The Yearbook of Agriculture 1959
Foreword

EZRA TAFT BENSON
Secretary of Agriculture

Food is important in keeping our people and our country strong. The Department of Agriculture is, in a sense, a department of food—food for health and food for fitness. Much of our work has to do with the production, marketing, and use of food.

An abundance of food is one of our blessings. The problems caused by our excessive supplies of a few commodities are quite in contrast to the hunger experienced daily by large numbers of people in many countries of the world. As Secretary of Agriculture I am grateful that we struggle with problems of too much rather than too little.

We are using our supplies not only to meet our own needs but also to assist millions of less fortunate people abroad. We have been generous with our abundance. Our shipments of food are helping the free world meet its challenges by saving some people from starvation, by raising living standards, by building good will, by laying the groundwork for future trade.

To be assured of an abundance of food of good quality, we must increase our knowledge. We are blessed with rich land. We must guard it well, conserving and improving it by means of the most up-to-date knowledge and techniques. We are blessed with intelligent, informed, and industrious farm people who put the results of agricultural research to work in highly effective ways. Research—agricultural research, food research—must go forward. We must learn to produce ever more efficiently, to process and package to meet increasing demands, to market ever more effectively, and to use our abundance ever more wisely.

Much remains to be learned about food in all these aspects. Research on a wide, continuous basis will help give us the more complete knowledge we need to employ our food resources wisely.
Accompanying research there must always be more and more education. Facts must be made available widely to get full use. This is the service which this Yearbook of Agriculture can help perform.

This book reports much that is new from the research of scientists in the Department and elsewhere. It tells many things we all need to know about food. It is a very important book. But the full measure of its importance depends on how well and how widely it is read and how well and widely the information it contains is used. I feel sure that it will be a powerful force pointing the way to stronger bodies, stronger homes, and a stronger country.
Preface

ALFRED STEFFERUD
Editor of the Yearbook

Even though women did much of the planning and writing of this Yearbook and women and women-to-be dominated our thinking, it is a book as well for men and men-to-be.

Food is a big part of a man's world, too. He produces, processes, and markets food. He buys, cooks, and eats food. He earns daily bread, worries about his waistline, and sometimes feeds the baby. He is his family's Food Expert.

We hope therefore that men will read this book. Maybe not all of it—to present as many aspects as possible of this complex subject, we prepared some chapters with many groups in mind, among them students, farmers, teachers, administrators, and technicians.

We suggest that men try on for size at least these chapters: Carbohydrates, page 88; Calories and Body Weight, page 101; Water, page 168; Nutritional Needs After 25, page 311; Fish and the Fishing Industry, page 353; What Your Food Money Buys, page 557; Don't Be Fooled by Fads, page 660; Feeding 6,280 Million, page 671.

We think students—tomorrow's husbands, wives, and parents—will find in these pages grist for themes and thought. If studies, TV, and dates permit no more, we recommend especially for them: The Story of Nutrition, page 7; Adolescents and Young Adults, page 303; Youth Learns About Food, page 647; Trends in Heights and Weights, page 181.

They may need to look up some terms in a dictionary, although we did what we could by providing a glossary, which is pretty good reading in itself.

Farmers have been the main readers of the Yearbooks of Agriculture these 111 years. Here they will find information about nutritional
values of the products they grow, but not about ways to grow more. To any farmer who may think this book is not "practical" for him, we offer the reminder that keeping his body and mind in prime working order is as important as oiling his tractor and feeding his livestock.

Farmers may like especially: Quality in Animal Products, page 327; Marketing, Quality, and Cost, page 408; Freezing Food at Home, page 461; Storing Perishable Foods at Home, page 477; Conserving Nutritive Values, page 483; The Years Ahead, page 701.

To teachers we recommend especially these chapters: The Story of Nutrition, page 7; Questions and Answers, page 23; The Nutriture of People, page 186; Recommended Allowances, page 227; A Table of Food Values, page 231; A Guide to Eating, page 267; Planning Meals for the Family, page 510; Habits—and More, page 631.

To parents also those chapters should be helpful.

For the many persons who regard nutrition as more than today's meals, we put food in a national and international framework, as in: The Development of New Foods, page 434; Are We Well Fed?, page 620; Feeding 6,280 Million, page 671; Sharing Our Bounty, page 681; School Lunches, page 691; The Years Ahead, page 701.

Our subject, to repeat, is complex. Our knowledge of it is comparatively new and is developing constantly. Some of it is controversial. We did not expect of the writers, therefore, that they would interpret data in the same way, draw predetermined conclusions, write in some prescribed fashion, or try to reflect the thinking of any particular person or unit in the Department of Agriculture. Scientists cannot work that way.

We have tried to present the facts clearly, but we have not tried to process them into an instant, ready-mix, no-trouble-at-all pap.

Our goal was a solid, authoritative, complete book that will put details of nutrition in proper perspective and counteract some of the nonsense or half-truths about food we read and hear so often.

The members of the 1959 Yearbook Committee are:


Agricultural Marketing Service: Martin Garber, Omer W. Herrmann, Frederick V. Waugh.

Federal Extension Service: Frances Scudder.

Office of Information: Alfred Stefferud.
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MOST of the questions that are answered here were asked of home demonstration agents by people all over the United States.

They indicate the widespread interest of Americans in nutrition and the kinds of information they want. The questions are barometers, in a sense, and guides that are useful in a number of projects.

Not all the questions fitted into the purpose of this book. Many others are considered at length in the chapters that follow. Some questions from various sources were added to round out this section and reflect more fully the scope of the book—although all the questions and answers together do not form a summary.

**How old is man’s knowledge of nutrition?**

As early as 1900 B.C., Egyptians recognized that diet might be a factor in the development of night blindness and related eye symptoms. For these, raw liver, which we now know is rich in vitamin A, was recommended as a curative procedure.

In 525 B.C., Herodotus recorded that in an examination of Persian and Greek skulls it appeared that the bone structure of the Greeks was considerably stronger, perhaps as related to differences in exposure to sunlight. We now know the importance of vitamin D in bone development and the effectiveness of sunlight in promoting vitamin D activity in the body.

The fascinating sequence of ideas in nutrition investigations has been related by Dr. Elmer V. McCollum, a pioneer investigator himself, in his comprehensive book, *A History of Nutrition* (Houghton Mifflin Company, 1957). Dr. McCollum suggested that Cato the Censor, the grim Roman statesman of the first century B.C., was perhaps the earliest effective teacher of sound dietetics because of his discourse on the value of cabbage, currently recognized as a relatively good source of the essential nutrient, vitamin C, as a restorer and preserver of health in times when dried or cooked cereals, lacking in vitamin C, were subsistence items among the populations.

Biblical references to the effects of certain foods or variations in food supplies, both feast and famine, are numerous. Similar observations through the Middle Ages have been recorded.

Dr. McCollum reviewed reports from throughout the world during the 17th, 18th, and 19th centuries that describe extensive epidemics, which we now recognize included symptoms of nutritional deficiency diseases, such as rickets, scurvy, pellagra, the neurological symptoms of beriberi, night blindness, anemia, and goiter.
**What's a good way to lose weight?**

Here are a few simple rules to follow in choosing low-calorie meals:

Select a varied diet that contains the different kinds of foods important for health—milk, meat (or alternates), fruit and vegetables, and whole-grain or enriched or restored cereals and bread.

Choose the foods with fewer calories in each of these groups. For instance, skim milk and buttermilk provide fewer calories than whole milk.

Prepare and serve foods in ways that do not add calories. Avoid fried foods, rich sauces, gravies, salad dressings, rich desserts, and so forth.

Reduce the amount of food eaten.

Take smaller servings.

Avoid snacking and between-meal eating unless such foods are planned as part of the total allowance of calories.

Take some exercise regularly to increase your expenditure of calories and to keep the body physically fit.

**How do I know if I am getting enough calories?**

Your weight is a good guide to whether you are getting enough calories. An adult should eat enough to maintain the weight that is desirable for him. Usually your weight at 25 to 30 years of age is considered your desirable weight for the rest of your life. If you weigh more than this amount, you probably are getting too many calories. If your weight is below this standard, you may need more calories. The child and teen-ager, who are still growing, need enough food to permit normal gains in weight.

**How many calories are there in a plain gelatin dessert? Why do some doctors recommend it?**

One-half cup of ready-to-serve gelatin dessert, eaten plain with no fruit added, furnishes about 80 Calories and about 2 grams of protein.

Doctors may recommend this food because it is easily digested, bland in flavor, and is acceptable to most people. It may be used in calorie-restricted diets as a substitute for desserts of higher calories.

**Can vegetable protein be substituted equally for animal protein?**

Vegetable proteins generally are of lower quality than animal proteins because they fail to provide the complete assortment of amino acids in the amounts the body needs for tissue building. Certain foods of plant origin—soybeans, nuts, dry beans, and peas—are better than others from plants. It takes only a small amount of protein from animal sources, however, to supplement the protein in vegetable foods. Combinations like cereal and milk, macaroni and cheese, egg and bread, and beans and frankfurters provide better protein than foods of plant origin used alone.

**Is bread that is advertised as high-protein bread a good substitute for meat?**

No. Many of the breads advertised as "high-protein" bread contain very little more protein than ordinary bread. Four slices of the ordinary white bread contain less than half as much protein as in an average serving of lean meat (2 to 3 ounces cooked). The protein in bread must be combined with some protein from foods of animal origin in order to provide all of the amino acids needed by the body.

**What can we eat to give us protein and few calories?**

Good sources of protein that are relatively low in fat and thus in calories are skim milk, cottage cheese, eggs, lean meat and fish, chicken, and turkey.

**What foods, if any, enhance fertility in women and virility in men?**

There is no food that enhances fertility in women and virility in men. Foods contribute nutrients that are important to good health, and the overall state of health may affect fertility and virility.

**What is inositol? What is its value?**

Inositol is included often among the
vitamins of the B complex. It is required for the growth and proper nutrition of animals, but its role in human nutrition is not yet known.

My child likes candy very much. How much should I give him?

Be sure he is eating all of the foods he needs for growth and health before giving him candy. Then be sure that the candy does not add more calories than he needs.

How does the protein content of peanut butter compare with that of meat?

Four tablespoons of peanut butter supply about the same amount of protein as 2 ounces of lean cooked meat (without bone).

Is fat essential in my diet?

Yes; some fat is necessary for good nutrition. Fat is a concentrated source of calories. Some fats provide vitamins A and D, and some are important as sources of essential fatty acids.

What is lecithin? What is its value in nutrition?

Lecithin occurs in various animal and vegetable tissues. It is chemically related to the fats. Lecithin is added to many foods because it has unusual properties, such as those of retarding oxidation, retaining moisture, and dispersing globules of fat.

What is glutamic acid?

Glutamic acid is one of the simple amino acids. It does not have to be provided as such in our diets because the human body can make it from other amino acids provided by our food.

What is wheat germ?

Wheat germ is the portion of the kernel called the embryo, from which the new plant starts its growth. It is about 2 to 3 percent of the kernel. The germ is a concentrated source of protein, iron, vitamin E, and the B vitamins. Its nutritional contribution to the ordinary diet is limited, however, because of the small amounts generally eaten, alone or combined with other foods.

How much vitamin E is required?

Little is known about the human requirement for this vitamin. Vitamin E is so widely distributed in common foods that there is little likelihood of a dietary deficiency. Wheat germ oil is the richest natural source of vitamin E, but the vitamin is present also in other vegetable and seed oils, green leaves, meat, eggs, and dairy products.

Which foods are especially important for sound teeth in children?

A diet adequate in all nutrients is necessary for the formation and maintenance of good teeth.

What is the value of brewer’s yeast?

Brewer’s yeast is a concentrated source of high-quality protein and of many of the B vitamins. Because it is also a good source of the minerals iron and phosphorus, it sometimes is prescribed for patients needing dietary supplements.

What is “royal jelly”? Has it any value in nutrition?

“Royal jelly” is a substance from the salivary glands of bees and fed by the worker bees to the queen bee. No important nutrient has been reported to be present in “royal jelly” that cannot be obtained readily from ordinary foods in our regular food supplies. Some food faddists claim that “royal jelly” has special health values for human beings, but there is no scientific basis for such claims.

Is it safe to cook acid foods in aluminum?

Yes. There is no scientific evidence to prove that cooking acid foods in aluminum pans is harmful.

Does beer furnish any nutrients?

