)	2200	55	1.1	15	4500	0.9	1.3	15	80	400
	12-15	47 (103)	158 (62)	2500	62	1.3	15	5000	1.0	1.5	17	80	400
	15-18	53 (117)	163 (64)	2300	58	1.3	15	5000	0.9	1.3	15	70	400

<sup>1</sup>The allowance levels are intended to cover individual variations among most normal persons as they live in the United States under usual environmental stresses. The recommended allowances can be attained with a variety of common foods, providing other nutrients for which human requirements have been less well defined. See text for more detailed discussion of allowances and of nutrients not tabulated.

<sup>2</sup>Entries on lines for age range 18-35 years represent the 25-year age. All other entries represent allowances for the midpoint of the specified age periods, i.e., line for children 1 to 3 is for age 2 years (24 months); 3 to 6 is for age 4½ years (54 months), etc.

<sup>3</sup>Niacin equivalents include dietary sources of the preformed vitamin and the precursor, tryptophan. 60 mg. tryptophan represents 1 mg. niacin.

<sup>4</sup>The calorie and protein allowances per kg. for infants are considered to decrease progressively from birth. Allowances for calcium, thiamine, riboflavin and niacin increase proportionately with calories to the maximum values shown.



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