Beer furnishes calories and very small amounts of some nutrients. The amounts of minerals and vitamins present are too small to be important in an ordinary diet.
Are carbonated beverages good for children?
The nutritive value of carbonated beverages is mainly in their sugar and calories. Children's diets may be deficient in essential nutrients if carbonated beverages are used in place of nutritionally important foods.

What is the difference in the nutritive values of ice cream and sherbet?
Ice cream is prepared largely from milk products and sweetening agents and contains the nutrients contributed by these foods. Sherbet is made with fruit or fruit juices, sweetening ingredients, and usually small amounts of milk or egg white.

Why are vitamins essential?
Vitamins, although they are required in minute amounts, are essential for growth and reproduction; formation of antibodies; coagulation of the blood; resistance to infection; formation of intercellular substances; and integrity of bones, teeth, skin, blood, and nervous tissue. They also function as coenzymes for innumerable chemical reactions concerned with the metabolism of food, on which the nutrition of the body depends.

Why can't I eat and drink whatever I please and take vitamin and mineral capsules to make sure I get essential nutrients?
A diet chosen by chance is not safe. It may lack protein and energy and other essential nutrients. It may supply too much carbohydrate and not enough of the other essentials. Vitamin and mineral preparations cannot take the place of the food sources of nutrients.

Which is higher in food value—liver from beef, pork, lamb, or calf?
All kinds of liver are excellent sources of good-quality protein, iron, riboflavin, and niacin.

What are the standards for hamburger?
Hamburger is prepared from chopped fresh beef with or without added beef fat. The fat content cannot exceed 30 percent. No other meats and no water may be added.

Are frankfurters already cooked?
Yes. Frankfurters are fully cooked when purchased and are safe to eat without further heating.

Does the thawing juice from frozen meat have any nutritive value?
Yes. It contains small amounts of water-soluble nutrients.

How can we tell a blade roast from chuck roast?
A blade roast comes from the rib end of the chuck. It contains a section of the shoulder blade and portions of rib bones. Another chuck roast is the arm roast, from the lower part of the chuck. It can be distinguished from a blade roast by the cross section of the round shank bone that is present. The arm also contains the ends of several of the ribs.

Is ground meat inspected?
Yes. Ground meat prepared in federally inspected establishments is made from wholesome carcasses. The process of grinding and seasoning the meat is fully supervised for good sanitary practices and use of meat from healthy animals.

Is commercially frozen stuffed turkey safe to use?
Commercially frozen stuffed turkeys are produced under rigid sanitary conditions. The size of the turkeys is limited. Both turkeys and stuffing are kept at low temperatures while they are handled. A mechanically mixed precooked stuffing in controlled amounts is mechanically stuffed into the body cavity and the turkeys are frozen at \(-30^\circ\) F. or lower. This quick process under sanitary conditions and under constant laboratory control results in stuffed poultry of extremely low bacterial count. The directions on the packages specify cooking times long enough for the bird and the
QUESTIONS AND ANSWERS

stuffing to reach a temperature of at least 165°, which is sufficient to destroy any micro-organisms that might be harmful.

Are turkey roasts practical for outdoor cooking?

Small turkeys about 4 pounds in weight ready-to-cook may be cooked outdoors on the grill. They are best cut in quarters to shorten the cooking time. When the coals are glowing, place the turkey parts on the grill, brush with barbecue sauce, and cook until tender, turning often. Larger turkeys, 10 to 12 pounds ready-to-cook, can be barbecued on a revolving spit. Allow about 20 minutes per pound for the larger birds.

Why is it unsafe to stuff poultry and freeze it at home?

Freezing stuffed poultry at home is not recommended because the rapid handling and freezing necessary for a safe product cannot be assured under home conditions. When poultry and stuffing are held at temperatures from 50° to 120° F., micro-organisms associated with food poisoning may multiply and produce toxins. Even a bird taken directly from the refrigerator may reach room temperature while it is being prepared for freezing, and the stuffing is likely to be still warmer. At 0°, the temperature of most home freezers, the freezing process is so slow that portions of the bird and the stuffing may remain in the danger zone too long, especially if the bird is a large one. It is better, therefore, to freeze poultry without stuffing and stuff it just before cooking.

How can you tell good cuts of meat?

Guides to be used in selecting meat include the stamps showing United States Government inspection and grade and the appearance of the cut. The inspection stamp certifies that the meat is from healthy animals, slaughtered under exacting sanitary conditions. The grade stamps are related to quality. The Prime and Choice grades contain more fat, are usually more tender, and may have a more pronounced flavor than the other grades—Good, Standard, and Commercial. High-quality meat is well marbled (fat intermingled with lean) and fine grained, and has a typical color.

Why is fat in beef sometimes yellow and sometimes white?

The color of beef fat is related to the ration of the animal. Cattle that have a large proportion of grass in their feed store some carotene in their fat; carotene gives a yellow color. Cattle on a ration high in grain have whiter fat with a low content of carotene. Color of fat is no longer used as a basis for Federal grading of carcasses.

What are some cheap meat substitutes?

Common meat alternates include poultry, fish, eggs, dry beans and peas, and cheese. Dry beans and peas are likely to be the cheapest of these foods on the basis of cost per serving. Cheese like the cottage, Swiss, and Cheddar-type may be more economical to buy than many cuts of meat—also poultry and eggs, especially when they are in plentiful supply. Certain fish, depending on the locality and supply, are inexpensive.

The cost of meat varies with the cut, quality, and kind of meat. You may find that some meats are as inexpensive as certain alternates.

What is the difference between a ham and picnic ham?

A ham is the cut from the upper part of the hind leg of a pig or hog. The cut of pork called a picnic or picnic shoulder is the shank end of the shoulder.

What are the signs of spoilage in fresh poultry?

Off-odors and off-flavors are the first indications of spoilage. Sliminess, mold, discoloration, and a putrid odor indicate advanced spoilage.

Does "USDA Inspected and Graded" mean higher quality in poultry?
The ready-to-cook poultry marked "USDA Inspected and Graded" has been graded for quality as well as inspected for wholesomeness. The grade designations are A, B, and C and are based on conformation, fleshing, fat covering, and the extent to which pin feathers have been removed.

What does "USDA Inspected" mean on fresh poultry?
"USDA Inspected" on poultry means that the poultry has been examined for wholesomeness and found fit for food by a trained inspector of the Department of Agriculture.

Should meat be washed before it is cooked?
Meat does not ordinarily need to be washed. Wiping with a damp cloth or scraping with the blunt edge of a knife usually is enough.

Can you oven-roast a beef round?
Roasts from the round of beef vary greatly in tenderness, depending on the age and finish of the animal. The beef round contains considerable amounts of connective tissue and therefore is a less tender cut. Round roasts of beef usually are cooked by moist heat—braised or pot roasted.

When I buy frozen meat and bring it home, it is slightly thawed. Can I refreeze it?
Frozen meat can be safely refrozen if it has not thawed completely. The meat may be less tender and juicy when it is refrozen after having been partially thawed. It will have higher quality if it is kept frozen.

What is the best buy in broilers when buying in quantity for freezing—live or ready-to-cook?
This depends on the price per pound. A live broiler will yield about 70 percent of its purchased weight when it is prepared ready-to-cook excluding neck and giblets. A broiler that weighed 3.5 pounds live will yield about 2.5 pounds ready-to-cook. A live broiler is cheaper when it costs less than two-thirds as much per pound as one ready-to-cook.

Do eggs contain as much iron as meat?
Yes. Equal quantities by weight of eggs and the lean part of meat contribute about the same amount of iron.

Is there any difference in food value between dried and fresh eggs?
There is practically no loss of nutritive value of eggs in the drying process. When reconstituted to the same moisture content as fresh eggs, dried eggs supply the same nutrients in about the same quantities.

Do brown eggs have the highest food value?
No. The color of the shell makes no difference in the nutritive value of an egg. Color of the shell is a characteristic of the breed of poultry.

Why are eggs necessary in the diet?
No single food is essential. The nutrients the body needs are found in many foods. Eggs are a good source of high-quality protein, iron, and vitamin A.

How can I identify a fresh egg in the shell?
The quality of an egg in the shell can be determined by candling. An egg of high quality has only a small airspace and its yolk is well centered. A large proportion of the white is thick.

Grade labeling provides the consumer with a basis for selecting eggs by quality. The letters U.S. mean the eggs were officially graded and the letters AA, A, B, or C designate the quality. AA is the highest grade. The date stamped on the carton tells when the eggs were graded. The grade mark is an assurance of the quality specified if the eggs have been kept under good conditions after grading.

How many eggs should we eat per week?
An egg a day, or at least 3 to 4 a week, is a sound recommendation.

Are frozen eggs used like fresh eggs in cooking?
Frozen eggs can be measured after thawing and used as fresh eggs in the following proportions: 3 tablespoons of thawed frozen whole egg equal one
whole fresh egg; 2 tablespoons of thawed frozen egg white equal one fresh egg white; 1.3 tablespoons of thawed frozen egg yolk equal one fresh egg yolk. Whole eggs or egg yolks to which salt was added before freezing are best used in scrambled eggs, salad dressing, or main dish. If sweetening was added, use them in cakes, custards, or other sweet food.

What are some ways of cooking and using dried egg?

Dried egg may be used instead of shell eggs in such cooked foods as cakes, cookies, muffins, popovers, long-cooked casseroles, and baked custards.

Two and one-half tablespoons of sifted dried egg plus an equal amount of water take the place of one shell egg. For some recipes, the dried egg is sifted with the dry ingredients. The water needed to replace the water removed from the egg in drying is added to the liquid in the recipe. For other recipes, the dried egg is blended with water first, then used as fresh eggs are used.

What is the difference between eggs of grade AA and grade A eggs?

Before breaking: An egg of grade AA has less airspace than an egg of grade A. The white of a grade AA egg must be clear and firm; that of a grade A egg, clear and reasonably firm. The yolk of a grade AA egg must be well centered, its outline slightly defined, and it must be free from defects. The yolk of a grade A egg may be fairly well centered, its outline fairly defined, and it must be practically free from defects.

After breaking: A grade AA egg covers relatively less area and has more thick white than does a grade A egg. A grade AA egg covers only a small area, has much thick white, and the yolk is round and upstanding. A grade A egg in comparison covers a moderate area, has considerable thick white, a medium amount of thin white, and the yolk is round and upstanding.

How can you tell what size eggs are the best buy?

The size of eggs is based on the total weight of a dozen eggs. The four common sizes of U.S. graded eggs are Extra Large, Large, Medium, and Small. Each of these terms refers to a size that has a specified minimum weight per dozen. The minimum weight for Extra Large eggs is 27 ounces per dozen; for the Large, 24 ounces; for the Medium, 21 ounces; and for the Small, 18 ounces.

For the same weight of eggs of the same grade:

Small eggs are as economical as Large ones when they cost no more than three-fourths as much as the Large ones;

Medium-sized eggs are more economical than Large ones if they cost no more than seven-eighths as much as the Large ones;

Extra Large eggs are cheaper than Large eggs when they cost no more than one-eighth more.

Is lumpy evaporated milk safe to use?

Lumps in evaporated milk are formed by the solids settling during storage. The lumps do not harm the milk. Cans of evaporated milk can be turned or shaken at frequent intervals during storage to prevent lumping.

How much cottage cheese is needed to supply the same amount of calcium as a glass of milk?

Eleven ounces or about one and one-half cups of cottage cheese will supply about the same amount of calcium as an 8-ounce glass of whole milk.

How does low-fat cottage cheese differ in food value from creamed cottage cheese?

Low-fat cottage cheese has very little fat and vitamin A. Creamed cottage cheese usually has about 5 percent fat and therefore furnishes more calories and vitamin A.

How is milk homogenized?

Milk is homogenized by a mechanical process that breaks up the fat into
small particles and distributes them throughout the milk. Cream does not form in homogenized milk because the fat particles do not rise to the top of the milk.

Is it possible for a person to drink too much milk?
Yes; if milk is consumed in such large amounts that it crowds out other important foods from the diet.

What is the value of yoghurt?
Yoghurt has the same food value as the milk from which it is made. When made from a partially skimmed milk, which is often the case, yoghurt is lower in fat, vitamin A value, and calories than when it is made from whole milk. Yoghurt is a good source of the other nutrients obtained from milk, however, especially calcium, riboflavin, and protein.

How many vegetables should be included in a dinner menu?
There are no fixed rules for the kinds and amounts of foods to include in each meal. This is a matter of individual preference. A daily food guide, a plan for choosing a nutritionally good diet, suggests at least four servings of vegetables or fruits each day.

Which is cheaper—canned or frozen peas?
The price and yield of canned and frozen peas must be compared to determine which is cheaper. A No. 2 can of peas, for instance, gives about 2 cups; a 10-ounce frozen package, about 1.5 cups. If you consider a half-cup as a serving, the can gives 4 servings; the package, 3. Divide the price of the can and package by the number of servings provided to see whether the frozen or canned peas are the cheaper.

Does white cabbage have a lower food value than red?
Not necessarily. Some varieties of white cabbage have as much vitamin C (the main nutrient) as red cabbage. The amount present depends in part upon the conditions under which the cabbage has been stored and the length of storage period. The method of cooking also affects the final value.

Is there any difference in food value between green and yellow dried peas?
Food values of green and yellow dried peas are very similar.

Is tomato juice a good source of vitamin C?
Yes. One-half cup of tomato juice will supply about one-fourth of the daily allowance of vitamin C recommended by the National Research Council.

How do canned and frozen vegetables compare in value with the fresh products?
Canned and frozen vegetables contain a high proportion of the nutrients originally present when the vegetables are handled and prepared commercially or in the home by modern scientific methods.

Are onion and parsley blood builders?
Foods that are good sources of iron or of high-grade protein improve the quality of the blood. Onions provide little of either of these nutrients. Parsley is a good source of iron, but is not likely to be eaten in a large enough quantity to supply a significant amount of iron.

How do you cook corn outdoors in an open fire?
Select sweet, young corn and strip the husks down to the end of the ear, but do not tear it off. Remove the silk and soak the corn in cold salted water for about 30 minutes. Drain and then brush kernels with butter or margarine and sprinkle with salt and pepper. Pull the husks up around corn again. Wrap each ear of corn in heavy-duty aluminum foil and twist the ends to close tightly. Roast the corn in hot coals after the fire has died down to embers. Turn frequently and roast for about 25 minutes or until done to taste.

What makes potatoes waxy?
Potatoes with a low content of starch and high content of water have a
QUESTIONS AND ANSWERS

tendency to be waxy when cooked. Potatoes with a high content of starch, on the other hand, are mealy when cooked. New or early-crop potatoes, which are harvested before they are fully mature, are likely to be more waxy than late-crop potatoes.

How do you care for onions after harvest?
Onions are best stored in a basket or crate in a cool, well-ventilated place. To have good keeping quality, onions must be mature and thoroughly dry.

How much loss is there when the liquid in canned vegetables is poured off?
Approximately one-third of the minerals and vitamins present are lost.

How do you keep raw pared potatoes from turning dark?
Pared potatoes often are placed in cold water for short periods to prevent darkening. The water keeps the air with its oxygen from the potato.

Why is it necessary to blanch vegetables before freezing?
Blanching is done by subjecting the vegetables to steam or boiling water, followed by quick cooling in ice water. This process slows or stops the action of enzymes, which otherwise would cause off-flavors, color changes, and toughness in frozen vegetables. Blanching also tends to inactivate enzymes responsible for destruction of vitamins.

Should vegetables be cooked in covered pans to retain vitamins?
Covering the pan helps to retain some of the vitamins by making it possible to cook vegetables in only a little water. The percentage of water-soluble vitamins dissolved in the cooking liquid is less when a small amount of water is used than when a large amount is used.

How can you select potatoes that will not turn dark when cooked?
The tendency to blacken after cooking varies with the variety of potato, season, locality where grown, and differences in chemical composition. You cannot tell from looking at the raw potatoes whether they will darken after cooking. Buy a small quantity to try out before deciding to buy a large amount. Much research has been conducted on the problem of the after-cooking darkening of potatoes, but as yet definite answers are not available.

Does rhubarb have any nutritive value?
Rhubarb furnishes small amounts of several nutrients, including vitamins A and C, and the minerals calcium, phosphorus, and iron. The calcium present, however, may not be available to the body as it may be bound by the oxalic acid that is present in rhubarb.
Rhubarb leaves should never be eaten. Their high content of oxalic acid makes them toxic in some cases.

How do you tell a ripe melon?
Ripeness in most kinds of melons is indicated by the softening of the fruit around the slight depression at the blossom end, which yields to the pressure of the finger. Usually the characteristic odor of the melon becomes stronger and is most perceptible when the full stage of ripeness has been reached. In some kinds of melons, a change of color to a lighter and sometimes a slightly yellowish tinge is an indication of ripeness.

Is there as much food value in canned grapefruit sections as there is in fresh grapefruit?
Grapefruit, like all citrus fruit, is a stable source of vitamin C. Only small losses occur in canning and during the usual storage periods.

Do fresh oranges have values that are lost in frozen, condensed orange juice, crystals, and canned orange juice?
The original content of vitamin C of the fresh juice determines the amount that will be in the canned or frozen product made from it. Canning and freezing methods now in use cause very little loss. Even vitamin C, which usually is destroyed more quickly than other nutrients, is remarkably stable
32 in these products. The canned juice may lose up to a fifth of its original vitamin C content after long storage at room temperature.

What causes fruit to turn dark when drying?
Discoloration is caused by contact of fruit with oxygen in the air and is speeded up by the enzymes present in the fruit. Darkening can be reduced or prevented in the drying of fruit by using a sulfur dioxide solution to the surface of the fruit or by cooking to destroy the enzyme activity.

Can lemon juice be substituted for ascorbic acid for use on peaches before freezing?
Lemon juice is not so effective as ascorbic acid in preventing darkening in frozen peaches. Also, the large amounts needed to prevent darkening would in some instances make the fruit too sour or mask the natural fruit flavor.

I cooked applesauce in a darkened aluminum kettle and now the kettle is clean and shiny. Will it hurt us to eat the applesauce?
No. The darkening of an aluminum pan when water or low-acid food is boiled in it is due to the formation of grayish-black metallic oxides. These may be from the aluminum pan or from iron salts that are in the water or food. When an acid food is cooked in the darkened aluminum pan, the oxides are dissolved by the acid, and the pan becomes shiny again. The food is not harmed.

How can I get the bottom crust of a pie to brown?
The pastry recipe and the baking temperature are important to the browning of piecrust. Pastry made by a rich formula—one that contains a large proportion of fat—browns more readily than that made by a lean formula. For good browning, the dough must be evenly mixed and the piepan must be dry before the crust is placed in it. An oven temperature of 400° to 450° F. to start baking is recommended primarily to brown the lower crust.

What makes pie dough tough?
Pie dough is tough when too little fat or too much water is used or when the fat is not mixed properly. Over-mixing pastry after adding the water also will make it tough.

What causes pastry dough to crumble?
Too little water or too much fat will cause pastry dough to crumble.

Can shrinkage of a baked piecrust be prevented?
Some shrinkage is normal in baked piecrust. Excessive shrinkage may be the result of overhandling or using too much water.

What causes uncooked spots on the bottom crust of a pie?
There are several possible causes: Inadequate blending of fat and flour; insufficient mixing after the addition of the water to moisten the dough evenly—especially if too much water is used; combining warm dough with cold dough. Uncooked spots on a bottom crust may result also from drops of water in the piepan.

What is raw sugar?
Raw sugar is the unrefined residue after the removal of molasses from cane juice. It contains a fairly high proportion of some minerals, but, like refined sugar, is mainly carbohydrate.

How do the following rank in content of vitamin C—orange juice, grapefruit, pineapple juice, cranberries?
Orange juice and grapefruit are among the excellent sources of vitamin C. Pineapple juice has from one-fifth to one-fourth the content of the two citrus items. Cranberries, as they are usually eaten in sauce, contain even less than pineapple juice.

Does jam add nutrients to the diet?
Jam is principally a carbohydrate
QUESTIONS AND ANSWERS

food, and it is a concentrated source of calories. It contains small amounts of minerals and vitamins. In the quantities usually eaten, the nutrients contributed are not significant in the diet.

What is the value of molasses?
Molasses is a concentrated sugar food. Its value in the diet is chiefly for its flavor and for the variety it provides. The content of iron and calcium is high, especially in the darker kinds, but because molasses generally is used in small quantities it does not make an important contribution to the ordinary diet.

Can saccharin and Sucaryl be used for jellymaking?
Yes; if recipes designed especially for making jellies without sugar are used. Such recipes have been developed by manufacturers of these sugar substitutes.

Can beet sugar be used for making jams and jellies?
Yes. Beet and cane sugar are identical in chemical composition and can be used with equal success in making jams and jellies.

Is there a difference between cane sugar and beet sugar?
No. Cane sugar and beet sugar have the same chemical composition although they come from different sources. Granulated sugar on the market is practically pure sucrose, whether obtained from the beet or cane.

Does beet sugar cause candy to crystallize?
Beet sugar, like cane sugar, will crystallize under certain conditions. Controlled crystallization is necessary in making candies. In fondant and fudge, the crystals are so small that they cannot be felt in the mouth. Overcooking or beating while hot will make a candy hard or grainy and will destroy its creaminess. Insufficient beating will allow coarse sugar crystals to develop. To help insure smooth candies, do not scrape the saucepan, let the candy cool undisturbed before beating it, and beat until the entire mixture begins to lose its shiny appearance and the candy holds its shape when dropped from a spoon.

What causes a cake to fall?
A cake is likely to fall if too much sugar or fat or baking powder or liquid is used. Undermixing or insufficient baking, too low an oven temperature, or moving a cake during baking before it has “set” also may cause a cake to fall and be soggy.

How can cake failures be prevented at high altitudes?
Special recipes are required at high altitudes. Usually a decrease in the amount of leavening agent (baking powder or soda) or sugar (or both) and an increase in the amount of liquid are needed. It is sometimes necessary to reduce the shortening when making very rich cakes at high altitudes.

How do you substitute sweet milk and baking powder for soda and sour milk in recipes?
Use the same amount of fresh milk as sour milk called for in the recipe and substitute one teaspoon of baking powder for each one-fourth teaspoon of baking soda.

What causes excessive shrinkage in cake?
This may result from too much liquid or too much fat in the cake recipe or from too much batter in the pan. Or, a cake may shrink if the pan is too heavily greased. Baking in too hot or too cool an oven may result in poor volume in cake.

What causes a cake to have a peaked or cracked top?
A cake batter that is low in shortening or has been overmixed may form a peak while baking. Too little leavening (baking powder or soda) or too much flour may also cause a peaked top. Cracking of the top crust may result from baking the cake in too hot an oven.
What causes poor texture in quick breads made with baking powder?

Overmixing is often the cause. A batter, such as a muffin batter, that contains about twice as much flour as liquid should be mixed only enough to moisten the dry ingredients. Too much stirring or beating develops the gluten in the flour, and as a result tunnels are formed. Too high a baking temperature also may cause poor texture in quick breads.

What makes biscuits dry and small in volume?

Biscuits may be dry and have a poor volume because too little liquid or baking powder was used, or they may have been mixed too much or baked at too low a temperature.

Why are muffins sometimes soggy?

Too much liquid or baking at too low an oven temperature will cause muffins to be soggy.

What is the difference between straight dough bread and sponge bread?

In the straight dough method, all the flour and other ingredients of the bread are mixed together in the dough at the beginning. The sponge method requires two steps in mixing. First a sponge is prepared by combining the softened yeast, some sugar, and part of the flour and liquid, and allowing the mixture to ferment until it is full of bubbles. The remaining ingredients then are added to make a dough stiff enough to knead.

What causes loaves of bread to have a flat top and sharp corners?

The dough has been overmixed, or not enough time has been allowed for rising.

When my homemade bread made with yeast lacks volume, how can this be corrected?

If your bread lacks volume, you may have used too little yeast, allowed too little time for rising, or held the dough at too low a temperature. Or you may have added the yeast to liquid that was too hot or let the dough rise at too high a temperature. Under the right conditions, yeast produces carbon dioxide gas, which leavens the bread. Warmth is needed for the process, but too much heat kills the yeast cells. A temperature of about 80°F is best. Overkneading the dough, which may injure the baking quality of the gluten in the flour, is another possible cause of poor volume in bread.

What causes a sour flavor to develop in yeast bread?

A sour flavor will develop in bread if a poor yeast is used, or if the dough has been allowed to rise too long or at too high a temperature. Insufficient baking or baking at too low a temperature also will affect the flavor of yeast bread.

What makes homemade yeast bread coarse textured?

Allowing the loaf to rise too much before baking is the most common cause of coarse texture in bread.

What substances other than the usual food ingredients are permitted in bread? What's their purpose? Are they harmful?

The Federal Standards of Identity under the Federal Food, Drug, and Cosmetic Act permit certain mineral salts to be used in bread as yeast foods and dough conditioners. They are used in commercial baking to give the dough and the finished loaf desirable physical properties. Sodium propionate or calcium propionate are often added as mold inhibitors. Also permitted are certain emulsifying agents which tend to produce a softer crumb. All of these substances are harmless.

Can I substitute 1 cup of butter or margarine for 1 cup of vegetable shortening in recipes for baked goods?

Butter or margarine may be used in place of vegetable shortening in baking, but a slightly larger amount is needed because butter and margarine contain only about 80 percent fat as contrasted with vegetable shortening.
QUESTIONS AND ANSWERS.

which is 100 percent fat. One cup of vegetable shortening is equivalent to 1 cup plus 2 tablespoons of butter or margarine.

Does altitude make any difference in the pressure used in pressure cookers for canning foods?

At altitudes high above sea level, it takes more than 10 pounds pressure in a pressure cooker to reach 240°F., the temperature required for processing meats and low-acid vegetables. One additional pound of pressure is needed for each 2,000 feet above sea level. For example, at an altitude of 10,000 feet, you need to use 15 pounds pressure to get a temperature of 240°F.

Should I use gelatin to prevent ice crystals from forming when making ice cream?

The purpose of using gelatin and other stabilizers in making ice cream is to prevent the formation of large ice crystals that cause a coarse texture. A stabilizer makes a film around small ice crystals as they form and around the air bubbles incorporated by stirring the mixtures during freezing. This keeps large crystals from forming.

Is chocolate that has turned white spoiled?
No. A whitish appearance in chocolate is due to the cocoa butter that has separated out. At a temperature of about 85°F., the cocoa butter in the chocolate melts and comes to the surface. When the cocoa butter hardens again it turns white. Only the appearance of the chocolate is affected; usually there is no loss of flavor or other quality.

What chemical process takes place when salt is used as a preservative?
Salt draws water from the food by the process of osmosis. A brine is formed that retards or prevents the growth of micro-organisms.

Why is salt used in foods?
Salt has many uses in food preparation. It is a seasoning and brings out flavor of other ingredients. It aids in the coagulation of proteins. Salt lowers the freezing point of water and is added to ice for freezing ice cream and other mixtures. As ice melts, heat is absorbed, and the temperature of the surrounding material is lowered. Salt also raises the boiling point of water solutions. Salt controls the fermentation of yeast to make more desirable baked products. Salt in high concentration is used in preserving foods to retard bacterial action.

Does monosodium glutamate have any food value?
It is used only for flavoring, and the amounts consumed are too small to make any worthwhile contribution to the ordinary diet. It is one of the more concentrated sources of sodium, however, and would not be permitted in diets in which sodium intake must be kept low.

What are some Government publications about food and nutrition?
Single copies of the publications listed below are free from the United States Department of Agriculture, Washington 25, D.C.:

Food for Fitness . . . A Daily Food Guide. Leaflet 424
Nutrition—Up To Date, Up To You. Home and Garden Bulletin Separate No. 1
Eat a Good Breakfast To Start a Good Day. Leaflet 268
Food for the Family With Young Children. Home and Garden Bulletin No. 5
Food for Families With School Children. Home and Garden Bulletin No. 13
Food Guide for Older Folks. Home and Garden Bulletin No. 17
Getting Enough Milk. Home and Garden Bulletin No. 57
Money-Saving Main Dishes. Home and Garden Bulletin No. 43
Turkey on the Table the Year Round. Home and Garden Bulletin No. 45
Cooking With Dried Egg. Home and Garden Bulletin No. 50
Dry Beans, Peas, Lentils . . . Modern Cookery. Leaflet 326
Peanut and Peanut Butter Recipes. Home and Garden Bulletin No. 36
Potatoes in Popular Ways. Home and Garden Bulletin No. 55
Freezing Combination Main Dishes. Home and Garden Bulletin No. 40
Home Freezing of Fruits and Vegetables. Home and Garden Bulletin No. 10
Home Canning of Fruits and Vegetables. Home and Garden Bulletin No. 8
How To Make Jellies, Jams, Preserves at Home. Home and Garden Bulletin No. 56
A Fruit and Vegetable Buying Guide for Consumers. Home and Garden Bulletin No. 21
Poultry Buying Guides for Consumers. Home and Garden Bulletin No. 34
How To Buy Eggs by USDA Grade and Weight Classes. Leaflet 442
U.S. Grades for Beef. Leaflet 310


Foods Your Children Need. Unnumbered.
Children's Bureau in cooperation with the Institute of Home Economics. 10 cents
Nutrition and Healthy Growth. Children's Bureau Publication No. 352. 20 cents
The Foods You Eat and Heart Disease. Public Health Service Publication No. 537. 10 cents
Tips on Cooking Fish and Shellfish. Bureau of Commercial Fisheries, Department of the Interior. 10 cents
Basic Fish Cookery. Bureau of Commercial Fisheries, Department of the Interior. Test Kitchen Series No. 2. 25 cents
How To Cook Halibut. Bureau of Commercial Fisheries, Department of the Interior. Test Kitchen Series No. 9. 20 cents

How To Cook Tuna. Bureau of Commercial Fisheries, Department of the Interior. Test Kitchen Series No. 12. 20 cents
How To Cook Crabs. Bureau of Commercial Fisheries, Department of the Interior. Test Kitchen Series No. 10. 20 cents
How To Cook Lobsters. Bureau of Commercial Fisheries, Department of the Interior. Test Kitchen Series No. 11. 20 cents
Shrimp Tips From New Orleans. Bureau of Commercial Fisheries, Department of the Interior. Circular 41. 15 cents

You may request up-to-date lists of publications on foods and nutrition from the United States Department of Agriculture and the Department of Health, Education, and Welfare, and on fish and fish cookery from the Bureau of Commercial Fisheries, Department of the Interior, Washington 25, D.C. Lists of publications that are for sale on various topics are also available without charge from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

How can I get help on diets and menus for diabetics?
These must be prescribed by the physician who knows the needs and problems of the individual patient.

General information on diabetes can be obtained from the following sources:

Chronic Disease Branch
Division of Special Health Services
Public Health Service
United States Department of Health, Education, and Welfare
Washington 25, D.C.

American Diabetes Association
1 East 45th Street
New York 17, N.Y.
Absorption In physiology, absorption pertains to the uptake of nutrients, water, or other substances by stomach or intestinal walls following digestion of food. For example, glucose, a common simple sugar, is absorbed without change, but starches must be broken down into sugars before absorption can take place. In food processing, absorption may also refer to uptake of other substances by foods, such as absorption of fats by foods during cooking in deep fat, or absorption of water by cereals during cooking.

Acetoacetaete A compound formed from condensation of two molecules of acetic acid. Acetic acid is an organic acid commonly formed in the metabolism of sugars and related substances. For example, it is the predominating acid in vinegar where it has been formed by the growth of micro-organisms on sugars, starches, and celluloses.

Adipose Animal fat. Adipose is commonly used in describing the part of the body where fat is stored, which is adipose tissue.

Adolescence The period of years between the beginning of puberty (when the reproductive organs become functionally active) and maturity.

Adrenal Near the kidney. The adrenal glands are ductless glands near the upper end of the kidneys. Their secretions are essential for the maintenance of life.

Aerobic Living or functioning in air or free oxygen.

Afterbirth The placenta and membranes expelled from the womb or uterus after the delivery of a child or a fetus.

Agricultural Research Center The Agricultural Research Center (ARC) is part of Agricultural Research Service and is located near Beltsville, Md., about 15 miles northeast of Washington, D. C. The center covers about 11 thousand acres and includes 950 buildings of all types equipped to meet specific research needs or to provide office and laboratory space. About 3 thousand experimental farm animals, 10 thousand mature fowl, and 5,500 small laboratory animals are kept at the ARC. There is an apiary for bees. Five acres are under glass in 31 greenhouses. There are experimental pastures, ranges, orchards, gardens, fields for cultivated crops, timber stands, and soil-treatment plots.

Agricultural Research Service One of the agencies of the U. S. Department of Agriculture. It has responsibility for conducting farm research, utilization research, and home economics research and for regulating services in animal and plant disease control and eradication and in meat inspection. It also has responsibility for Federal grants to States for agricultural research and for coordinating all the research done within the Department, except research in economics and statistics.

Amino acid Organic compounds of carbon, hydrogen, oxygen, and nitrogen. Each amino acid molecule contains one or more amino group (–NH₂) and at least one carboxyl group (–COOH). In addition, some amino acids (cystine and methionine) contain sulfur. Many amino acids linked together in some definite pattern form a molecule of protein.

Anaerobic Living or functioning in the absence of air or free oxygen. The opposite of aerobic.

Antacid A substance that counteracts or neutralizes acidity.

Antibiotics Substances that are "against life." They are chemical substances, which are produced by certain living cells, such as bacteria, yeasts, and molds that are antagonistic or damaging to other living cells, such as disease-producing bacteria. Antibiotics may kill living cells or prevent them from growing and multiplying. Penicillin is an example of an antibiotic that damages certain bacteria that cause disease in man.

Antibody One of many specific substances produced in the body to react against disease-producing or other foreign materials in the blood stream. Some antibodies remain in the blood stream for many years and help to give a person immunity to certain diseases.

Antioxidant A substance capable of chemically protecting other substances against oxidation.

Arachidonic acid A substance essential to body tissues built by the animal body from the simpler fatty acids that are derived from the food fats.
ARTERIOSCLEROSIS A thickening and hardening of the walls of the arteries and capillaries, which lead to loss of their elasticity.

ASCORBIC ACID Another name for vitamin C.

ASEPTIC CANNING A process that involves rapid heating of food to destroy food spoilage organisms, then transferring the cooked food into sterile cans by procedures that prevent the reentry of micro-organisms into the cooked food during the filling and sealing operations.

ATHEROSCLEROSIS A degeneration of blood vessels caused by a deposit of fatty materials along the lining of the wall of the blood vessel. Cholesterol is one of these fatty materials.

AVAILABLE A nutrient is available to the body when it is in the form that can be absorbed from the digestive tract and then used for its intended function in the body.

AVIDIN A protein material that can combine with the B vitamin, biotin, causing the vitamin to be unavailable to the body. Cooking renders avidin inactive.

BACTERIA Very small, one-celled organisms visible only under a microscope and widely distributed in the air, water, soil, and animal and plant tissues. They have some useful functions, such as in decaying of dead matter and in fermentation of fruit or vegetable juices—as in the making of sauerkraut. Many bacteria produce disease or cause harmful spoilage of foods.

BASAL METABOLISM The energy produced by an individual during physical, digestive, and emotional rest, measured directly by the heat evolved and indirectly by the oxygen consumed and carbon dioxide given off.

BATTER A mixture of flour and liquid, usually combined with other ingredients such as sugar, salt, eggs, and baking powder, as for cakes, muffins, waffles, or pancakes. The consistency of a batter is such that it can be stirred with a spoon and is thin enough to pour or drop from a spoon.

BILE A thick green or yellow fluid formed in the liver, collected in the gallbladder, and emptied into the intestinal tract at intervals, particularly during the digestion of fats. It is a complex mixture containing salts of bile acids, which aid in digestion of fats, and cholesterol and other substances from different body sources. It carries cholesterol from the liver into the intestine for excretion or for reuse in digestion as needed.

Bio- (prefix) Living.

YEARBOOK OF AGRICULTURE 1959

BIOCHEMISTRY The chemistry of living things, plant and animal.

BIOLOGICAL Pertaining to the science of life.

BIOLOGICAL CATALYST A substance produced by living organisms that speeds up the rate of a chemical reaction but is not itself used up in the reaction. An enzyme.

BIOLOGICAL FUNCTION The role played or the task performed by a chemical compound or a system of chemical compounds in living organisms.

BIOLOGICAL VALUE The biological value of a food protein is the efficiency with which that protein furnishes the proper proportions and amounts of the amino acids needed, at the time of synthesis of body proteins, by man or animals eating these foods. The more nearly a protein supplies the tissues with the necessary proportions and amounts of these amino acids, the higher is its biological value.

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GLOSSARY

CALCIFICATION Process by which organic tissue becomes hardened by a deposit of calcium salts.

CALCIUM A mineral element that is an essential constituent of bone and is essential for blood clotting, muscle tone, and nerve function.

CALORIC Pertaining to heat or energy; used in reference to the calorific value of a food, it means the heat or energy that can be obtained as muscular work and heat when the body uses or metabolizes that food.

CALORIE The unit by which heat is measured. It is defined in terms of the amount of heat required to raise the temperature of a specified amount of water 1 degree centigrade. A small caloric (written with a small c) is the amount of heat required to raise 1 gram of water from 14.5° to 15.5° C. A large Caloric (capital C) is the amount of heat required to raise 1,000 grams (1 kilogram) of water from 14.5° to 15.5° C. The large Calorie is used exclusively in expressing the calorific value of foods and the calorie needs of humans and animals. (Calorie and caloric, as adjectives, usually are not capitalized.)

CALORIMETER An instrument for measuring the heat change and the energy in any system.

CALORIMETRY The science of measuring heat.

CARAMELIZE To heat sugar or foods containing sugar until a brown color and characteristic flavor develop.

CARBOHYDRATE An important group of organic substances that contain carbon, hydrogen, and oxygen. The hydrogen and oxygen are present in the same proportion as in water (H₂O), and there is one molecule of water for every carbon. Starch and sugar are carbohydrates.

CARBON The chemical element present in all substances designated as organic. These include proteins, carbohydrates, and fats. When a compound containing carbon combines with oxygen in the body, energy is liberated and carbon dioxide is formed. Compounds that do not contain carbon are classed as inorganic.

CARBON DIOXIDE A compound that is formed when carbon combines with oxygen. It leaves the body chiefly when air is exhaled from the lung.

CARCASS The part of an animal’s body that is used for meat. After an animal is slaughtered and the entrails, head, feet, and lower parts of legs and hide are removed, the carcass remains. It is hung and chilled and later is cut up into steaks, roasts, etc.

CARDIOVASCULAR Pertaining to the heart and blood vessels.

CARIIES, DENTAL Tooth decay.

CAROTENE A yellow compound of carbon and hydrogen that occurs in plants and is a form of vitamin A. Alpha, beta, and gamma carotenes may be converted into vitamin A in the body.

CARTILAGE A special form of white connective tissue that is attached to the ends of bones that are either divided into joints or united by joints. It is more flexible but not so strong as bone. Cartilage is the first substance to form in growing bone; then calcium and phosphorus are deposited in the cartilage, thus changing it to bone.

CATABOLISM The breaking down in the body of chemical compounds into simpler ones, usually accompanied by the production of heat.

CATALYST A substance that speeds up the rate of a chemical reaction but is not itself used up in the reaction.

CELL The structural and functional microscopic unit of plant and animal organisms.

CELL-PLATELET A small, colorless, disk-shaped cell in the blood.

CELLULOSE A carbohydrate found in the woody part of plants and trees. It is converted to glucose on hydrolysis. Cellophane and cotton are almost pure cellulose.

CENTIGRADE (C.) A thermometer scale in which water freezes at 0° C. and boils at 100° C. To change to degrees Fahrenheit, multiply degrees centigrade by nine-fifths and add 32. Also CELSIIUS (C.), the preferred form approved by the Ninth General Conference on Weights and Measures in 1948.

CENTRAL NERVOUS SYSTEM The brain and spinal cord.

CHEMICAL ADDITIVES Substances added to foods to improve their flavor, color, texture, or keeping quality.

CHLOROPHYLL The green coloring matter present in growing plants, which under stimulus of light is active in the manufacture of carbohydrates from carbon dioxide and water.

CHOLESTEROL The commonest member of the group of sterols; it is present in many foods and also can be made within the body.
**CHROMATOGRAPHY** A technique for separating complex mixtures of chemical substances.

**CHYLOMICRONS** Very small (micro-) globules of fat of varying sizes in transport after digestion and absorption. Chyle is a product of digestion of fats absorbed into the lymphatic circulation and thence into the thoracic duct.

**CITROVORUM FACTOR** A special substance found in liver. It supports growth and is classified with the B vitamins.

**CLINICAL USE** A clinic is usually a part of a large hospital. Its physicians diagnose and prescribe for patients who are not hospitalized or are not in need of immediate hospitalization or who can be treated satisfactorily at home. Thus, clinical use means that a treatment or medication is such as can be used for such patients.

**COAGULATION** The change from a fluid state to a thickened jelly, curd, or clot.

**COENZYME** A partner needed by some enzymes to accomplish a biochemical change.

**COLLAGEN** A protein that forms the chief constituent of the connective tissue, cartilage, tendon, bone, and skin. Collagen is changed to gelatin by the action of water and heat.

**COLOSTRUM** Milk secreted during the first week of lactation.

**COMBUSTION** The combination of substances with oxygen accompanied by the liberation of energy.

**COMPLEX (NOUN)** A complicated combination of substances made up of less complicated and interrelated parts.

**CONDENSED MILK** A liquid or semiliquid food made by evaporating a mixture of sweet milk and refined sugar to such point that the finished sweetened condensed milk contains not less than 28 percent of total milk solids and not less than 8.5 percent of milk fat.

**CONDUCTION** The transmission of heat or electricity through an object, or from one object to another in direct contact with it, without the motion of the conducting bodies. Conduction is different from convection, which is the transmission of heated particles, and different from radiation, which is the transmission of heated particles effected through the atmosphere.

**CONGENITAL** A congenital defect is one that exists at birth.

**CORONARY** In physiology, usually refers to the arteries that supply the heart. For example, coronary thrombosis or coronary occlusion occur in the coronary artery.

**CREAM OF TARTRAR** The common name for potassium acid tartrate, an acid salt that is used in angelcake to stabilize the egg-white foam, to whiten the color, and to increase the tenderness of the cake. It is used also as an acid ingredient in tartrate baking powder.

**CREATININE** A chemical compound containing nitrogen, carbon, hydrogen, and oxygen, which is present in the urine and results from the metabolism of protein.

**CULTURE** (i.e., added to milk) Micro-organisms, such as bacteria, molds, and yeasts, which are usually grown under controlled conditions. Specific cultures are used to produce many kinds of cheese and buttermilk and other fermented milks.

**Curd** The semisolid mass that is formed when milk comes in contact with an acid, such as the acid secretion in the stomach or with an enzyme.

**CYSTICERCOSIS** Infestation of the body with a form of tapeworm called cysticercus, which is sometimes present in raw beef. Beef should be cooked at least to the rare done stage (140°F.) to avoid danger.

**D- (prefix)** A chemical prefix that denotes a compound that turns the plane of polarized light to the right.

**DECALCIFICATION** The withdrawal of calcium from the bones where it has been deposited. It may be caused by an inadequate supply of calcium in the diet so that calcium has to be taken from the bones to help meet the body's needs. It may be caused also by an imbalance in some of the hormone activity in the body.

**DEFICIENCY DISEASE** A disease resulting from an inadequate dietary intake of something required nutritionally; most commonly refers to diseases resulting from dietary deficiencies of vitamins or trace elements.

**DEHYDRATION** The loss of water from the body which is not compensated by drinking water.

**DEHYDRATED FOODS** Products from which most of the water has been removed in order to improve their stability during storage.

**DEHYDRATION** The loss of water from the body which is not compensated by drinking water.

**DESICCATE** To dry.

**DIABETES** A disorder in metabolism usually accompanied by high water requirements and excretion of large volumes of urine. Sugar diabetes, or diabetes mellitus,
the type best known to laymen, is due to low production of insulin, a pancreatic hormone essential for the oxidation of sugar in the tissues. When sugar cannot be burned, the level of sugar in blood and tissues rises and the body demands water for the dilution and elimination of these large quantities by way of the kidney. Eventually inability to utilize sugar gives rise to errors in fat metabolism, including an overproduction of cholesterol.

**DIETETICS** The application of the science of nutrition to the feeding of individuals and groups of people.

**Digestion** In physiology, the breaking down of foods into simpler components in the alimentary or digestive tract. Foods may be digested by natural body enzymes in the stomach and intestines, or be broken down similarly by the chemist using chemicals and prepared enzymes, heat, or micro-organisms. Proteins are digested to peptides and amino acids, fats to fatty acids and glycerol, carbohydrates to dextrins and sugars. Buttermilk is an example of a food partially digested by natural enzymes and micro-organisms in the milk.

**Disperse** To scatter or distribute over an area or to separate a substance into smaller parts. For example, in making mayonnaise, the oil is separated into small particles by beating and is distributed throughout the egg-acid mixture.

**Dough** A mixture of flour and liquid, usually with other ingredients added. A dough is thick enough to knead or roll, as in making yeast bread and rolls. It is too stiff to stir or pour.

**Dry weight** The weight of the residue of a substance that remains after virtually all the moisture has been removed from it. Also called dry matter.

**Edema** Swelling of a part of or the entire body due to the presence of an excess of water. Edema is most noticeable at the end of the day around the ankles, which increase in size. When the condition becomes severe, an impression remains for a few minutes where a finger was pressed against the skin.

**Edematous** Refers to the condition of edema, which is the retention of an abnormal amount of fluid in the tissues.

**Edible** A term applied to food that is fit to eat. It usually refers to food that is suitable for human consumption. The initials E. P. are used to denote the edible portion of a food—for example, a banana without its skin, a pork chop without the bone, a melon without its seeds and rind.

**Elastin** A protein substance that is found in tendons, cartilage, connective tissue, and bone. Elastin is not softened as much as collagen by heat in the presence of water.

**Electronic (oven)** An electronic oven makes use of microwave energy to heat the food instead of using the ordinary electricity, as in the conventional electric oven. A magnetron tube, or generator, is used as the means of changing electricity into microwaves. The tube gives off energy, which is beamed into the food, where it produces heat.

**Element** Any one of the fundamental atoms of which all matter is composed.

**Emulsification** A process of breaking up large particles or liquids into smaller ones, which remain suspended in another liquid. Emulsification may be done mechanically, as in the homogenization of ice cream mixtures. It may be hastened by chemicals, as by the use of acid and lecithin (from egg yolk) in emulsification of oil for mayonnaise. It may be accomplished naturally in body processes, as when bile salts emulsify fats during digestion.

**Emulsify** To make into an emulsion. When small drops of one liquid are finely dispersed (distributed) in another liquid, an emulsion is formed. The drops are held in suspension by an emulsifying agent, which surrounds each drop and makes a coating around it.

**Endemic** An endemic disease is one that occurs in low incidence but more or less constantly in a given population.

**Endocrine** Secreting internally, or into the blood stream, as endocrine glands, or glands of internal secretion.

**Endogenous** Originating within or inside the cells or tissues.

**Endometrium** The mucous membrane that lines the uterus or womb.

**Endosperm** The starchy portion within the kernel of wheat, corn, or other cereal, from which refined flour is produced after the germ and fibrous outer layers are removed.

**Environmental** Pertaining to external influences.

**Energy** Capacity to perform work.

**Enzymatic** Related to that class of complex organic substances called enzymes, such as amylase and pepsin, that accelerate (catalyze) specific chemical reactions in plants and animals, as in digestion of foods.
ENZYME One of a class of substances formed in living cells. It speeds up chemical reactions but does not change during the process.

EPIDEMIC A disease is epidemic when many people in a region are attacked at the same time or when the disease is spreading rapidly.

EPITHELIAL Refers to those cells that form the outer layer of the skin, those that line all the portions of the body that have contact with the external air (such as the eyes, ears, nose, throat, lungs), and those that are specialized for secretion as the liver, kidneys, and urinary and reproductive tract.

ERGOSTEROL A substance belonging to the class of sterols that is found chiefly in plants and animal tissue, yeasts, and molds. It is white and crystalline and similar in appearance to the material that candles are made of. On exposure to ultraviolet light it is converted to vitamin D₂.

ESTROGENS Hormones secreted by the ovaries.

ETIOLOGY Causes of a disease or a disorder.

EVISCERATION Of poultry and fish, refers to removal of the intestinal tract and other organs from the animals.

EXCRETION The products of digestion and metabolism that are discarded from the body—feces from the intestinal tract and urine from the kidneys.

EXOGENOUS Originating from outside the cells or tissues.

EXTRINSIC FACTOR Literally, a constituent from outside; in nutrition something obtained from food, commonly used to refer to vitamin B₁₂ in relation to the disease known as pernicious anemia.

FACTOR In nutrition, any chemical substance found in foods. A factor might be a vitamin, a mineral, or any other nutrient or nonnutrient. Usually it has some effect on growth or reproduction of animals. A factor may be "identified" or remain "unidentified." In arithmetic, factor is a value or ratio expressing the relationship between two items, such as liters of oxygen and the equivalent amount of oxygen in grams.

FAHRENHEIT (F.) A thermometer scale that marks the freezing point of water at 32° F. and the boiling point at 212° F.

FAT A glyceryl ester of fatty acids. Fats generally are substances of plant and animal origin. Fat may be in solid form, as butter, margarine, lard, or other shortening, or in liquid form, as the vegetable oils.

FAT-SOLUBLE Refers generally to substances that cannot be dissolved in water but can be in fats and oils, or in fat solvents. The fat-soluble vitamins are vitamins A, D, E, and K.

FATTY ACID Organic compound of carbon, hydrogen, and oxygen, which combines with glycerol to make a fat.

FERMENT To undergo chemical change brought about by the enzymes contained in certain micro-organisms.

FERMENTATION The chemical changes brought about by the activity of enzyme systems of micro-organisms. For example, yeast contains enzymes that produce carbon dioxide and alcohol from sugar. In bread-making, it is this carbon dioxide that causes the dough to rise. The souring of milk is lactic fermentation, some of the milk sugar being converted by the action of lactic acid bacteria into lactic acid. Lactic fermentation also is utilized in making pickles.

FETUS The unborn young or embryo of animals in the later stages of their development before birth. (Adjective: fetal.)

FIBER Meat fibers are the long cells in muscles of the meat. The size and shape of the fibers determine the physical structure and grain of the meat.

FLORA (INTESTINAL) The bacteria and other small organisms that are found in the intestinal contents.

FOLACIN The name officially selected to replace the term folic acid, a vitamin of the B complex.

FOLIG ACID One of the vitamins of the B complex. Its new official name is folacin; it is also known as pteroylglutamic acid. It is a bright-yellow compound needed in very small amounts in the diet of animals and man. A deficiency results in poor growth, anemia, and other blood disorders.
GLOSSARY

**Folinic Acid**  Another name for the citrovorum factor.

**Fortify**  To add one or more nutrients to a food so that it contains more of the nutrients than was present originally before processing. Milk often is fortified with vitamin D.

**Fractionation**  A term used by the chemist when he takes natural materials apart in the laboratory by chemical means. He does this for various reasons—usually to isolate or purify some specific compound present in feeds or foods.

**Frank**  (referring to disease and symptoms)  Outright, not just a suggestion.

**Galactose**  A white crystalline sugar obtained from lactose (milk sugar) by hydrolysis.

**Gamma Globulin**  A protein in the blood that forms antibodies.

**Gastric**  Pertaining to the stomach.

**Gastrointestinal**  Refers to the part of the digestive system made up of the stomach and the intestines.

**Gene**  The particle in the cell that carries hereditary characteristics. Genes control the development of the body and its specific functions.

**Genetic**  Pertaining to heredity.

**Genetically**  Relating to genetics, the science of heredity, variation, sex determination, and related phenomena.

**Genitourinary**  Refers to the organs of reproduction and of the excretion of urine.

**Germ**  The part of a cereal seed that grows and produces new plants.

**Gestation**  Pregnancy.

**Gibberellins**  A group of growth-regulating substances that are produced by certain species of fungi of the genus Gibberella.

**Gingivitis**  Inflammation of the gums of the jaws.

**Glandular**  Adjective of gland. A gland is an organ that makes and discharges a chemical substance that is used elsewhere in the body or eliminated.

**Gluten**  An elastic substance that gives adhesiveness to dough. It is formed when the proteins in flour, especially those in wheat flour, absorb water. Gluten assists in giving shape to the cooked product as it coagulates when heated.

**Glycerol**  Same as glycerin. Serves as the backbone radical or framework of the fat molecule, permitting attachment of three fatty acids. Glycerol is an alcohol containing three carbons and three hydroxy (−OH) groups; methyl, or wood, alcohol contains one carbon and one hydroxy group; ethyl, or grain, alcohol contains two carbons and one hydroxy group.

**Glycolytic**  Pertaining to the chemical breakdown of sugars to lactic acid.

**Gonadotropins**  Hormones from embryonic sex glands.

**Growth-regulating substances**  Chemicals that in extremely small amounts will affect the rate or type of growth of cells, tissues, and organs; sometimes referred to as hormonelike substances.

**Hard (water)**  Water containing soluble salts of calcium and magnesium and sometimes iron. Hardness caused by bicarbonate salts of these metals is known as temporary hardness, because boiling expels the carbon dioxide and converts the bicarbonate to the insoluble carbonate, forming incrustation on the walls and bottom of the container. Hardness from chlorides and sulfates of calcium and magnesium is not affected by boiling.

**Heat-labile**  Changeable by heat; unstable to heat.

**Heat-of-combustion values**  The amount of heat produced (usually expressed as calories) when a unit weight of a substance is oxidized.

**Hemicellulose**  A complex carbohydrate that occurs widely in plants as a structural part of their cell walls. It differs chemically from cellulose by being subject to hydrolysis with dilute mineral acids.

**Hemoglobin**  A protein in the blood that contains iron and carries oxygen from the lungs to the tissues.

**Hemolytic**  Refers to the destruction or breakdown of the red blood cells.

**Hemorrhage**  Loss of blood.

**Heritable**  Capable of being inherited; the tendency of a characteristic to be inherited.

**Hermetic**  Food containers that do not permit gas or micro-organisms to enter the container or to escape from it. A properly sealed tin can is a hermetic container.

**Hexose sugar**  A sugar that has six carbon atoms in its chemical structure, as corn sugar.
HOMEOSTATIC Steady biochemical states in the body, maintained by physiological processes.

HOMOGENIZED Broken up into small particles of the same size. Homogenized milk has been treated to break the fat into such small globules that it will not rise to the top as cream.

HORMONE A chemical substance that is produced in an organ called an endocrine gland and is transported by the blood or other body fluids to other cells. A hormone greatly influences the functions of some specific organ and of the body as a whole. Thyroxin is a hormone secreted by the thyroid gland. Insulin is a hormone secreted by the pancreas.

HYDROGEN The chemical element with the smallest atomic weight. Present in proteins, carbohydrates, fats, and water. Hydrogen makes up approximately 10 percent of the human body.

HYDROGENATION The addition of hydrogen to any unsaturated compound. Oils are changed to solid fats by hydrogenation.

HYDROGEN PEROXIDE A chemical substance often used as a bleach to remove color. It is used also in medicine and surgery as an antiseptic agent and as a cleansing agent in mouth washes, tooth pastes and powders. Its antiseptic and cleansing action is due to the fact that it gives off sufficient oxygen to destroy bacteria.

HYDROLYSIS The splitting of a substance into the smaller units of which it is composed by the addition of the elements of water. For example, when starch is heated in water containing a small amount of acid or subjected to the action of digestive enzymes, the simpler sugar glucose is released.

HYPER- A prefix meaning above, beyond, in excess of the normal or average.

HYPERTENSION An abnormally high blood pressure.

HYPERTHYROIDISM Overactivity of the thyroid gland so that it secretes abnormal amounts of the hormone thyroxin.

HYPERTROPHIED Increase in the size of an organ, independent of natural growth.

HYPERVITAMINOSIS The undesirable effects produced by taking an excess of a vitamin concentrate or pure vitamin.

HYP- A prefix denoting a deficiency or lack or less than the normal or desirable amount.

ICE CRYSTALS When food is exposed to a low enough temperature, the water in food solidifies and forms ice crystals. The formation of large ice crystals in foods such as fruits, vegetables, or meats may rupture the cell walls and affect the appearance and texture of the food. Pure water freezes at 32°F.

IMPERMEABLE Not capable of being penetrated. It is always necessary to name the substance to which a food wrapping material is impermeable. It may be impermeable to water vapor only or to water vapor and to air (or other gases).

INACTIVATE To suspend or terminate certain biological activities, such as by heat, irradiation, or other forms of energy.

INCIDENCE The frequency of occurrence of a situation or of a condition, like a disease.

INEDIBLE A substance that is not fit for food, such as poisonous nuts and plants. Tough skins, seeds, and decayed spots of fruits and vegetables and bones of meat are considered inedible parts because they are not suitable for human consumption.

INERT Relatively inactive.

INERT GAS Does not react with the materials in food. Nitrogen is an inert gas that may be used to replace air (oxygen) in packages of food in order to slow down the deterioration of the food.

INGEST To eat or take in through the mouth.

INORGANIC A large group of chemical compounds that do not contain carbon.

INSEMINATION The planting of seed. The introduction of semen.

INSTITUTE OF HOME ECONOMICS The Institute of Home Economics includes three divisions in the Agricultural Research Service of the U. S. Department of Agriculture—Human Nutrition, Household Economics, and Clothing and Housing. In these fields it undertakes research on problems of national concern. The Human Nutrition Research Division conducts studies on the nutritive requirements of people, the composition and nutritive value of food to meet these needs, and the physiological availability of nutrients in foods. It develops new and improved methods to prepare, preserve, and care for foods in homes and institutions, to obtain the best nutritive values from food purchases, to prevent deterioration in food quality, to make foods more acceptable in meals, and to make best use of abundant or new foods on the market.
The Household Economics Research Division investigates levels of food consumption and nutritive value and economy of customary diets of various population groups. It conducts research on patterns of rural family expenditures, household production for family use, and economic problems of household management, including the effect of the economic situation on family living. Recommendations are developed for effective and economical use of food and other family resources for higher levels of living. The Division cooperates with other Federal and State agencies in the coordination of nutrition programs.

The Clothing and Housing Research Division is concerned with and evaluates the serviceability of clothing and household textiles in relation to consumer needs, to properties of fabrics, and to the construction, design, care, and reconditioning of garments and home furnishings. It determines the characteristics of housing and household equipment needed to meet family requirements for efficient housekeeping and comfortable living. It develops information basic to wise planning, improved use, and care of clothing, household textiles, the house, its equipment and its facilities.

**Insulin** A chemical substance in the group of hormones that is secreted from special cells in the pancreas. It is essential for the normal utilization of sugar by the body. A lack of insulin results in the development of diabetes.

**Intake** Substances or amounts of substances which are taken in by the body—e.g., the intake of food.

**Intestinal juices** The digestive juices secreted by the intestinal walls (in contrast to gastric juices secreted by the stomach walls) and pancreatic juices secreted by the pancreas. The intestinal juices contain enzymes, which complete the final stages in digestion of protein, fat, and carbohydrate.

**Intestinal tract** The entire intestines, both small and large.

**Intrinsic factor** A chemical substance in normal stomach juice. It is necessary for the absorption of vitamin B₁₂ from the intestine.

**Involution** The change back to a normal condition that certain organs undergo after fulfilling their functional purposes. After pregnancy, the uterus returns to a normal nonpregnant condition.

**Irradiation** To treat with ultraviolet rays from sunlight or an artificial source; to treat with X-rays or other radioactive agent.

**Irritability** A term usually applied to nerves. It refers to their ability to respond or react to a stimulus.

**I. U.** The abbreviation for International Units, the measure of the potency of a vitamin.

**Kinetic energy** The capacity to do work as a result of motion; for example, the kinetic energy of a waterfall can be used to turn a generator to make electricity.

**L-** A chemical prefix that denotes a compound that turns the place of polarized light to the left. The opposite of a D-compound.

**Labile** Easily destroyed.

**Laboratory animals** Mice, rats, guinea pigs, dogs, and many other small animals that are used in laboratories as the subjects for scientific experiments.

**Lactation** The secretion of milk or the period during which milk is formed.

**Lactic acid** A compound formed in the chemical metabolic processes which accompany muscular activity; also a substance formed by the fermentation of lactose, the sugar in milk.

**Lactose** A sugar that occurs in milk. It is a white, crystalline sugar that is less soluble and less sweet than ordinary cane sugar (sucrose).

**Linoleic acid** One of the digestion products from certain fats, which is essential to body tissues.

**Lipids** A broad term for fats and fatlike substances; characterized by the presence of one or more fatty acids. Lipids include fats, cholesterol, lecithins, phospholipids, and similar substances, which do not mix readily with water.

**Low acid** Meat, poultry, and most of the common vegetables (except tomatoes) contain little of the organic acids and therefore are called low-acid foods. In canning, an acid food, such as tomatoes, can be processed in a boiling water bath because its acid aids in the destruction of certain spoilage organisms and prevents the growth of toxins by other spoilage organisms. To process low-acid foods in a reasonable length of time requires a temperature higher than that of boiling water and requires increased pressure, such as in a pressure cooker.

**Lymph** A yellowish liquid that contains corpuscles and is present in the lymphatic vessels or channels of the body.
LYMPHATIC SYSTEM  The tissue spaces, all the small and large lymphatic vessels, and the two large ducts or canals in the thorax.

LYSINE  One of the amino acids essential to the nutrition of man and animals. It is of special dietary concern because it is one of the amino acids that is present at a relatively low level in some food proteins of plant origin.

MALFORMATION  A deformity; an abnormal development or formation of a part of the body.

MAMMARY GLANDS  The milk-secreting glands; the breasts.

MATRIX  The intercellular framework of a tissue.

MATURATION  The process of coming to full development, maturity, or adulthood.

MEAT  The flesh of animals used as food. Meat contains proteins, fats, minerals, vitamins, and water. The commonest meats used as food are beef, veal, lamb, and pork. Poultry and fish are sometimes included with the foods classified as meat.

MEMBRANE  A thin, soft, pliable layer of animal or vegetable tissue.

MENSTRUATION  The monthly discharge peculiar to women. It begins at the age of puberty and continues to menopause.

METABOLIC  Refers to metabolism.

METABOLISM  The sum of the chemical changes that go on in the body as food is made into body tissues, energy is produced, and body tissue is broken down. There are two parts to body metabolism:
- Anabolism is constructive and includes building, maintaining, and repairing tissue;
- Catabolism is destructive and includes changing or breaking down tissue or other materials in the body into simple substances for producing energy and for excretion.

MICROBIOLOGICAL  Pertaining to microorganisms—that is, microscopic plants or animals. Refers usually to a method by which certain micro-organisms are used to determine the amounts of a particular nutrient, like a vitamin or an amino acid, in a food. Such assays are possible because these micro-organisms must have these vitamins and amino acids in order to grow. These determinations are called microbiological assays or analyses.

MICRO-ORGANISMS  Very small living beings. Bacteria, yeasts, and molds are micro-organisms found in foods.

MICROWAVE  A very short electromagnetic wave of high frequency energy produced by the oscillation of an electric charge. Microwave energy is converted into heat when it is absorbed by the food. Microwaves are about 5 inches long—in contrast to radio waves, which average about 0.3 mile in length. A short wave has a greater frequency, or vibrations per second, than a longer wave has. Electronic ovens have a frequency of 2,450 megacycles (million cycles) per second. Ordinary AC electricity, which vibrates 60 times per second, has a frequency of 60 cycles per second.

MISCIBLE  Capable of being mixed easily with another substance. For example, sugars are readily miscible in water; fats cannot be mixed with water but are partly miscible in alcohol and are completely miscible in ether.

MOISTURE CONTENT  The amount of water in a substance.

MOLECULE  A chemical combination of two or more atoms that form a specific substance. For example, the combination of an atom of sodium and an atom of chlorine makes a molecule of sodium chloride, or table salt. This is a comparatively simple molecule. There are also large, complex molecules, such as hemoglobin. Proteins and starches are examples of even larger and very complex molecules containing many atoms.

MORBIDITY  Has the same meaning as sickness. The term is used to indicate the extent of illness in a population, as contrasted to mortality or deaths.

MUCOSA  The mucous membrane that lines the passages and cavities of the body, as in the gastrointestinal tract.

MUCOUS MEMBRANE  A membrane lining the cavities and canals of the body that have contact with the air. It is kept moist by mucus secreted by special cells and glands. The eyes, ears, nose, throat, lungs, digestive tract, genitourinary and reproductive tracts are lined with mucous membrane.

MUCUS (NOUN)  A sticky liquid secreted by the mucous glands and mucous membranes.

MUSCULATURE  The muscular apparatus of the body or any part of it.

NATIONAL INSTITUTES OF HEALTH  The National Institutes of Health are the research arm of the Public Health Service in the Department of Health, Education, and Welfare. There are seven Institutes: Cancer; Heart; Allergy and Infectious Diseases; Arthritis and Metabolic Diseases; Dental Research; Mental Health; and Neurological Diseases and Blindness. Each is engaged in
fundamental laboratory and clinical research into the causes, treatment, and prevention of the diseases with which it is concerned.

**Neonatal** Newborn.

**Neural** Refers to nerves or nervous tissue.

**Neuritic** Refers to nerves. Neuritic pain is pain due to damage to nerves; neuritis is an inflammation of nerves.

**Nitrogen** A chemical element essential to life. Plants can use nitrogen compounds direct from the soil, and nitrogen-fixing bacteria can use nitrogen directly from the air, but animals must have their nitrogen supplied by protein foods.

**Nitrogenous** A substance containing nitrogen is referred to as nitrogenous. Proteins contain nitrogen, as do the chemical components of proteins—amino acids. Protein-decomposition products containing nitrogen are called nitrogenous extractives. They are found in well-ripened meat and contribute to the flavor of meat.

**Nonfat solids** The portion of milk remaining after the water and butterfat have been accounted for; nonfat-dried-milk solids.

**NRC** An abbreviation for National Research Council; usually used when referring to the recommended dietary allowances.

**Nutrient** A chemical compound with specific functions in the nourishment of the body, such as tryptophan, an amino acid; thiamine, a vitamin; or calcium, a mineral. The body depends on food for about 50 different nutrients.

**Nutritionist** A professionally trained person who applies the science of nutrition and related subjects in research, teaching, or advisory services.

**Nutriture (or nutritional status)** The condition of physical health and well-being of the body as related to the consumption and utilization of food for growth, maintenance, and repair.

Nutriture, or nutritional status, may be appraised by such methods as clinical examinations with special attention to condition of the skin, eyes, mouth, tongue, gums, muscles; determination of overweight or underweight, often by measurement of the thickness of a skin fold; blood pressure and pulse rate; biochemical tests on the blood for various constituents associated with health; and tests of urine samples, with or without the administration of certain nutrients.

**Obese** Fat; excessive overweight due to the presence of a surplus of body fat.

**Organic** A large group of chemical compounds that contain carbon.

**Organic acids** Acids containing only carbon, hydrogen, and oxygen. Among the best known are citric acid (in citrus fruits) and acetic acid (in vinegar).

**Osmosis** The transfer of materials that takes place through a semipermeable membrane that separates two solutions, or between a solvent and a solution, that tends to equalize their concentrations. The walls of living cells are semipermeable membranes, and much of the activity of the cells depends on osmosis.

**Osmotic pressure** The pressure exerted by the movement of a solvent through a semipermeable membrane into a more concentrated solution on the other side of the membrane. This pressure on the walls of the membrane is the driving force that causes diffusion of particles in solution to move from one place to another.

**Ossification** The process of forming bone. Cartilage is made into bone by the process of ossification. The minerals, calcium, and phosphorus are deposited in the cartilage, changing it into bone.

**Ossify** To change into bone or bony substance.

**Overweight** An excess of more than 10 percent above the desirable weight.

**Ovum** A female germ cell.

**Oxidation** The removal of electrons, in the most general sense; may also mean the combining with oxygen or the removal of hydrogen.

**Oxidative** Refers to the processes of oxidation.

**Oxygen** One of the most plentiful chemical elements. Oxygen makes up 65 percent of the human body. When other chemical substances combine with oxygen, energy is released.

**Palatability** The quality characteristics (such as color, flavor, and texture) of a food product that make an impression on the organs of touch, taste, smell, or sight and have significance in determining the acceptability of the food product to the user.

**Pancreas** A glandular organ extending across the upper abdomen close to the liver. It secretes into the intestinal tract digestive juices containing enzymes to act upon protein, fat, and carbohydrate. It also secretes directly into the blood the hormone insulin,
which is essential for one stage in the oxidation of sugar to carbon dioxide and water. Adjective: Pancreatic.

PANDEMIC A disease that is widespread throughout several countries, regions, or much of the world.

PAPILLAE A small, nipple-shaped elevation. Many such elevations are found on the tongue and give it a velvety appearance.

PARATHYROID Four small glands in the neck situated beside the thyroid gland. They secrete the hormone that affects calcium metabolism.

PARBOILED RICE; CONVERTED RICE Rice that has been especially treated with heat and water before the husks are removed so that the nutrients in the outer layers of the kernel are driven inward to the kernel. This reduces the loss of nutrients when the outer layers are removed in milling.

PART PER MILLION A way of expressing amounts, especially of trace minerals in diets or foods. Examples of how small a part per million is: It is equal to 1 pound in 500 tons, 1 inch in about 16 miles, or 1 cent in 10 thousand dollars.

PATHOLOGY The branch of medicine that deals with the special nature of disease.

PEDIATRICIAN A physician who specializes in the treatment of the diseases of children.

PERCOMORPH Refers to fish of the perch family. Percomorph oil, prepared from the livers of such fish, is a concentrated source of vitamin D.

PERINATAL The interrelated care of both mother and infant during pregnancy, labor, and following delivery.

PERMEABLE Capable of being penetrated.

PEROXIDASE An enzyme that speeds up oxidative changes in certain plant constituents.

PHAGOCYTE A cell that can engulf particles or cells that are foreign or harmful to the body. Phagocytes are present in the blood and lymph and also in the lungs, liver, and spleen.

PHARMACOPOEIA A book that describes drugs and preparations used in medicine. The United States Pharmacopoeia is revised every 10 years after a committee of experts has decided on the necessary changes.

PHOSPHOLIPIDS Fatlike substances containing phosphorus and nitrogen, along with fatty acids and cholesterol. Phospholipids are abundant in brain and nerve tissues, in egg yolk, and in some plant sterols, as in soybean lecithin.

PHOSPHORUS A mineral element necessary for the formation of bone and essential in the blood and soft tissues of the body.

PHOSPHORYLATE A chemical term that applies to the introduction of a phosphorus and oxygen group into a complex chemical compound.

PHYSIOLOGICAL Refers to the science of physiology, which deals with functions of living organisms or their parts.

PIGMENT Any of the coloring materials in the cells and tissues of plants and animals. In fruit and vegetables, the green pigment is chlorophyll; orange to red pigments are carotenoids; red to blue colors are anthocyanins; light-yellow pigments are flavones and flavonols. In meat, the chief pigment producing the pink or red color is myoglobin.

PITUITARY GLAND A gland, in the lower part of the brain, which produces a number of hormones. These hormones regulate the growth of all body tissues and regulate the development and action of other endocrine glands such as the thyroid, pancreas, and adrenal glands.

PLACENTA An organ on the wall of the uterus (womb). The developing young animal is attached to it by means of the umbilical cord. The placenta is the source of nourishment for the young in the uterus.

PLAQUE Tiny patches or unnatural formations on tissues such as on tooth surfaces and on inner arterial walls. The plaques, called atheroma, that are found in walls of arteries contain some lipids, usually cholesterol and oleic acid, and some connective or scar tissue of protein origin. Their formation is related to abnormal fat metabolism. They contribute to stiffening of blood vessel walls, closing of arteries, choking circulation, and ruptured arteries. They may be formed in coronary arteries of people of all ages but appear to be most prevalent in men 45 to 60 years of age engaged in light work or sedentary occupations.

PLASMA The colorless fluid portion of the blood in which the cells are suspended.

POLYPHENOLS An extensive class of organic chemical substances that react readily with oxygen, generally yielding colored substances.

POLYUNSATURATED FATTY ACIDS A class of...
fatty acids that have more than one unsaturated linkage in the chain, each lacking two hydrogens. Saturated fatty acids have all the hydrogens the carbon chain can hold. Mono-unsaturated fatty acids have only one unsaturated linkage. Although there are many kinds of polyunsaturated fatty acids, linoleic appears to be the only one which the body cannot synthesize and so must receive it from food sources.

**Potent** Strong, powerful, efficacious.

**Potential energy** Energy in chemical form, which may be released either as heat or muscular work when the substance is oxidized.

**Preconceptional** Before pregnancy.

**Precocoon** To heat food before canning, freezing, or drying. Vegetables may be precooked in boiling water, steam, or hot air, as in an oven, and fruits in boiling fruit juice, sirup, water, or steam.

**Precursor** Forerunner; something that precedes. In biochemistry, a compound that can be used by the body to form another compound.

**Predispose** A verb that indicates a special tendency toward a certain disease or other situation.

**Pregnancy** The condition of having a developing embryo in the body; the state of being with child.

**Prematurity** Delivery occurring before the expected time.

**Pressure cooker** An airtight container for the cooking of food at high temperature under steam pressure. It is equipped with a gage for measuring and indicating the pressure on a graduated dial or with some other device. Pressure cookers are used in canning low-acid foods, for cooking less tender cuts of meat and poultry, and for cooking some vegetables.

**Processing of foods** Subjecting them to various manufacturing procedures to change their characteristics. Processing includes canning, freezing, and dehydrating, so the foods can be stored; it includes changing the form of the food, such as making oil or flour from seeds and making pickles from cucumbers; it includes simply cooking food; for example, baking of bread.

**Progestosterone** A sex hormone secreted by the corpus luteum in the ovary.

**Protein** One of a group of complex organic compounds that contain nitrogen, carbon, hydrogen, and oxygen and are essential for life and growth. They are formed by various combinations of different amino acids.

**Protoplasm** The essential protein substance of living cells, upon which all the vital functions of nutrition, secretion, growth, and reproduction depend.

**Provitamin A** Any of a number of substances, called carotenes, that occur in nature and can be converted into vitamin A in the body.

**Puberty** The age at which the reproductive organs become functionally active. It occurs when a person is between 12 and 17 years old and is indicated in the girl by the beginning of menstruation and in the boy by seminal discharge and change of voice.

**Puerperium** The period in a woman’s life between the time her infant is born and the time her uterus returns to its normal size, usually about 6 weeks.

**Puree** A smooth, pulpy food product from which the rough fiber has been removed by sieving or other means. Most baby foods are in the pureed form.

**Putrefaction** The decomposition of proteins by micro-organisms under anaerobic conditions, resulting in the production of incompletely oxidized compounds, some of which are foul smelling.

**Pyridoxine** One of the B vitamins, commonly designated as vitamin B_6_. Strictly speaking, vitamin B_6_ includes a group of three vitamins of nutritional interest—pyridoxine, pyridoxamine, and pyridoxal.

**Radical** In chemistry, a group of elements joined in a set formation, which appears as a unit in a series of compounds or behaves as one piece without decomposition in chemical reactions. Examples are the glycerol radical in fats, the carboxyl group in organic acids, and the phenyl radical (benzene ring) in certain amino acids. The amino acids themselves act as larger radicals in making up proteins.

**Radioactive** Giving off atomic energy in the form of radiations, such as in alpha, beta, or gamma rays.

**Radioisotopes** One of a broad class of elements capable of becoming radioactive and giving off atomic energy, such as is detectable with a Geiger counter. Some radioisotopes occur naturally; others are produced artificially. The word is synonymous with radioactive elements and includes tracer elements.
RANCID Having a disagreeable odor or flavor; usually used to describe foods with a high content of fat when oxidation or hydrolysis of unsaturated fatty acids has occurred. Noun: Rancidity.

RANCIDIFY The process of chemically changing fat or oil with the formation of small amounts of new compounds, which have different characteristics. Rancid fats have typical rank odors and flavors, changed baking properties, and other properties different from those of the original fat.

RECONSTITUTE To restore to the normal state, usually by adding water, such as reconstituting dry milk by adding water to make it fluid milk.

REDUCING (chemical action) The taking up of oxygen from air and from other materials.

REDUCING SUGAR A sugar that can be oxidized readily by chemical means.

REHYDRATION Soaking or cooking or using other procedures to make dehydrated foods take up the water they lost during drying.

RETINA A delicate membrane of the eye connected to the optic nerve (nerve of vision) and necessary for maintenance of sight.

ROLLING BOIL A description of a mixture, usually jelly sirup or candy, when it is boiling rapidly. A full rolling boil cannot be stirred down because bubbles of vapor are continually forming, rising to the top, and breaking on the surface of the mixture.

RUMEN The first stomach of cattle and other animals, such as sheep and goats, which chew a cud. It serves as a storage place for rapidly swallowed food. The food then can be returned to the mouth for more thorough chewing at a later time.

RUMINANT Any of a group of hoofed mammals, including oxen, sheep, goats, antelopes, giraffes, deer, and camels, that have a special stomach compartment, called the rumen, which is designed to aid in the digestion of grasses and other plants that are indigestible to humans.

SALMONELLA A large group of bacteria, some of which are associated with food poisoning. Certain salmonellas are sometimes found in raw and dried eggs and in poultry products. They can be destroyed by sufficient heating.

SALT One of a class of compounds formed when the hydrogen atom of an acid radical is replaced by a metal or metallike radical. The most common salt is sodium chloride, the sodium salt of hydrochloric acid. Other metal or metallike salts in food may include phosphorus, calcium, potassium, sodium, magnesium, sulfur, manganese, iron, cobalt, zinc, and other metals. They may be present as chlorides, sulfates, phosphates, lactates, citrates, or in combination with proteins, as in calcium caseinate.

SECRETORY The formation of a secretion. Thus, the salivary glands of the mouth secrete saliva and are secretory glands.

SEDENTARY Specifically, the habit of sitting a great part of the time. More generally, it is used to refer to a minimum of physical activity.

SELECTIVE BREEDING (OF PLANTS) The choice of certain varieties or strains of plants as parent stock for breeding purposes in order to develop an offspring that possesses the desired characters present in one or both of the parents.

SEROUS The formation of a secretion. Thus, the salivary glands of the mouth secrete saliva and are secretory glands.

SEDENTARY Specifically, the habit of sitting a great part of the time. More generally, it is used to refer to a minimum of physical activity.

SELECTIVE BREEDING (OF PLANTS) The choice of certain varieties or strains of plants as parent stock for breeding purposes in order to develop an offspring that possesses the desired characters present in one or both of the parents.

SOLUTION A uniform liquid mixture containing a solvent and a solute. Salt dissolved in water is a solution—water is the solvent; salt is the solute.

SPECIFIC GRAVITY The relation of the weight of a definite volume of a substance to the weight of an equal volume of water.

SPECIFIC HEAT Heat or thermal capacity of a substance in relation to that of water.

SPOILAGE ORGANISMS Bacteria, yeasts, and molds that cause food to spoil. They live everywhere—in the air, soil, and water and on food, plants, and animals.

SPORE An inactive form of a microorganism that is resistant to destruction and capable of becoming active again.

SQUALENE A chemical compound representing an intermediate step in the formation of cholesterol from acetates. It amounts to the joining of four molecules of acetic acid.

STERILE Free from living microorganisms. A food container may be made sterile by heating it in a pressure cooker where the temperature will reach 240°F. at 10 pounds pressure or by using dry heat at a high temperature in an oven.
STERILITY (REPRODUCTIVE) As applied to reproduction: Not being able to conceive or produce young.

STERILIZE The process by which microorganisms, such as bacteria, yeasts, and molds, are killed. In food preparation, this is usually done by the use of high temperatures.

STEROL A complex, fatlike substance that can be dissolved in ether and other fat-solvents. Sterols are found in plant and animal tissues. Cholesterol is a sterol that helps the body to use fat and is used also in the body for making bile salts, hormones, and vitamin D.

STOMACH A saclike organ into which the food passes upon being swallowed. The early stages of digestion, particularly digestion of proteins, occur in the stomach before the partly digested food passes on to the intestines.

STRESS Intense strain. In medicine, any circumstance great enough to disrupt the normal, steady functioning of the body.

SUBCLINICAL DISEASE A disease, usually mild, that has no definite symptoms or signs which can be recognized by the usual visual or clinical means.

SUBSTRATE A substance that is acted upon, as by an enzyme.

SUGAR Usually means cane sugar used as ordinary sugar. May also mean any simple carbohydrate with a sweet taste.

SULFITING The treatment of foods with sulfur dioxide or certain related compounds. The sulfur combines with enzymes in the food and prevents them from causing the quality to deteriorate.

SULFUR DIOXIDE A chemical compound of sulfur and oxygen having antioxidant properties; sometimes used in food technology for control of discoloration.

SYNDROME A medical term meaning a group of symptoms that occur together.

SYNTHESIS A coming together of two or more substances to form a new material.

SYSTEM A functional unit; an arrangement whereby the parts function together toward a common goal, such as the digestive system or the respiratory system.

TERM (AT TERM) The end of the normal period of gestation or pregnancy when birth occurs.

THERAPEUTIC Refers to curing a disease.

THERAPY The medical treatment of disease.

THERMAL Refers to heat.

THYROID The gland in the neck that secretes the hormone thyroxin.

TOXICITY The quality of a substance that makes it poisonous or toxic; sometimes refers to the degree of severity of the poison or the possibility of being poisonous.

TRACER ELEMENT A radioactive element used in biological and other research to trace the fate of a substance or follow stages in a chemical reaction, such as the pathway of metabolism of a nutrient or growth formations in plants or animals. Radioactive elements that have proved useful for tracer work in nutrition research are carbon 14, calcium 45, cobalt 60, strontium 90, and phosphorus 32. Carbon 14 is used widely in studies of fat and sugar metabolism and cholesterol formation.

TRAUMA Physically, wound or injury; psychologically, an emotional shock. Adjective: Traumatic.

TRICHINOSIS Disease caused by trichinae (small worms sometimes present in raw pork or developing from ova in infected pork) embedding themselves in the intestinal tract and muscles. Pork should always be cooked well done (185°F.).

TRIMESTER Three months, or one-third of the nine months of pregnancy. The nine months of pregnancy are divided into the first, second, and third trimester.

TRYPTOPHAN An amino acid that is essential for the nutrition of man and animals. It is frequently present in inadequate amounts in food protein of plant origin; when such foods are the sole diet, tryptophan is often one of the limiting amino acids for the synthesis of animal tissues.

UMBILICAL CORD The connection between the navel of the fetus and the placenta of the uterus.

UNPALATABLE Not pleasing to the senses of taste, smell, sight, or touch.

UNSATURATED FATTY ACID A fatty acid that has a double bond between two carbon atoms at one or more places in the carbon chain. Hydrogen can be added at the site of the double bond. An unsaturated fat is one that contains an unsaturated fatty acid. A saturated fatty acid has no double bonds.

UREA An end product of protein metabolism excreted in the urine.
URIC ACID A chemical compound that contains nitrogen and is present in small amounts in the urine.

URINARY Refers to the urine, which is formed by the kidney and excreted.

UTERUS The organ that holds the offspring before birth; commonly called the womb.

VAPOR PHASE The part of any substance that exists as a gas.

VARIETAL Differences between varieties of the same plant. Groups of plants within the same species may differ in certain characteristics. For example, different varieties of potatoes may contain widely differing levels of ascorbic acid. Such differences between varieties are known as varietal differences.

VASCULAR Full of vessels that contain a fluid. In physiology, the blood and lymph vessels in the body.

VERTEBRATES Animals with backbones or spinal cords (so-called "higher" animals in the animal scale). All mammals, birds, reptiles, and fish are vertebrates.

VISCOSITY A property of fluids that determines whether they flow readily or resist flow. A pure liquid at a given temperature and pressure has a definite viscosity. Viscosity of liquids usually increases with a decrease in temperature. Thus, sugar sirups are thicker when they are cold than when they are heated. Viscosity is important in food preparation. The quality of a baked product, for example, is related to the viscosity of the batter or dough.

VITAL STATISTICS Figures on births, deaths, longevity, disease rates, and other data that indicate the state of health of a population.

VITAMIN One of a group of substances that in relatively small amounts are essential for life and growth.

WATER-EXTRACT Whatever can be removed or dissolved out of a substance with water. A substance like sugar is completely soluble in water, whereas when yeast is shaken up with water only a small portion of it goes into solution. What remains is insoluble and does not pass into the water-extract.

WAXY FLOUR A flour prepared from certain varieties of rice or corn that contain a type of starch that has waxy adhesive qualities. The flour acts as a stabilizer when it is used as an ingredient in sauces or gravies and binds the mixture together, so there is no separation when the mixture is frozen.

WHEAT GERM The heart or kernel of the wheat; the embryo, from which a new plant may develop.

WORK An accomplishment of body activity measurable in work units, such as foot-pounds.

XYLOSE A simple sugar obtained from the woody parts of plants by hydrolysis of the complex carbohydrates they contain.

YEAST One-celled fungi widely distributed in nature. Some convert sugar in fruit juices to alcohol. Some are used to produce carbon dioxide for a leavening agent in breadmaking.
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